Chapter 21

Environmental Offsets

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21. ENVIRONMENTAL OFFSETS

21.1 Introduction

The chapter outlines how the proponent proposes to establish biodiversity offsets for the project. Proposed offsets are based on impact estimates provided in **Chapter 18 – Terrestrial Ecology, Chapter 19 – Aquatic Ecology** and **Chapter 35 – Matters of National Environmental Significance**.

21.2 Regulatory Framework for Offsets

21.2.1 Commonwealth Government Offsets

The *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy (DSEWPaC, 2012) outlines the Australian Government's approach to the use of environmental offsets ('offsets') under the *Environment Protection and Biodiversity Conservation Act 1999 (*EPBC Act).

The EPBC Act Environmental Offsets Policy (EOP) defines offsets as measures that compensate for any residual adverse impacts of an action on the environment. This policy relates to all matters protected under the EPBC Act, including Matters of National Environmental Significant (MNES).

The policy has five key aims, to:

- ensure the efficient, effective, timely, transparent, proportionate, scientifically robust and reasonable use of offsets under the EPBC Act
- 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
- deliver improved environmental outcomes by consistently applying the policy
- outline the appropriate nature and scale of offsets and how they are determined
- provide guidance on acceptable delivery mechanisms for offsets.

21.2.2 Queensland State Government Offsets

The Queensland Government Environmental Offsets Policy (QGEOP) (EPA, 2008) sets principles for environmental offsets in Queensland. The policy defines environmental offset as an action taken to counterbalance unavoidable, negative environmental impacts that result from an activity or a development.

The QGEOP is based on seven policy principles that direct the way offsets must be used to contribute to ecologically sustainable development. These principles are:

- Principle 1: Offsets will not replace or undermine existing environmental standards or regulatory requirements, or be used to allow development in areas otherwise prohibited through legislation or policy
- Principle 2: Environmental impacts must first be avoided, then minimised, before considering the use of offsets for any remaining impact
- Principle 3: Offsets must achieve an equivalent or better environmental outcome
- Principle 4: Offsets must provide environmental values as similar as possible to those being lost

- Principle 5: Offset provision should minimise the time-lag between the impact and delivery of the offset
- Principle 6: Offsets must provide additional protection to environmental values at risk, or additional management actions to improve environmental values
- Principle 7: Offsets must be legally secured for the duration of the offset requirement.

The policy sets out the framework for applying "specific-issue" offsets policies for important environmental values such as vegetation and fish habitat. Those specific issues offset policies administers under the QGEOP are:

- Queensland Biodiversity Offsets Policy (DERM, 2011a)
- Offsets for Net Gain of Koala Habitat in Southeast Queensland Policy (DERM, 2010)
- Policy for Vegetation Management Offsets (DERM, 2011b)
- Marine Fish Habitat Offset Policy (DAFF, 2012).

21.2.3 Queensland Biodiversity Offsets Policy

The Department of Environment and Heritage Protection (EHP) administers the Queensland Biodiversity Offsets Policy (QBOP). The application of QBOP to development is described in section 5 of the policy (page 7) and the following is relevant to the project:

- this policy does not apply to development that is a significant project declared under section 26(1)(a) of the *State Development and Public Works Organisation Act 1971*

As such the QBOP may be considered to not apply to the project; however the Queensland Coordinator-General does have the delegation to apply the QBOP at his or her discretion to a project that has been declared a significant project under the Act.

In consideration of the above discretion, the proponent has proposed a practical strategy for offsetting significant impacts at the State level. All offsets proposed in this strategy will serve to benefit multiple species or communities at both the Commonwealth and State levels.

21.3 Environmental Values to be Offset

Environmental values of State and National significance that may be impacted by the project are discussed in **Chapter 18, Chapter 19 and Chapter 35**.

This section describes those environmental values that are proposed to be offset by the proponent.

Under the EOP offsets must be provided if significant adverse residual impacts (i.e. impacts after avoidance and mitigation measures) are likely on MNES. **Chapter 35** describes that significant residual impacts are likely for the following MNES:

- Threatened ecological communities (TECs)
  - Brigalow (*Acacia harpophylla*) dominant and co-dominant (Brigalow)
  - Semi-evergreen vine thickets of the Brigalow Belt (north and south) and Nandewar Bioregions (SEVT)
  - Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin (Natural grasslands)
- Threatened species
  - Ornamental snake *(Denisonia maculata)*.

21.3.1 Threatened Ecological Communities

Clearing for the establishment of open cut pits and supporting infrastructure associated with the project will result in an overall reduction in the extent of TECs in the project area. **Table 21-1** summarises the area of TECs within the project footprint, as represented by regional ecosystem (RE) classification.

Table 21-1 Area of Clearing for Listed TECs

TEC	REs represented	Impact area (ha)
Brigalow (*Acacia harpophylla*) dominant and co-dominant*	11.3.1	8.7
	High value regrowth (HVR) 11.3.1	11
	11.4.8	34.6
	11.4.9	62.2
	HVR 11.4.9	7.6
	11.5.16	190.4
	HVR 11.9.5	1.8
Total Brigalow		**316.3**
Natural grasslands	11.8.11	84.4
Semi-evergreen vine thicket	11.8.13	18.0

* Estimated areas for Brigalow TEC take into account the regrowth vegetation more than 15 years old which meets the listing requirements for the TEC (refer Environment Australia, 2001)

The proponent proposes to offset these areas.

21.3.2 Threatened Fauna Species

Vegetation associated with potential habitat for threatened species will be affected by project activities. The proponent proposes to offset an area of potential habitat for the ornamental snake (*Denisonia maculata*), listed as vulnerable under the EPBC Act, that may be impacted by the project. The area of potential habitat which is proposed to be offset corresponds to endangered and of concern REs associated with habitat requirements for the species which will be impacted within the project area. These impact areas proposed for offsets relating to the ornamental snake are presented in **Table 21-2**.

Table 21-2 Impacts on Potential Habitat for the Ornamental Snake and Proposed Offsets

REs associated with habitat requirements within the project area	RE biodiversity status	Proposed offset area (ha)
11.3.1	Endangered	8.7
HVR 11.3.1	Endangered	11.0
11.3.4	Of Concern	1.6
11.3.25	Of Concern*	8.7
11.4.2	Of Concern	156.4
11.4.8	Endangered	34.6
11.4.9	Engendered	62.2

REs associated with habitat requirements within the project area	RE biodiversity status	Proposed offset area (ha)
HVR 11.4.9	Engendered	7.6
11.8.11	Of Concern	84.4
11.8.13	Endangered	18.0
HVR 11.9.5	Endangered	1.8
	Total	**395.0**

* Listed as "Least Concern" under the *Vegetation Management Act 1999*

21.3.3 Offset Benefits for other Ecosystems and Species

There are unlikely to be significant residual impacts on listed threatened or migratory species, other than the ornamental snake, which have been addressed accordingly by offsets proposed in **Section 21.3**. These offsets will however result in offset benefits for other endangered and of concern REs and known or likely to occur threatened and migratory species under the EPBC Act that will be impacted by the project. The area of offset for these ecosystems and species are presented in **Table 21-3**.

Table 21-3 Offset Benefits for other Ecosystems and Species

Ecosystem or species	Biodiversity status	EPBC Act Status	Offset area (ha)
RE 11.3.4	Of concern	-	1.6
RE 11.3.25	Of concern*	-	8.7
RE 11.4.2	Of concern	-	156.4
Squatter pigeon	-	Vulnerable	10.3
Black-throated finch (southern)	-	Endangered	583.6
Australian painted snipe	-	Vulnerable	10.5
Eastern great egret	-	Migratory	8.7
White-bellied sea-eagle	-	Migratory	8.7
Latham's snipe	-	Migratory	8.7
Rainbow bee-eater	-	Migratory	585.4
Rufous fantail	-	Migratory	8.7
Cattle egret	-	Migratory	9.7
Fork-tailed swift	-	Migratory	585.4
White-throated needletail	-	Migratory	585.4

* Listed as "Least Concern" under the *Vegetation Management Act 1999*

21.4 Proposed Offset Approach

It is noted that land-based offsets proposed for the project under the EOP can only be legally secured through mechanisms available under Queensland law. Offsets are therefore limited by the nature of the

legal protection mechanisms available in Queensland, and the ability to reach an agreement with the Queensland Government.

The proposed offset approach is to initially locate offsets within parts of the project area (i.e. the mining leases (MLs) comprising the project) that are not identified for development. The proponent, and related companies, own several pastoral properties in the Brigalow Belt Bioregion and these have been assessed at the desktop level for biodiversity values. These properties will be used subsequent to the project area. Any values that cannot be offset within the project area or other proponent related properties will be located on third party properties, away from the project.

This method is considered to be the most effective, reliable and efficient approach available to achieve the offsets required whilst maintaining consistency with the applicable offset principles and policies.

21.4.1 Methodology for Identifying Potential Offsets

The identification of offsets for the impact areas listed in **Table 21-1** and **Table 21-2** was assessed at three scales (shown in **Figure 21-1**):

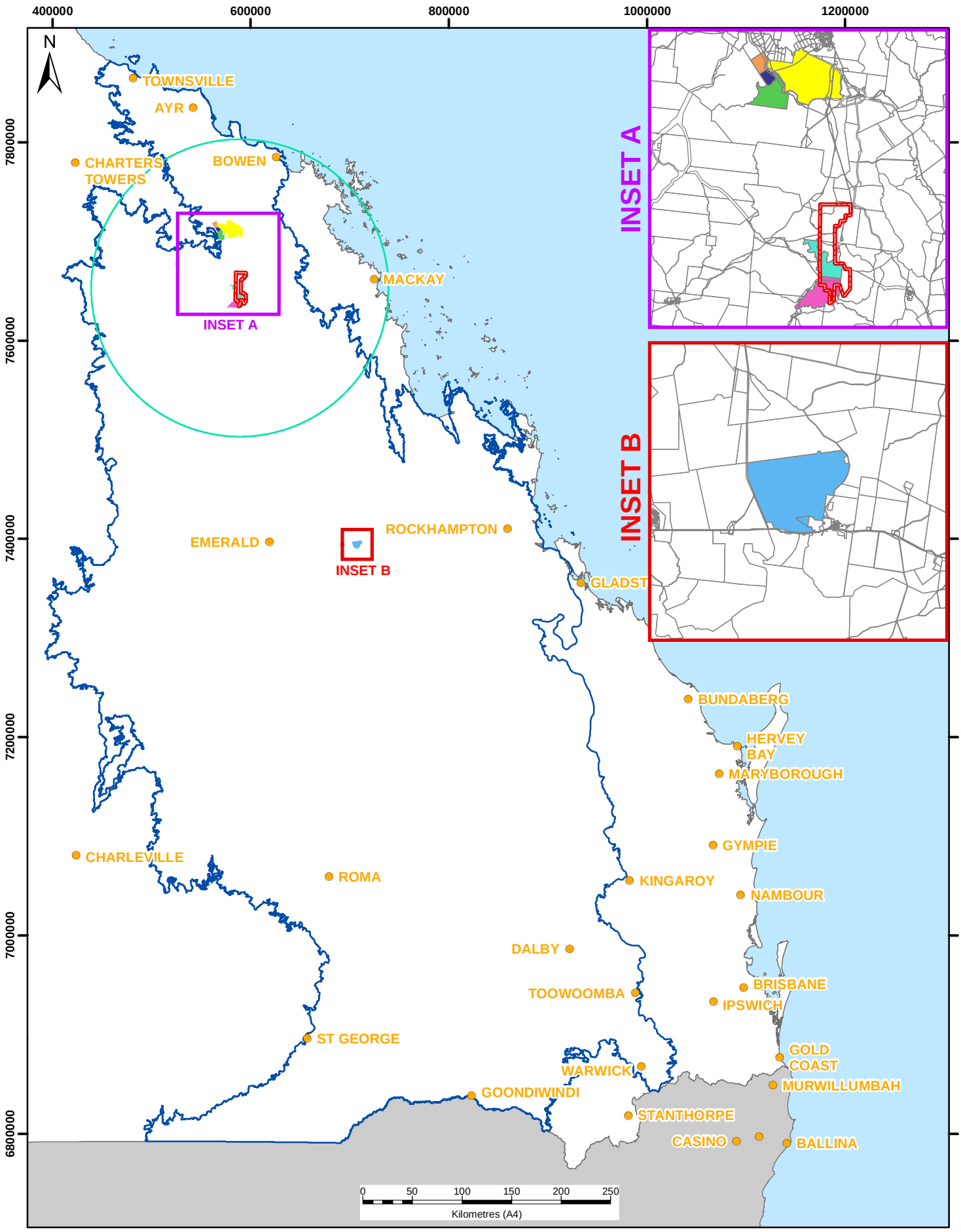
- on proponent related tenements and properties, particularly the Byerwen project tenements
- within 150 km of the project
- within the Brigalow Belt Bioregion.

The EOP contains the flexibility to allow offset obligations to be met with similar but not identical composition. For example, the Brigalow TEC contains 16 of the Queensland mapped REs that are dominated by *Acacia harpophylla* (Brigalow). The offset proposed may be for an identical RE to what is impacted or one of the other 15 REs which have been identified as Brigalow.

In the interest of securing good environmental outcomes, searches for potential offset areas focused on finding all obligations for each MNES in **Table 21-1** and **Table 21-2**, at the highest value impacted. For example, the analysis for the Brigalow TEC centred on only the equivalent REs as mapped by the Queensland Herbarium that have an endangered-dominant status under the VMA. The analysis then filtered the potential areas that would also satisfy the habitat requirement for the ornamental snake (i.e. those potential Brigalow TECs that were on deep cracking clay soils). This exercise was repeated for each of the MNES identified in **Table 21-1** and **Table 21-2**.

The Queensland RE mapping was utilised as a surrogate for the MNES during this process. At each of the above scales data was assessed and interrogated to evaluate potential offset areas. RE, HVR and pre-clear area datasets were intersected by Property Map Assessable Vegetation (PMAV) category X areas (being areas where the landowner has the existing right to clear the vegetation under the VMA). In addition, the analysis was designed to exclude all mining lease or protected areas, to find the first level of potential offset areas. These results were then further refined to show the areas that fell within either special features (e.g. biodiversity corridors as per the Biodiversity Planning Assessment) or within stream order (SO) buffers (e.g. a 100 m buffer of SO 3 – 4 and a 200 m buffer of SO5+) or a combination of both. At the 150 km and proponent related property scales the results from the pre-cleared area data were further analysed to find areas that fell within areas where the foliage predictive cover was greater than 11% (defined as the minimum coverage required for a functioning vegetation community).

A further calculation at the 150 km buffer and the proponent related property scale used searches for the dominant vegetation group within mixed polygons to locate further potential areas for analysis if the need arose.



Legend

- Project Area
- Brigalow Belt Bioregion Boundary
- Project Area 150km Buffer

Proponent Related Properties

- 1CP905226
- 1DK4
- 3DK114
- 3HT616
- 4DK114
- 618PH2106
- 689SP251696

Scales used for Identifying Potential Offsets	
Figure 21-1	**Byerwen Coal Project**
Date: *5/03/2013*	**Author:** samuel.ferguson
	Map Scale: 1:5,000,000
Revision: R1	**Coordinate System:** GDA 1994 MGA Zone 55
G:\CLIENT\SA-TO-D\BYEGEN - Byerwen EIS\GIS\Maps\EIS Chapters\EIS_Chpt_21_Offsets\BYEGEN_offsetproperties.mxd	

21.5 Delivery of Biodiversity Offsets

21.5.1 Process to Finalise and Secure Offsets

A process to finalise and deliver the offsets required for the project is illustrated below (**Figure 21-2**). The impacts of the project will be confirmed and refined during the final design phase of the project.

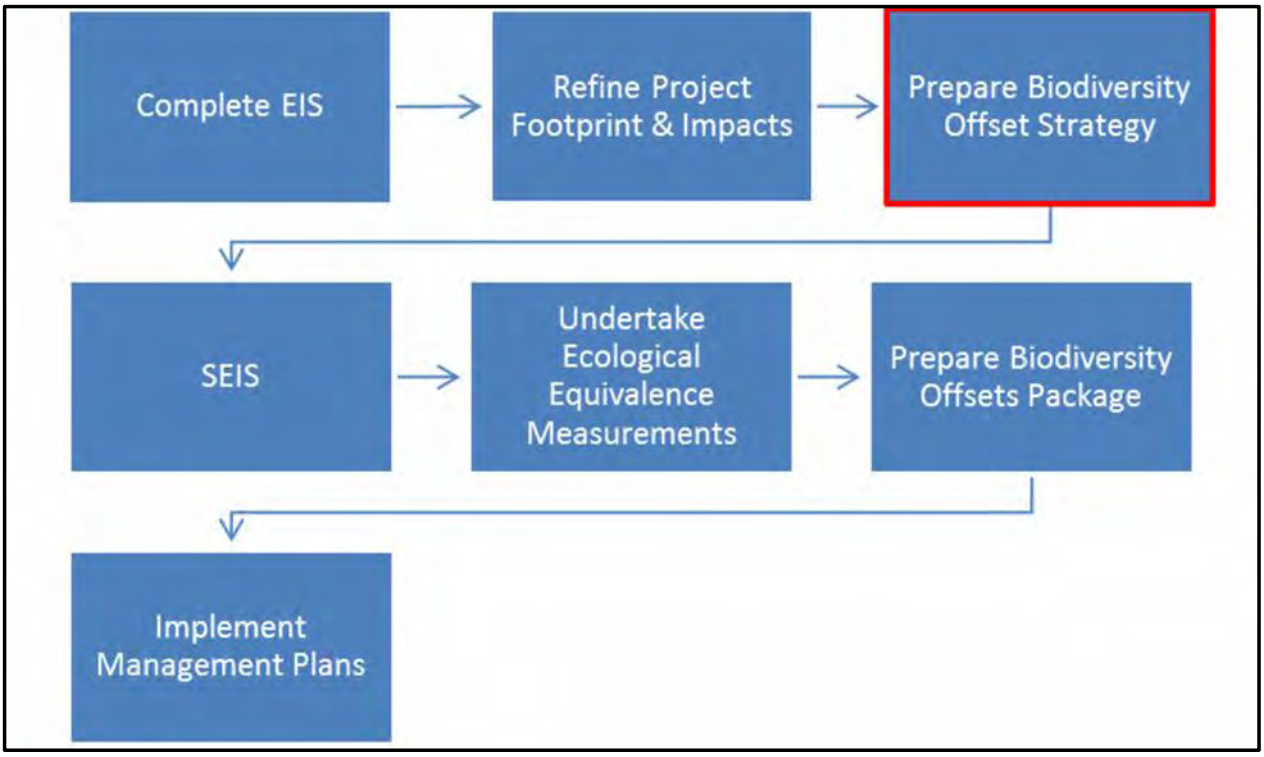


Figure 21-2 Process to Finalise Offset Requirements and Secure Offsets

A biodiversity offset package will then be prepared that will:

- address the requirements of the EOP for a land based offset
- identify the ecological score of the impact site
- identify the ecological score of the proposed offset site
- address the relevant approval conditions
- address any criteria required by the Queensland Government for the offset management plan develop an Offset Area Management Plan/s which will be as per the requirements of the EOP and the Voluntary Declaration
- secure a legally binding mechanism on Title.

21.5.2 Offset Availability on Proponent Related and Third Party Properties

After final impact and ecological equivalence methodology (EEM) calculations of the impact sites, non-development areas on proponent related tenements and properties will be assessed and utilised initially for offset supply. Subsequent to this, approaches will be made to landholders with potential offset sites to participate in the offset package. The approach to sourcing the offsets on the proponent related and third party properties will be to amalgamate areas of TECs and offset these areas into larger patch sizes

wherever possible. Additionally, offsets for MNES that can be co-located and/or where superior outcomes can be achieved, will be sourced wherever possible.

21.5.3 Securing Offsets

The next phase of the process post issue of the Environmental Authority (EA) for the project will be to undertake EEM assessments. Once the final obligation is determined, the next step will be to initiate discussions with the owners of each potential property to verify their willingness to participate in the provision of offsets and to field verify the RE and pre-clear mapping.

The principal management actions required in the Offset Area Management Plan will be negotiated with the regulator and landholders at this stage.

The preferred legally binding mechanism to secure the offsets is the Voluntary Declaration process as facilitated by the *Vegetation Management Act 1999* (VMA).

21.5.4 Proposed Timeframes

It is proposed that the proponent will enter into a Deed of Agreement (DOA) for the life of the project with EHP. Within twelve months (12 months) from the date that the DOA is signed by both parties, the proponent will submit, for approval, the offset package for the first 10 years of impact, which includes signed mechanisms to legally secure the offsets for the disturbance incurred, in a manner that meets the requirements set out in the EOP.

21.5.5 Ratios to be Applied to the Offsets

The EOP and QBOP do not specify ratios for calculating offset areas. Ratios are determined on a case-by-case basis, with consideration of several factors including the results of BioCondition and ecological equivalency assessments (Eyre et al. 2011; DERM 2011c). These ecological measurements are conducted on the impact as well as the offset sites to establish the final area required for the offset.

21.6 Available Offset Options

This assessment has been undertaken via desktop GIS analysis of the Queensland RE mapping version 6.1 as a surrogate for the TEC. Additionally the pre-clear, HVR v 2.1 and Biodiversity Planning Assessment (BPA) layers were added to the analysis. The target area for offsets was determined as the project with a buffer of 150 km applied around the development footprint.

The results of this assessment are displayed in **Table 21-4** for those potential offset areas available on the proponent related properties. In summary, there is excess suitable land available for use as offsets within a 150 km radius of the project. Depending on outcomes of detailed ecological equivalence assessment, if required, additional offset supply will be sourced outside of the 150 km radius.

21.6.1 Balance of Mining Lease outside the Impact Area

Options are likely to exist for at least five of the six RE based TEC offset targets to be located on the project area. Potential offset areas for habitat for the ornamental snake also occur on the balance of the project area in substantial quantities and additionally there are 9,700 ha of non-remnant areas that could be assessed for their offset potential if required for habitat.

Opportunities to offset the TECs of endangered SEVT (Broad Vegetation Group (BVG) 7a), Brigalow (BVG 25a) and Natural Grasslands (BVG 30b) on the project mining lease are particularly significant, because there are few opportunities to locate endangered communities in a secure location under the control of the project proponent that are of a significant scale and exist outside of areas covered by mining lease applications

21.6.2 Proponent Related Properties

Options are likely to exist for a number of offset targets to be located on the proponent related properties, as shown in **Table 21-4**.

Table 21-4 Potential Offset Opportunities on Proponent Related Properties

Value to be Offset		BVG	Impact Area (ha)	Potential for offsets (ha)	Potential offsets by BVG
RE	TEC				
11.3.1	Brigalow	25a	8.7	538.37	
HVR 11.3.1	Brigalow	25a	11.0		
11.4.8	Brigalow	25a	34.6	150.60	
11.4.9	Brigalow	25a	62.2	6,070.60	
HVR 11.4.9	Brigalow	25a	7.6		
11.5.16	Brigalow	25a	190.4	565.70	
HVR 11.9.5	Brigalow	25a	1.80	241.10	
		Total	**316.3**		**15,114**
11.8.11	Natural Grasslands	30b	84.4	499.00	1,128
11.8.13	SEVT	7a	18	2,731.20	3,171
11.4.2	-	17a	156.40	386.80	2,945
11.3.4	-	16c	1.6	104	104
11.3.25	-	16a	8.7	36	36

21.6.3 Within 150 km of the Project

Only areas of HVR mapped as PMAV category X were included in assessment. There are large areas available within the 150 km radius assessed to secure offsets for the RE and TEC based offsets.

A summary of potential offsets by BVG available within 150 km, on the project area and on proponent related properties, including candidate properties with sufficient potential offset to supply 3 times the impact area, is provided in **Table 21-5**.

Table 21-5 Potential Offsets Opportunities by BVG

Value to be Offset		BVG	Potential offsets by BVG within 150 km		Potential offsets by BVG on the project area	Potential offsets by BVG on proponent related properties
RE	TEC		Area (ha)	Candidate properties	Area (ha)	Area (ha)
11.3.1 HVR 11.3.1 11.4.8 11.4.9 HVR 11.4.9 11.5.16 HVR 11.9.5	Brigalow	25a	348,247	271	1,895	15,114
11.8.13	SEVT	7a	10,443	147	1,766	3,171
11.8.11	Natural Grasslands	30b	62,873	145	1,769	1,128
11.4.2	-	17a	205,449	247	348	2,945
11.3.4	-	16c	14,829	153	3.6	97
11.3.25	-	16a	16,167	207	13.6	22

21.6.4 Third Party Properties within the Brigalow Belt Bioregion

The assessment of the Brigalow Belt Bioregion offers many opportunities to offset the impact. At this scale of area, only the potential offsets available via remnant or HVR vegetation were assessed. Again, all potential impacts were able to be accommodated within the Bioregion.

The further refinements of adding the filter of special features and stream orders greater than 3 were also added to the filter, and again all potential impacts were accommodated.

21.7 The Means by which the Offsets will be Secured and Managed

Provided below are details relating to the mechanisms to be used to secure offset sites for the project. Details are also provided regarding the preparation of Offset Area Management Plans (OAMPs), which will outline the ongoing management actions required at each site.

21.7.1 Legally Secured Offsets

All direct offset sites will be secured using one of the legally binding mechanisms on Title that are available to ensure the protection of the offset and implementation of the OAMPs. These legally binding mechanisms are:

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

The mechanisms adopted to secure offsets will ultimately depend upon the mechanisms available and agreed to by the relevant parties.

21.7.2 Management of Offset Sites

OAMPs will be prepared for each offset site in accordance with the specific requirements contained within the EOP and the requirements for using a Voluntary Declaration. The OAMPs will include, but are not limited to, information on the threats and the management actions required on each offset site to abate those threats. Each OAMP will contain an estimate of the costs of management and the reporting and monitoring program that will extend until the management outcomes are achieved or the expiration of the Environmental Authority, whichever occurs first.

Management actions recommended could include:

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

The length of active management will be influenced by the condition of vegetation, type of habitat and vegetation on site, as well as existing management issues.

21.7.3 Monitoring and Reporting on Progress of Legally Secured Offsets

Regular monitoring and reporting on the progress of the offset will be provided to the regulator with biennial photo point monitoring to be conducted and, every seven years, BioCondition assessment(s) to be conducted at the same location(s) as the photo points. These monitoring actions will provide a record of comparability over the term of the offset and the overall progress of the offset in returning to remnant vegetation status.

Weed monitoring will be conducted annually by the land manager and recorded. These records will be incorporated into reports to the regulator as per the above schedule of monitoring and reporting.

21.8 Conclusion

Environmental values of State and National significance will be impacted by the project. The EPBC Act Environmental Offsets Policy (EOP) and Queensland Government Environmental Offsets Policy (QGEOP) set out principles for environmental offsets.

Under EOP, offsets must be provided if significant adverse residual impacts (i.e. impacts after avoidance and mitigation measures) are likely on MNES. **Chapter 35** describes that significant residual impacts are likely for the following MNES:

- Threatened ecological communities (TECs)
  - Brigalow (*Acacia harpophylla*) dominant and co-dominant (Brigalow)
  - Semi-evergreen vine thickets of the Brigalow Belt (north and south) and Nandewar Bioregions (SEVT)
  - Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin (Natural grasslands)
- Threatened species
  - ornamental snake *(Denisonia maculata)*.

The proponent proposes to offset areas of TECs within the project footprint and an area of potential habitat for the ornamental snake corresponding to endangered and of concern REs associated with habitat requirements for the species which will be impacted by the project.

The proposed offset approach is to initially locate offset areas within parts of the project area (i.e. the mining leases (MLs) comprising the project) that are not identified for development. Proponent related companies own several pastoral properties in the Brigalow Belt Bioregion and these have been assessed for both National and State significant biodiversity values and these properties will be used for offsets subsequent to the project area. Any values that cannot be offset within the project area or other proponent related properties will be located on third party properties, away from significant mine development areas.

An assessment of available offset options revealed there is excess suitable land available for use as offsets within a 150 km radius of the project. Depending on outcomes of detailed ecological equivalence assessment, if required, additional offset supply will be sourced outside of the 150 km radius.

All direct offset sites will be secured using one of the legally binding mechanisms on Title that are available to ensure the protection of the offset and implementation of the Offset Area Management Plans (OAMPs).

Regular monitoring and reporting on the progress of the offset will be provided to the regulator and will provide a record of comparability over the term of the offset and the overall progress of the offset in returning to remnant vegetation status.