Matters of National Environmental Significance Management Plan Annual Report – 2020/2021

Meteor Downs South Rail Loop Project

Sojitz Blue Pty Ltd

APPROVALS

Rev	Date	Description
0	16 June 2021	Draft issued for client review
1	28 June 2021	Final report addressing client comments

	Name	Position	Date
ORIGINATORS	Dean Orrick Rose Easton	Ecologist Environmental Scientist	28 June 2021
APPROVER	Dr Jarrad Cousin	Principal Ecologist	28 June 2021

CO2 Australia recognises the First Nations of Australia. We acknowledge the Traditional Custodians who have lived on and cared for Country, and their continuing connection to the land, and extend our respects to all First Nations Peoples.

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ABBREVIATIONS AND ACRONYMS

DAWE	Commonwealth Department of Agriculture, Water and the Environment
EA	The Environmental Authority (EA0001828) for the Meteor Downs Rail Loop
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
ha	Hectare
MDS Project	The Meteor Downs South Coal Project
MDS Rail Loop Project	The Meteor Downs South Rail Loop Project
MNES	Matters of National Environmental Significance
Rail Loop MNESMP	Matters of National Environmental Significance Management Plan for the MDS Rail Loop Project
RE	Regional Ecosystem
Sojitz Blue	Sojitz Blue Pty Ltd
TEC	Threatened Ecological Community

1 INTRODUCTION

1.1 BACKGROUND

Sojitz Blue Pty Ltd (Sojitz Blue) operates the Meteor Downs South Project (MDS Project) in central Queensland on behalf of its joint venture partner U & D Mining Industry (Australia) Pty Ltd (U&D). The MDS Project is a small open cut coal mining operation located between Rolleston and Springsure in the Central Highlands Regional Council local government area in Queensland.

In order to transport coal from the MDS Project, Sojitz Blue has constructed a rail loop off the existing Blackwater rail system (the MDS Rail Loop Project). The rail loop is located approximately 3 km from the MDS Project access road intersection with the Dawson Highway (Figure 1). A load-out facility, stockpile pad and buildings (office, crib room, control room and ablutions block) have also been constructed as part of the MDS Rail Loop Project.

The MDS Rail Loop Project was subject to a separate approval process to the MDS Project and was approved by the Commonwealth Department of the Environment and Energy (now the Department of Agriculture, Water and the Environment) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 19 December 2019 (EPBC 2019/8482). State Government environmental approval was granted by the Queensland Department of Environment and Science in June 2019 (Environmental Authority EA0001828).

A Matters of National Environmental Significance Management Plan (hereafter Rail Loop MNESMP) was developed by SLR Consulting Australia Pty Ltd (SLR 2019a) as part of the EPBC Act approval process. The Rail Loop MNESMP details how direct and indirect impacts to the following matters of national environmental significance (MNES) will be managed over the life of the project:

- Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin threatened ecological community (Natural Grasslands TEC)
- King blue-grass (*Dichanthium queenslandicum*).

Condition 6 of the EPBC Act approval requires the implementation of the Rail Loop MNESMP.

1.2 PURPOSE AND SCOPE

The Rail Loop MNESMP requires the submission of an annual report to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) by 30 June each year, documenting the implementation of and adherence to the Rail Loop MNESMP.

This report has been prepared by CO2 Australia Limited (CO2 Australia) on behalf of Sojitz Blue for the reporting period from July 2020 to June 2021. The scope of this report includes:

- current project details, including relevant contacts
- climatic conditions during the reporting period
- activities undertaken during the reporting period including:
  - construction and operational activities
  - mitigation and management measures
  - monitoring activities
- an assessment of the adherence to the performance criteria set out in the Rail Loop MNESMP
- a description of the potential threats and risks to MNES

- proposed amendments to be made to the Rail Loop MNESMP
- details of any corrective actions required to be implemented
- a management, monitoring and reporting schedule for the next reporting period (i.e. July 2021 to June 2022).

2 PROJECT DETAILS

Relevant approval and contact details for the MDS Project are provided in Table 1.

Table 1: Project details

Meteor Downs South Project	
Lot Plan Locations	Lot 56 on DSN808
EPBC Act Reference No.	EPBC 2019/8482
Queensland Government Environmental Authority	EA0001828
Project Contact	Alec Richards Environmental Advisor Sojitz MDS Mining Pty Ltd arichards@sojitzblue.com.au

148°10'0"E

148°20'0"E

24°10'0"S

24°20'0"S

24°30'0"S

Springsure

5 Mile Reserve

Cairdbeign

Joes Plain Reserve

DAWSON HWY

Orion

Albinia

Meteor Park

Mount Hope State Forest

Sojitz Blue Pty Ltd

Location diagram

Figure 1
MDS Rail Loop location

- Population centres
- MDS Project (ML70452)
- MDS Rail Loop

Roads

- State-controlled roads
- Regional access
- Local access

DATA SOURCE:
The following datasets are © State of Qld:
- Cadastral Data (Qld DCDB)
- Population centres
- Roads
- Mining Leases

Information provided by Sojitz
- MDS Rail Loop project area

Date: 6/16/2021 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:150,000@A3

0 1.5 3 4.5 6
Kilometres

N

CO2 Australia

Path: P:\GISData\Projects\Sojitz\925_20210614_Annual_report_figures\MNESMP_RAIL_LOOP_annual_report_Figure_1_Rail_Loop_Location.mxd

3 CURRENT CONDITIONS

During the 2020/2021 management period, a total of 528 mm of rain was recorded at the nearest weather station (Comet Street, Springsure #35065, ~45 km north of the MDS Project Rail Loop) which was 77% of the long-term annual average of 685.3 mm. Notably, the months of April and May leading up to the post-wet season survey only received a total of 7 mm of rain.

The temperature data indicated mean maximum and minimum temperatures were similar to the long-term average from 10 of the 12 months, with the mean maximum and minimum temperatures during the management period ~0.5°C and ~0.6°C above the long-term average, respectively.

In summary, the climate conditions during the 2020/2021 management period could be characterised as being somewhat warmer and drier than normal.

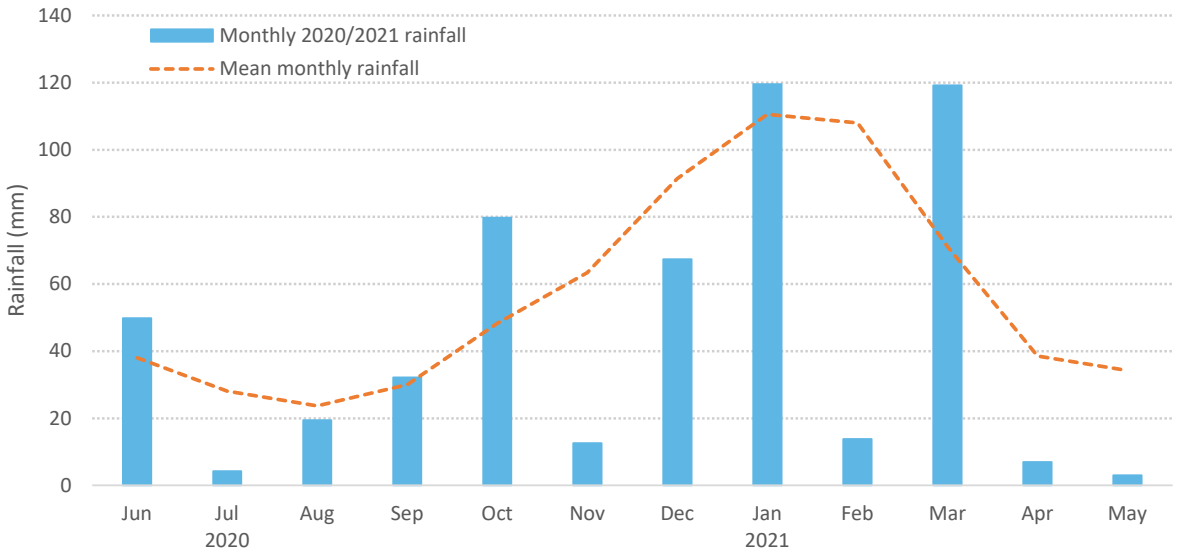

Figure 2: Rainfall recorded during the 2020/2021 management period.

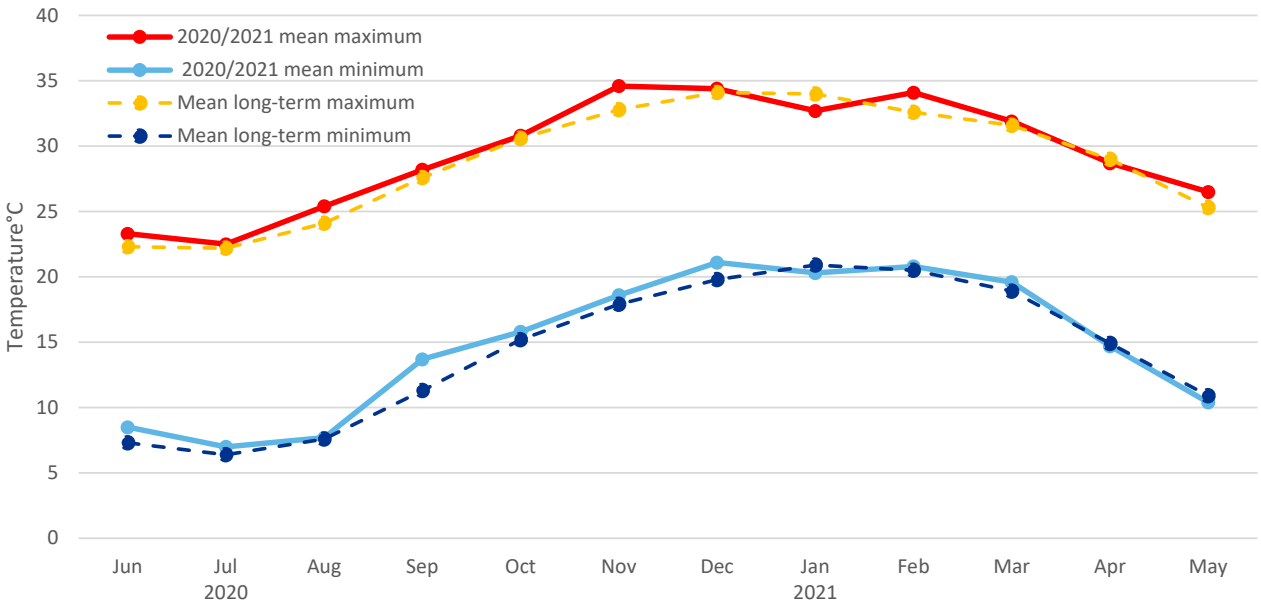

Figure 3: Temperature recorded during the 2020/2021 management period.

4 REPORTING PERIOD ACTIVITIES

4.1 CONSTRUCTION AND OPERATION

All works commencing in February 2020 for the construction of the MDS Rail Loop Project site were completed at the end of July 2020. No further construction works occurred during the current 2020/2021 reporting period.

4.2 MITIGATION AND MANAGEMENT MEASURES

Sections 4.2.1 to 4.2.6 summarise the measures undertaken during the 2020/2021 reporting period to mitigate and manage impacts to MNES on the MDS Rail Loop Project site.

4.2.1 Vegetation clearing controls

As detailed in Section 4.1, construction works including clearing of vegetation, were completed in July 2020. Weighbridge construction for haulage trucks was completed in May 2021. As per the requirements of the Rail Loop MNESMP, the following mitigation and management measures were implemented as part of the vegetation clearing works:

- vegetation clearing boundaries were clearly demarcated prior to vegetation clearing works
- environmental awareness training was developed and provided to all personnel as part of the site induction
- a permit to disturb system was implemented
- the total area of MNES habitat cleared was monitored (see Section 4.3.1).

4.2.2 Weed control

The MDS Project Weed and Pest Management Plan (Sojitz 2018) has been developed for the MDS Project site and will be applied at the MDS Rail Loop Project site. The following measures were undertaken to prevent the introduction, establishment and spread of weeds and pest on the MDS Rail Loop Project site:

- Construction of a weed wash-down facility was completed at the MDS site in April 2021.
- Weed surveys have been carried out as part of the monitoring activities in this reporting period (see Section 4.3.6).

4.2.3 Erosion and sediment control

Permanent erosion and sediment controls have been established around the fill and coal stockpiles to prevent the degradation of adjacent areas of MNES habitat.

4.2.4 Dust suppression

Vegetation clearing works have been limited to the MDS Rail Loop Project footprint, with all clearing completed as part of the construction. There was no issues attributable to dust observed in either the dry season survey (November 2020) or the post-wet season survey (May 2021)(Section 4.3.8).

4.2.5 Fire prevention and preparedness

No uncontrolled fires occurred on the MDS Rail Loop Project site during the 2020/2021 reporting period. Appropriate firefighting equipment was made available and all personnel and contractors were provided with training.

4.2.6 Rehabilitation

No rehabilitation activities occurred during the 2020/21 monitoring period. Now that all construction has been completed, rehabilitation of temporary areas will be scheduled.

4.3 MONITORING ACTIVITIES

Details and results of monitoring activities undertaken during the 2020/21 reporting period are presented below in Sections 4.3.1 to 4.3.7. Table 2 describes the organisations that implemented each of the monitoring programs under the Rail Loop MNESMP.

Table 2: Persons undertaking monitoring

Monitoring Activity	Organisation
General site inspections	CO2 Australia
Vegetation clearing reconciliation	Sojitz Blue
Habitat condition assessments	CO2 Australia
Targeted flora and fauna surveys	CO2 Australia
Weed surveys	CO2 Australia
Biomass monitoring	CO2 Australia
Photo monitoring	CO2 Australia
Dust monitoring	Sojitz Blue

4.3.1 Monitoring of vegetation clearing

All vegetation clearing works for the MDS Rail Loop Project have been restricted to the project footprint defined in the Rail Loop MNESMP (Figure 4). Consequently, the maximum area of natural grasslands TEC and king blue-grass habitat permitted to be disturbed under the EPBC Act approval has been cleared for the MDS Rail Loop Project (Table 3).

Table 3: Vegetation clearing impacts

MNES	Area cleared to June 2021	Maximum disturbance limits (ha) – EPBC Act approval (EPBC 2019/8482)*	% of actual disturbance limit cleared
Natural grasslands TEC	77	77	100
King blue-grass	19.5	19.5	100

* The Rail Loop MNESMP requires that clearing works do not exceed the disturbance limits specified in the EA. As no clearing limits are specified in the current EA (EA0001828), the maximum disturbance limits in the EPBC Act approval have been used for the purposes of this report.

148°26'E

148°27'E

24°22'S

24°23'S

Sojitz Blue Pty Ltd

Location diagram

Figure 4
Clearance Area

Disturbance areas
MDS Rail Loop site

Ground-truthed REs
RE 11.8.11
RE 11.8.11/11.8.5
RE 11.3.3a

Brisbane

DATA SOURCE:
The following datasets provided by Sojitz
- Disturbance areas
- Ground-truthed REs

0 100 200 300 400
Metres

N

CO2 Australia

Date: 6/16/2021 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:9,000@A3

Path: P:\GISData\Projects\Sojitz\925_20210614_Annual_report_figures\MNESMP_RAIL_LOOP_annual_report_Figure_4_Clearance_Area.mxd

4.3.2 General site inspections

In accordance with the Rail Loop MNESMP, general site inspections were undertaken during both dry season and post-wet season site visits. No concerns were noted regarding the condition of fencing or gates during the general site inspections.

The condition of fencing and gates at the MDS Rail Loop during the post-wet season surveys was still in good condition, and no impacts from dust or particulate matter were observed. It was noted that weed cover measured as part of BioCondition assessments are higher than previous surveys at most sites, particularly at site 04 which is adjacent to the Dawson Highway. Non-native grass species form the majority of weed incursion in the MDS Rail Loop site.

4.3.3 Habitat monitoring

Habitat condition assessments

Habitat condition assessments were conducted in May 2021 at four permanent monitoring sites. Figure 5 shows the locations of each habitat monitoring site. These surveys represent habitat condition assessments during the year 2 management period at the MDS Rail Loop monitoring sites.

Site context was also assessed as part of the habitat condition assessments. Table 4 summarises the site condition and site context scores for each of the four monitoring sites. A detailed description of the habitat condition assessments is provided in the Post-wet Season Monitoring Report (2020/2021) (CO2 Australia 2021) in Appendix A.

The results of the habitat condition assessments were used in the calculation of habitat quality scores for each MNES.

Table 4: Site condition and site context scores at each habitat monitoring sites in May 2021

Site	RE	Site condition score (/10)	Site context score (/10)
MDSRL01	11.8.11	5.67	10.00
MDSRL02	11.8.11	6.17	8.85
MDSRL03	11.8.11	5.67	8.85
MDSRL04	11.8.11	4.17	8.85
Average score		**5.42**	**9.13**

MNES habitat quality scores

Habitat quality scores for each MNES were calculated using a combination of the site condition and site context scores from the habitat condition assessments. The calculation of a habitat quality score for king blue-grass also included species presence index which was informed by targeted surveys for the species.

Table 5 presents the habitat quality scores for the 2020/2021 reporting period for each MNES.

Based on the results of the site condition and assessments, habitat quality scores for the two MNES averaged 7.14 out of 10 for Natural grasslands TEC and 5.71 out of 10 for king blue-grass (Table 5). King blue-grass had the lower score of the two MNES (5.71) on account of the absence of any confirmed king-blue grass tussocks within the surveyed plots at the time of surveying.

148°26'E

148°27'E

24°22'S

24°23'S

MDSRL01

MDSRL02

MDSRL03

MDSRL04

MDSRL05

Sojitz Coal Mining Pty Ltd - MDS Rail Loop

Figure 5
Monitoring sites

Disturbance areas
MDS Rail Loop site
Watercourse

Ground-truthed REs
RE 11.8.11
RE 11.8.11/11.8.5
RE 11.3.3a

Habitat monitoring site
Habitat monitoring plots
Weed monitoring plots

DATA SOURCE:
The following datasets provided by Sojitz
- Disturbance areas
- Ground-truthed REs

Date: 6/16/2021 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:9,000@A3

0 100 200 300 400
Metres

N

CO2 Australia

Location diagram

Brisbane

Path: P:\GISData\Projects\Sojitz\925_20210614_Annual_report_figures\MNESMP_RAIL_LOOP_annual_report_Figure 5 - MDS RAIL LOOP monitoring sites.mxd

Table 5: Monitoring sites showing their habitat quality scores contributing to MNES

Site	RE	Natural Grasslands TEC	King blue-grass
MDSRL01	11.8.11	7.68	6.14
MDSRL 02	11.8.11	7.41	5.93
MDSRL 03	11.8.11	7.14	5.71
MDSRL 04	11.8.11	6.34	5.07
	Average score	**7.14**	**5.71**

Figure 6 shows the change in the habitat quality scores for each MNES between 2019 and 2021.

The Natural Grasslands TEC and King blue-grass habitat quality score decreased between the 2019/20 and 2020/21 monitoring period. Natural Grassland TEC habitat quality score decreased from 7.83 to 7.14 out of 10 whereas the King blue-grass habitat quality score decreased from 6.27 to 5.71 out of 10 (Figure 6), indicating gradual degradation in habitat quality for both MNES.

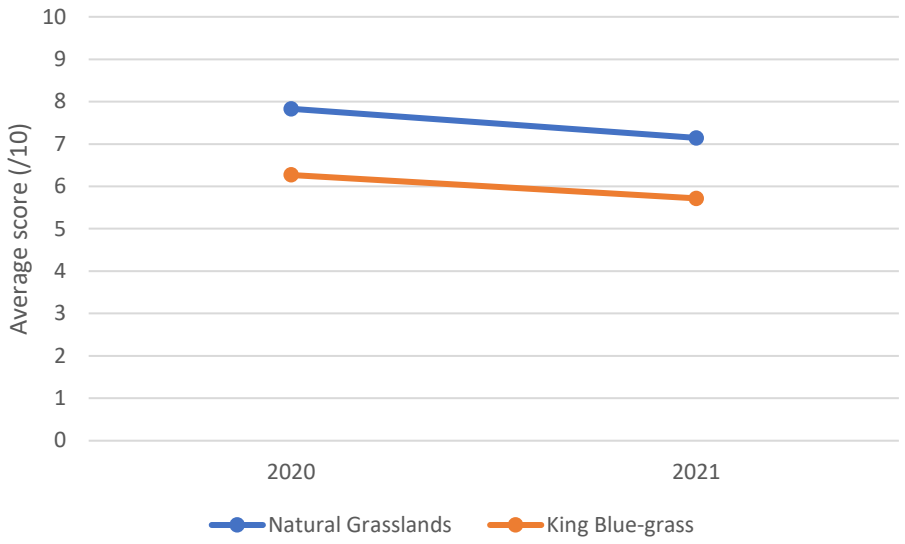

Figure 6: Changes in habitat quality scores for MNES between 2020 and 2021.

4.3.4 Photo monitoring

Photo monitoring was undertaken as part of the post-wet season surveys in May 2021. Photos were taken at the four habitat monitoring sites (Figure 5). Five photos were taken at each monitoring point from a height of approximately 1.5 m looking north, east, south and west with a ground photo taken looking down at an angle of 45°.

Photo monitoring of the MDS Rail Loop site showed relatively consistent levels of biomass, characterised by a moderate grass cover. Whereas many areas of comparable RE 11.8.11 on the MDS project site showed dense grass cover, the MDS Rail Loop site was not consistent with this, despite being represented by the same vegetation community. This is likely a consequence of historical disturbance, with the current condition an indication that the site is in a state of recovery. Ongoing management and photo monitoring should detect that change over time, as the grassland continues to recover.

The results from the photo monitoring are presented in the Post-wet Season Monitoring Report (2020/2021) (CO2 Australia 2020) in Appendix B.

4.3.5 Targeted surveys

Targeted surveys were undertaken for king blue-grass during the 2020 post-wet season surveys. King blue grass was not observed within the MDS Rail Loop Project area.

It should be noted that King blue-grass was detected by SLR Consulting Australia Pty Ltd (SLR) within the MDS Rail Loop Project area in June and July of 2019 (SLR 2019b). It is likely that king blue-grass was not detectable during the 2021 post-wet season surveys and may still be present. Further targeted searches for king blue-grass will be conducted during the 2021/22 monitoring period.

4.3.6 Weed monitoring

Weed surveys were undertaken as part of the dry season surveys in November 2020 at five permanent weed monitoring plots (Figure 5). These surveys, while within year 2 of management of the MDS Rail Loop project area, are representative of the baseline surveys given they are the first of the dry season weed monitoring surveys at the site.

A total of eight weed species were identified from the five weed monitoring plots at the MDS Rail Loop project area. No additional species of weeds were observed on the site outside of those identified within the weed monitoring plots. Across the five weed monitoring plots, the average number of weed species observed per plot was 5.6 species, ranging between four species (Site MDSRL05) and seven species (Site MDSRL04) with only one weed species (*Leucaena leucocephala*) encountered at a single site. Weed cover across the five weed monitoring plots averaged 8.3%; ranging between 2.9% (Site MDSRL05) and 14% (Site MDSRL02) (Table 6 and Figure 7).

The most encountered weeds were *Setaria incrassata* and *Physalis lanceifolia*, each recorded from all five sites (Table 11). However, while encountered at all sites, the average cover of *Physalis lanceifolia* across those five encountered sites averaged only 0.4%, whereas *Setaria incrassata* had the highest average cover of 5.4%. *Cenchrus ciliaris* was encountered at three of the five sites, but had the second highest average cover, averaging 2.1% cover across the three sites it was recorded from.

Table 6: Results of weed monitoring assessments at the MDS Rail Loop site.

Scientific name	Common name	Family name	Percentage cover of weed species from given site					# sites	Avg cover (%)[a]
			MDSRL01	MDSRL02	MDSRL03	MDSRL04	MDSRL05		
Alternanthera pungens	Khaki weed	Amaranthaceae	0.1	0.1	0.2	0.5		4	0.2
Parthenium hysterophorus	Parthenium weed	Asteraceae	0.6		0.1	0.9		3	0.5
Leucaeana leucocephala	Leucaena	Fabaceae		0.1				1	0.1
Cenchrus ciliaris	Buffel grass	Poaceae	1.3	4.8		0.1		3	2.1
Melinis repens	Red natal grass	Poaceae	1.4		0.1	1.5	0.1	4	0.8
Setaria incrassata	Purple pigeon grass	Poaceae	2.6	8.5	7.4	6.9	1.7	5	5.4
Physalis lanceifolia	Gooseberry	Solanaceae	0.1	0.5	0.2	0.4	0.6	5	0.4
Verbena officinalis	Common verbena	Verbenaceae			0.2	0.1	0.5	3	0.3
		# species	**6**	**5**	**6**	**7**	**4**		
		Weed cover (%)[b]	**6.0**	**14.0**	**8.2**	**10.4**	**2.9**		

[a] Avg cover (%) represents the average percentage cover of a given weed species across encountered sites.

[b] Weed cover represents the sum of the average weed cover percentages of all weed species.

148°26'E

148°27'E

24°22'S

24°23'S

6
MDSRL01

4
MDSRL05

5
MDSRL02

6
MDSRL03

7
MDSRL04

5 ← Number of weed species within weed monitoring plot

Weed monitoring plot symbolising % weed cover

09 ← Weed monitoring plot number

Sojitz Blue Pty Ltd

Figure 7
MDS Rail Loop
Weed monitoring results

Disturbance areas
MDS Rail Loop site
Watercourse

Ground-truthed REs
RE 11.8.11
RE 11.8.11/11.8.5
RE 11.3.3a

Weed monitoring plots

Weed cover (%)
< 5
6 - 10
11 - 15
16 - 25
26 - 50
51 - 100

DATA SOURCE:
The following datasets provided by Sojitz
- Disturbance areas
- Ground-truthed REs

0 100 200 300 400
Metres

N

CO2 Australia

Date: 6/26/2021 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:9,000@A3

Location diagram

Brisbane

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4.3.7 Biomass monitoring

Biomass monitoring at the MDS Rail Loop project site was undertaken during both the dry season and post-wet season surveys of the 2020/2021 management period. Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for monitoring all four of the sites comprising RE 11.8.11 (Table 7). Where the observed biomass at a site was mid-way between two photos within a given biomass standard, the middle of the corresponding range was reported (i.e. observed biomass between 3,015 kg/ha and 3,850 kg/ha 'Downs country' photo standards was reported as 3,433 kg/ha).

Biomass monitoring showed limited variability in biomass of ground cover within seasons across all four photo monitoring sites. During the dry season, there was a moderate biomass for the vegetation type, with a biomass ranging between 2,140 kg/ha and 2,578 kg/ha. During the post-wet season, biomass was higher than the dry season surveys, ranging from 3,015 and 4,445, indicating that biomass within these RE 11.8.11 sites is a function of seasonality. Post-wet season biomass in 2021 was also higher than those recorded in the same season of 2020, likely due to greater rainfall in the months leading up to the 2021 post-wet season surveys. Results of biomass surveys are presented in Table 7 and represented graphically in Figure 8.

Table 7: Results of biomass monitoring on the MDS Project site using Brigalow Belt Future Beef pasture photo standards

Photo monitoring site*	RE type	Brigalow Belt Future Beef pasture photo standard type Downs country	2020 post-wet season biomass kg/ha	2020 dry season biomass kg/ha	2021 post-wet season biomass kg/ha
MDSRL01	11.8.11	✓	3,015	2,578	3,850
MDSRL02	11.8.11	✓	2,578	2,140	3,015
MDSRL03	11.8.11	✓	2,140	2,140	3,015
MDSRL04	11.8.11	✓	3,015	2,578	4,445

* taken from the 50 m point of the permanent habitat monitoring transect.

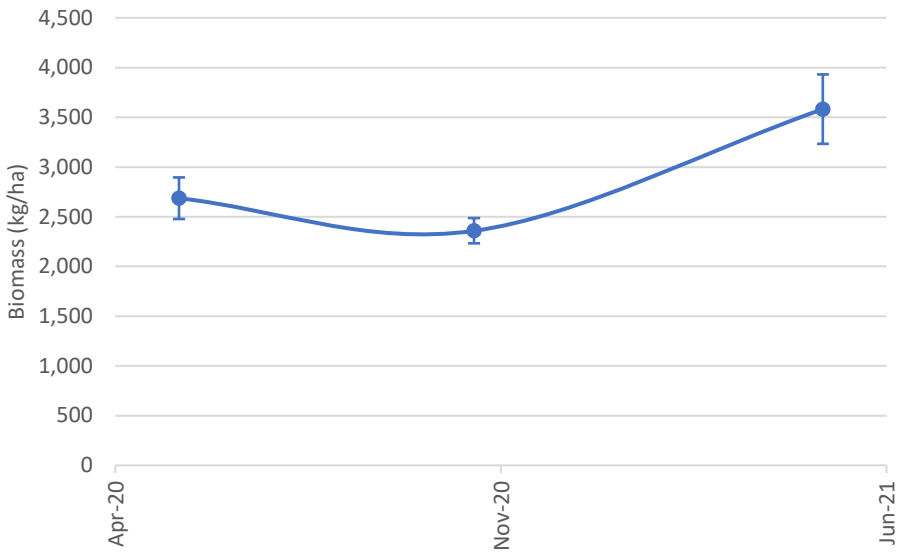

Figure 8: Graphical representation of the change in biomass at the MDS Rail Loop project site between June 2020 and May 2021.

4.3.8 Dust Monitoring

As per the Rail Loop MNESMP, two dust monitoring gauges have been installed at the MDS Rail Loop site. Dust levels at the dust gauges have been monitored in accordance with the *Australian Standard AS3580.10.1 Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited Matter – Gravimetric method*.

The results from the dust deposition monitoring at the two dust monitoring gauges for the reporting period are presented in Table 8.

The performance criteria relating to dust deposition in the Rail Loop MNESMP requires that dust deposition not exceed 120 mg/m^2/day, averaged over one month when measured at any sensitive or commercial place. Results of the dust monitoring from the 2020/21 reporting period identified a number of the sites exceeding 120 mg/m^2/day (see bold figures in Table 8), however none of the dust monitoring sites are located at a sensitive receptor as defined under the Project's EA.

Additionally, no evidence of dust or other particulate material on the vegetation within the MDS Rail Loop Project site was observed during the general site inspections (Section 4.3.2).

Table 8: Results of dust monitoring during the 2020/21 reporting period

Site	MNES habitat represented by the site	Total Solids (g/m²/month)							
		2 March 2020 to 2 April 2020	2 April 2020 to 30 April 2020	30 April 2020 to 28 May 2020	28 May 2020 to 23 June 2020	23 June 2020 to 13 July 2020	10 August 2020 to 10 September 2020	18 November 2020 to 18 December 2020	22 March 2021 to 19 April 2021
DMS7	Natural grassland TEC and king blue-grass habitat	**167**	**170**	**147**	**143**	**213**	63	**153**	37
DMS8	Natural grassland TEC and king blue-grass habitat	**350**	117	**186**	120	**147**	30	120	37

5 ADHERENCE TO PERFORMANCE CRITERIA

Table 9 provides an assessment of the adherence to the performance criteria set out in the Rail Loop MNESMP. It also includes details of any corrective actions that have been undertaken, or will be undertaken, based on the monitoring results obtained during the reporting period.

Table 9: Adherence to performance criteria

Management objective	Success metric	Adherence to success metric	Corrective action
Avoid and minimise loss of natural grasslands on and King blue-grass habitat around the project site.	Grassland habitat outside the proposed disturbance footprint is maintained, with no clearing occurring as a result of the project.	As outlined in Section 4.3.1, no clearing has occurred outside of the project footprint as defined in the Rail Loop MNESMP. The maximum area of Natural Grassland TEC and king blue-grass habitat permitted to be disturbed under the EPBC Act approval has been cleared for the MDS Rail Loop Project.	No corrective action required.
Avoid and minimise loss of natural grasslands on and King blue-grass habitat around the project site.	Rehabilitation of disturbed areas in the project site no longer required for operation of the rail facility.	As detailed in Section 4.2.6, no rehabilitation activities have been undertaken within the MDS Rail Loop project area.	No corrective action required.
Prevent the decline of TEC and King blue-grass habitat quality in the Project management area.	Habitat quality is maintained or increased according to diagnostic conditions for natural grasslands (TSSC 2009).	As detailed in Section 4.3.3, habitat quality assessments were completed as part of the 2021 post-wet season surveys. Results of the habitat quality assessments indicate that the habitat condition scores for both Natural Grasslands TEC and King blue-grass decreased from the baseline surveys undertaken in June 2020.	**Corrective action required** In accordance with the Rail Loop MNESMP, the following corrective actions are recommended to be undertaken. Given the likelihood that the reduced habitat quality score is attributable to an increase in weed cover, it is suggested that the frequency and intensity weed control measures is reviewed, as well as the type of measures to be implemented. Weed monitoring assessments will be undertaken in the 2021/22 monitoring period which will also inform the change in weed species abundance and distribution.

Management objective	Success metric	Adherence to success metric	Corrective action
Minimise the impacts of weeds on TEC and King blue-grass conditions	No new weed species are established in the project area. No increase in extent or cover of existing weed infestations (particularly species declared under the *Biosecurity Act 2014*, or Leucaena, Mimosa, and perennial exotic grasses).	As detailed in Section 4.3.6, baseline weed surveys were completed in June 2020 and November 2020; both considered baseline weed assessments from which the results of future weed surveys will be compared against. Notwithstanding, a reduction in habitat quality scores for Natural Grasslands TEC and King blue-grass is understood to be partly attributable to an increase in weed cover. Accordingly, it is suggested that the frequency and intensity of weed control measures is reviewed, as well as the type of measures to be implemented.	No corrective action required at this stage.
Avoid and minimise the loss of King blue-grass within the management area of the project site.	Population size/density/ of King blue-grass is stable or increased.	As detailed in Section 4.3.3, no King blue-grass were positively identified from the four habitat condition sites. It is likely that King blue-grass was not detectable during the 2021 post-wet season surveys and may still be present. Further targeted searches for king blue-grass will be conducted during the 2022 annual monitoring surveys to confirm its presence.	No corrective action required.
Minimise the impact of dust on surrounding natural grasslands and King blue-grass.	Population size/density of King blue-grass and natural grasslands is stable or increased.	There was no evidence to suggest dust was causing any issues to Natural Grassland TEC or King blue-grass populations during the November 2020 and May 2021 survey events.	No corrective action required.
Avoid and minimise the negative impact of fire on the grassland TEC and habitat for King blue-grass.	▶ No unplanned fires on the site. ▶ If required, planned controlled burns in Natural Grasslands TEC and King blue-grass habitat) occur: – in no more than 30% of the area; – at an interval greater than 5 years; – at a time of year when soil moisture is high (Late wet to early dry season or following good spring rains).	No uncontrolled fires occurred on the MDS Rail Loop Project site during the 2020/2021 reporting period. No planned controlled burns have been implemented to date. Appropriate firefighting equipment was made available and all personnel and contractors were provided with training.	No corrective action required.

6 POTENTIAL THREATS AND RISKS

Vegetation clearing works, weed introduction and extensive heavy machinery pose the greatest risk to MNES and their habitat in the MDS Rail Loop Project site. To mitigate this risk, the measures outlined in the Rail Loop MNESMP will be adhered to, including the implementation of contingency plans and corrective actions where required. Ongoing management and monitoring activities will provide an indication of the efficacy of management actions in achieving the performance criteria set out in the Rail Loop MNESMP.

Given the end of construction works, the risk from vegetation clearing, weed introduction and heavy machinery is minimised. Instead, it is imperative to ensure the exclusion of vehicles outside of formed access tracks.

7 AMENDMENTS TO RAIL LOOP MNESMP

No amendments to the Rail Loop MNESMP are required to be made at this point in time.

8 MANAGEMENT, MONITORING AND REPORTING SCHEDULE – 2021/2022

To guide management, monitoring and reporting activities for the 2021/2022 reporting period, Table 10 outlines a schedule of the management, monitoring and reporting activities to be undertaken as part of the Rail Loop MNESMP.

Table 10: Management, mitigation, monitoring and reporting activities for the 2021/2022 reporting period

Action	Timing	2021						2022					
		July	August	September	October	November	December	January	February	March	April	May	June
Management and mitigation measures													
Effectively manage site works and ongoing project activities so that clearing outside of the Project footprint will not occur.	During construction and operations	At all times											
▶ The extent of the project footprint will be clearly marked out prior to clearing.	Prior to vegetation clearing works												
▶ All site clearing can only be undertaken in accordance with the authorised permit to disturb.	During construction and operations												
▶ Environmental awareness training will be provided to all workers as part of site induction, including specific topics on MNES, risks and protective measures.	Prior to vegetation clearing works												
Rehabilitation will establish self-sustaining natural grassland habitat.	After construction and clearing operations.												
Erect suitable fencing to exclude unauthorised vehicles or grazing stock from management area.	During construction and operations												
Early installation of Erosion & sediment controls (ESCs) as works progress, and permanent ESC around fill and coal stockpiles.	During construction and operations												

Action	Timing	2021						2022					
		July	August	September	October	November	December	January	February	March	April	May	June
Implementation of dust suppression techniques.	During construction and operations												
Manage fire regimes	During construction and operations												
Manage weeds in accordance with the Meteor Downs South Weed and Pest Management Plan (Sojitz, 2018).	During construction and operations												
Environmental awareness training will be provided to all workers as part of site induction, including weed hygiene and awareness.	Prior to construction and clearing operations.												
Undertake targeted weed control measures in accordance with the weed management plan, using an integrated program including selective herbicides, fire management and stock exclusion to maintain competitive natural grasslands.	During construction and operations												
Water truck will be on site during construction for dust suppression	During construction and operations												
Ground and vegetation disturbance to be limited to the necessary project footprint.	During construction and operations												
Stockpiles of topsoil, subsoil and parent material will be kept in a tidy condition and reused or stabilised as soon as practical.	During construction and operations												
Speed limits on internal roads will be limited to a maximum 40 km/hr.	During construction and operations												

Action	Timing	2021						2022					
		July	August	September	October	November	December	January	February	March	April	May	June
Build and maintain fire breaks for asset protection.													
Fire management of the site will consider: – Protection and operation of the rail facility through risk assessment; – appropriate fire management regimes (frequency, timing, extent) for the grasslands; – management impacts and implications (positive or negative) on weed management.	During construction and operations												
Monitoring													
General site inspections	Biannually – once at the end of the wet season and once at the end of the dry season					✓					✓		
Habitat quality assessments & photo monitoring	Annually, post-wet										✓		
Targeted surveys for King blue-grass	Annually, post-wet										✓		
Weed monitoring	Every two years (biennially) at the end of the wet season and dry season					✓					✓		
Biomass monitoring	Biannually - at the end of each wet season and dry season					✓					✓		
Dust deposition monitoring	Monthly during construction phase and quarterly during operational phase			✓			✓			✓			✓

Action	Timing	2021						2022					
		July	August	September	October	November	December	January	February	March	April	May	June
Rehabilitation Monitoring	Annually, at the end of the wet season after rehabilitation works are finished										✓		
Reporting													
Review of the Rail Loop MNESMP	Annually	✓											
Annual report	Annually, required to be submitted to DAWE by the 30 June										✓		

9 REFERENCES

CO2 Australia (2021). *Post-wet Season Monitoring Report (2020/21)*. A report prepared for Sojitz Blue Mining Pty Ltd. CO2 Australia Limited, Brisbane.

SLR Consulting Australia Pty Ltd (SLR)(2019a). *Matters of National Environmental Significance Management Plan – Meteor Downs South Rail Loop Project*. A report prepared for Sojitz Coal Mining Pty Ltd. SLR Consulting Australia Pty Ltd, Townsville.

SLR Consulting Australia Pty Ltd (SLR)(2019b). *Preliminary Documentation Report Referral #2019-8482*. A report prepared for Sojitz Coal Mining Pty Ltd. SLR Consulting Australia Pty Ltd, Townsville.

Sojitz Coal Mining Pty Ltd (Sojitz)(2018). *Meteor Downs South Mine Weed and Pest Management Plan*. Sojitz Coal Mining Pty Ltd, Springsure.

APPENDIX A DRY SEASON MONITORING REPORT (2020/21) (CO2 AUSTRALIA 2020)

Dry Season Monitoring Report (2020/21)

Year 4

- *MDS Project site*
- *Lexington offset site*

Year 1

- *MDS Rail Loop site*
- *Lexington Rail Loop offset site*

Meteor Downs South Coal Mine Project

Sojitz Blue Pty Ltd

APPROVALS

Rev	Date	Description
0	16 December 2020	Draft report issued to client
1	14 January 2021	Report finalised based on client review and issued to client

	Name	Position	Date
ORIGINATORS	Dr Jarrad Cousin Dean Orrick	Senior Ecologist Ecologist	16 December 2020
APPROVER	Christopher Ewing	Head of Ecosystem Markets and Innovation	16 December 2020

CONTENTS

1 INTRODUCTION

U&D Mining Industry (Australia) Pty (U&D) has approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to develop and operate the Meteor Downs South (MDS) Coal Mine Project (the MDS Project) (Figure 1). U&D is in a joint venture with Sojitz Blue Pty Ltd (Sojitz Blue) to develop and operate the MDS Project.

1.1 MDS PROJECT AND CORRESPONDING OFFSETS

Under the Project EPBC Act approval (EPBC 2013/6779), the MDS Project has prepared the following documents:

- Matters of National Environmental Significance Management Plan (MNESMP)
  - to address EPBC 2013/6779 conditions 2, 3 and 4 with respect to the direct and indirect impacts of the MDS Project on matters of national environmental significance (MNES) at the MDS Project site
- Offset Management Plan (OMP)
  - to address EPBC 2013/6779 conditions 5 and 6 with respect to environmental offsets at the Lexington offset site (Figure 1) for significant residual impacts of the MDS Project on MNES and matters of state environmental significance (MSES)

The MNESMP and OMP outline annual biodiversity monitoring requirements at each site, as summarised in Table 1. The baseline (Year 1) management periods for the MDS Project site and the Lexington offset site are considered to be June 2017 – June 2018 (Project site) and October 2017 – October 2018 (Lexington offset site).

The current report incorporates the Year 4 (2020/2021) dry season monitoring report for both the MDS Project site and the Lexington offset site.

Table 1: Summary of MDS Project and offset site biodiversity monitoring requirements.

Site	Monitoring activity	Management plan	Frequency	Timing
MDS Project site	General site inspection	MNESMP Section 13.2	Biannually	End of the dry season and end of the wet season
	Habitat condition assessment	MNESMP Section 13.3	Annually	Dry season
	Photo monitoring	MNESMP Section 13.4	Annually	
	Targeted surveys for king blue-grass and bluegrass	MNESMP Section 13.5	Annually	End of the wet season and/or when most detectable
	Habitat availability assessment for Australian painted snipe	MNESMP Section 13.6	Every 2 years	Wet season or following inundation event
	Pest animal monitoring	MNESMP Section 13.7	Every 2 years	Dry season and post-wet season
	Weed monitoring	MNESMP Section 13.8	Every 2 years	
Lexington offset site	General offset site monitoring	OMP Section 7.1	Annual	Post-wet season

Site	Monitoring activity	Management plan	Frequency	Timing
	Habitat condition assessment and photo monitoring	OMP Section 7.2	Every 2 years for first 10 years and then every 5 years thereafter until 31 October 2037	Post-wet season
	Weed monitoring	OMP Section 7.4	Every 2 years	Dry season and post-wet season
	Pest animal monitoring	OMP Section 7.5	Every 2 years (dry season and post wet season surveys)	Dry season and post-wet season
	Biomass monitoring	OMP Section 7.6	Annually	Post wet season prior to and during grazing events

1.2 MDS RAIL LOOP AND CORRESPONDING OFFSETS

In December 2019, Sojitz Blue received approval under the EPBC Act to develop and operate the Meteor Downs South Mine Rail Loop (MDS Rail Loop). Under the Project EPBC Act approval (EPBC 2019/8482), Sojitz Blue has prepared the following documents:

- Matters of National Environmental Significance Management Plan (Rail Loop MNESMP)
  - to address EPBC 2019/8482 condition 6 with respect to the direct and indirect impacts of the MDS Rail Loop project on matters of national environmental significance (MNES) at the MDS Rail Loop site
- Offset Management Plan (amendment to the OMP to incorporate the Rail Loop offsets)
  - to address EPBC 2019/8482 conditions 2, 3, 4 and 5 with respect to environmental offsets at the Lexington Rail Loop offset site (Figure 1) for significant residual impacts of the MDS Rail Loop on MNES.

The Rail Loop MNESMP and OMP outline annual biodiversity monitoring requirements at each site, as summarised in Table 2. The baseline management periods for the MDS Rail Loop site and the corresponding Lexington Rail Loop offset site are considered to be December 2019 - June 2020, with the current report incorporating the Year 1 (2020/2021) dry season monitoring report for both the MDS Rail Loop site and the Lexington Rail Loop offset site.

Table 2: Summary of MDS Rail Loop site and Lexington Rail Loop offset site biodiversity monitoring requirements.

Site	Monitoring activity	Management plan	Frequency	Timing
MDS Rail Loop site	General site inspection	Rail Loop MNESMP Section 7.2	Biannually	End of the dry season and end of the wet season
	Habitat quality assessments and photo monitoring	Rail Loop MNESMP Section 7.3	Annually	Post-wet season
	Targeted surveys for king blue-grass	Rail Loop MNESMP Section 7.4	Annually	

Site	Monitoring activity	Management plan	Frequency	Timing
	Weed monitoring	Rail Loop MNESMP Section 7.5	Biannually within habitat quality assessment plots Every 2 years at each of the weed monitoring plots	End of the dry season and post-wet season
	Biomass monitoring for fire management	Rail Loop MNESMP Section 7.6	Biannually	End of the dry season and end of the wet season
Lexington Rail Loop offset site	General offset site monitoring	OMP Section 7.1	Annually	Post-wet season
	Habitat condition assessment and photo monitoring	OMP Section 7.2	Every 2 years for first 10 years and then every 5 years thereafter until 31 October 2039	Post-wet season
	King blue-grass surveys	OMP Section 7.3	Every 5 years from baseline (2019)	End of the wet season and/or when most detectable
	Weed monitoring	OMP Section 7.4	Baseline in 2020 (Year 1), then every 2 years	Dry season and post-wet season
	Biomass monitoring	OMP Section 7.6	Annually	Post wet season prior to and during grazing events

148°0'0"E
148°10'0"E
148°20'0"E
24°0'0"S
24°10'0"S
24°20'0"S

Fernlees
Minerva
Arcturus
Springsure
Cairdbeign
Orion
Albinia
Wealwandangie
Minerva Hills National Park
5 Mile Reserve
Joes Plain Reserve
Meteor Park
Mount Hope State Forest

Sojitz Coal Mining Pty Ltd

Location diagram

Figure 1
Location of the MDS project, MDS Rail Loop and corresponding offsets

- Population centres

Roads

- State-controlled roads
- Regional access
- Local access
- Minerva lots (lot 10 & 11 DN40126)
- MDS Project (ML70452)
- MDS Rail Loop
- Lexington offset
- Lexington Rail Loop offset

DATA SOURCE:
The following datasets are © State of Qld:
- Cadastral Data (Qld DCDB)
- Mining Lease

Information provided by Sojitz
- Rail Loop project area
- Lexington Rail Loop offset

0 2.5 5 7.5 10
Kilometres

N

CO2 Australia

Date: 11/27/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:200,000@A3

Path: P:\GIS\Data\Projects\Sojitz\922_20201106_Lex_MDS_dry_season_20200201127 - Figure 1 - Site context.mxd

2 METHODOLOGY

Field surveys were undertaken by two tertiary-qualified ecologists (Dr Jarrad Cousin and Dean Orrick) between 16-20 November 2020. Permanent monitoring sites were established at the MDS Project site and Lexington offset site as part of the baseline surveys carried out between December 2017 and April 2018, detailed in the following:

- *MNESMP Baseline Monitoring Report – Meteor Downs South Coal Mine Project.* A report prepared by CO2 Australia in 2017 (CO2 Australia 2017) – baseline monitoring sites established in December 2017
- *Lexington Offset Area Initial Baseline Monitoring Report – Meteor Downs South.* A report prepared by CO2 Australia in 2018 (CO2 Australia 2018) – baseline monitoring sites established in April 2018.

Permanent monitoring sites for the MDS Rail Loop site and the Lexington Rail Loop offset site were established as part of baseline surveys carried out during post-wet season field surveys in June/July 2020, and detailed in the following report:

- *Post-wet Season Monitoring Report – Year 3 (2019/20).* A report prepared by CO2 Australia in 2020 (CO2 Australia 2020) – baseline monitoring sites established in June/July 2020.

2.1 MONITORING LOCATIONS

2.1.1 MDS Project site

Dry season monitoring activities at the MDS Project site comprised:

- General site inspection
- Habitat condition assessments
- Photo monitoring
- Biomass monitoring

Table 3 shows activities at each monitoring location at the MDS Project site. A total of 20 permanent sites/plots were monitored across the balance of ML70452 outside of the MDS project site (refer to Figure 2 and Figure 3). Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 3), according to the following:

- 10 x habitat monitoring sites (100 m x 50 m)
  - collocated with weed and rabbit monitoring plots (Sites 01 – 10)
- 30 x photo monitoring sites
  - established at 0 m and 50 m points along 100 m habitat monitoring transect (Sites 01 – 10) and at SW corner of weed monitoring plots (Sites 11 – 20)
- 20 x weed monitoring plots (1 ha)
  - partly collocated with weed and rabbit monitoring plots (Sites 01 – 10), with remaining 10 sites (Sites 11 – 20) standalone weed monitoring plots

At each of the 10 habitat monitoring sites (Sites 01 – 10), a 1.8 m capped galvanised star picket is installed at the start (0 m) and central (50 m) points of the 100 m transect. GPS locations are recorded for each of the sites in GDA94, Zone 55 projection. At each of the standalone weed monitoring plots (Sites 11 – 20), a single 1.8 m capped galvanised star picket is installed at the SW corner of the plot. GPS locations are recorded for each of the sites in GDA94, Zone 55 projection.

Refer to Table A-1 in Appendix A for detailed locations of each of the monitoring sites at the MDS Project site.

Table 3: Monitoring locations at the MDS Project site, surveyed as part of the 2020/21 dry season surveys

Site	Photo monitoring	Biomass monitoring	Habitat monitoring					
			Brigalow TEC	Natural Grasslands TEC	King blue-grass	Bluegrass	Squatter pigeon	Australian painted snipe
01	✓	✓					✓	
02	✓	✓		✓	✓	✓		
03	✓	✓					✓	
04	✓	✓		✓	✓	✓		
05	✓	✓					✓	
06	✓	✓		✓	✓	✓		
07	✓	✓	✓					
08	✓	✓		✓	✓	✓		
09	✓	✓						✓
10	✓	✓					✓	
11 – 20	✓	✓						

148°22'E 148°23'E 148°24'E

24°21'S 24°22'S 24°23'S

11 01 02 12 13 14

C01 C02 C03 C05

P07 P08

Sojitz Coal Mining Pty Ltd - MDS Project

Figure 2
MDS Project
monitoring sites - north

Location diagram

- Mining Lease
- Disturbance areas
- Access tracks
- Watercourse
- Brigalow TEC
- Natural Grassland TEC
- Habitat for King blue-grass and bluegrass
- Habitat for squatter pigeon
- Habitat for Australian painted snipe
- Habitat monitoring site
- Habitat monitoring plots
- Weed monitoring plots
- Rabbit monitoring plots
- Pig monitoring plots
- Pest animal survey tracks
- Pest animal camera sites

0 0.25 0.5 0.75 1
Kilometres

N

CO2 Australia

DATA SOURCE:
The folowing datasets are © State of Qld:
- Mining Lease
The following datasets provided by Sojitz
- Disturbance areas
- Ground-truthed regional ecosystem mapping

Date: 11/27/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:17,500@A3

Path: P:\GISData\Projects\Sojitz\922_20201106_Lex_MDS_dry_season_20200201127 - Figure 2 - MDS monitoring sites north.mxd

148°21'E
148°22'E
148°23'E
24°23'S
24°24'S
24°25'S

03
P07
C03
14
15
C04
19
C05
P06
16
C09
18
17
C10
04
C06
05
P05
06
C07
C11
P04
07
C08
P03
08
20
C12
P02
09
C13
C14
10
P01
C15

Sojitz Coal Mining Pty Ltd - MDS Project

Figure 3
MDS Project
monitoring sites - south

Mining Lease
Disturbance areas
Access tracks
Watercourse
Brigalow TEC
Natural Grassland TEC
Habitat for King blue-grass and bluegrass
Habitat for squatter pigeon
Habitat for Australian painted snipe
Habitat monitoring site
Habitat monitoring plots
Weed monitoring plots
Rabbit monitoring plots
Pig monitoring plots
Pest animal survey tracks
Pest animal camera sites

0 0.25 0.5 0.75 1
Kilometres

N

CO2 Australia

Location diagram

Brisbane

DATA SOURCE:
The folowing datasets are © State of Qld:
- Mining Lease
The following datasets provided by Sojitz
- Disturbance areas
- Ground-truthed regional ecosystem mapping

Date: 11/27/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:17,500@A3

Path: P:\GISData\Projects\Sojitz\922_20201106_Lex_MDS_dry_season_20201127 - Figure 3 - MDS monitoring sites south.mxd

2.1.2 MDS Rail Loop site

Dry season monitoring activities at the MDS Rail Loop site comprised:

- General site inspection
- Biomass monitoring
- Weed monitoring

Table 4 shows activities at each monitoring location established at the MDS Rail Loop site. A total of five permanent monitoring sites/plots were monitored (refer to Figure 4). While the Rail Loop MNESMP (SLR 2019) stipulated one of the weed monitoring plots to be established in the *Leucaena* plantation, consultation with Sojitz Blue indicated the safety issues related to monitoring sites within the centre of the rail loop requiring crossing of the rail line. Instead, all plots were established on the outside of the rail loop (refer to Figure 4). Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 4), according to the following:

- 4 x biomass monitoring sites
  - assessed from the 50 m point of the habitat monitoring transect at each of the four habitat monitoring sites (Sites MDSRL01 – MDSRL04),
- 5 x weed monitoring plots (1 ha)
  - collocated with the habitat monitoring sites (Sites MDSRL01 – MDSRL04), with a single standalone weed monitoring plot (Site MDSRL05)

At each of the 4 biomass monitoring sites (Sites MDSRL01 – MDSRL04), a 1.8 m capped galvanised star picket is installed at the start (0 m) and central (50 m) points of the 100 m habitat monitoring transect. At the single standalone weed monitoring plots (Site MDSRL05), a single 1.8 m capped galvanised star picket is installed at the SW corner of the plot. GPS locations are recorded for each of the sites in GDA94, Zone 55 projection.

Refer to Table A-2 in Appendix A for detailed locations of each of the monitoring locations at the MDS Rail Loop site.

Table 4: Monitoring locations at the MDS Rail Loop site, surveyed as part of the 2020/21 dry season surveys.

Site	Weed monitoring	Biomass monitoring
MDSRL01 – MDSRL04	✓	✓
MDSRL05	✓	

148°26'E

148°27'E

24°22'S

24°23'S

MDSRL01

MDSRL02

MDSRL03

MDSRL04

MDSRL05

Sojitz Coal Mining Pty Ltd - MDS Rail Loop

Figure 4
MDS Rail Loop
- monitoring sites

Disturbance areas
MDS Rail Loop site
Watercourse

Ground-truthed REs
RE 11.8.11
RE 11.8.11/11.8.5
RE 11.3.3a

Habitat monitoring site
Habitat monitoring plots
Weed monitoring plots

DATA SOURCE:
The following datasets provided by Sojitz
- Disturbance areas
- Ground-truthed REs

Date: 11/27/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:9,000@A3

0 100 200 300 400
Metres

N

CO2 Australia

Location diagram

Brisbane

Path: P:\GIS\Data\Projects\Sojitz\922_20201106_Lex_MDS_dry_season_20200201127 - Figure 4 - MDS RAIL LOOP monitoring sites.mxd

2.1.3 Lexington offset site

Dry season monitoring activities at the offset site comprised:

- General offset site monitoring
- Biomass monitoring

Table 5 shows activities at each monitoring location at the offset site. A total of 20 permanent monitoring sites/plots were monitored across the offset site. Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 5, Figure 5 and Figure 6), according to the following:

- 20 x biomass monitoring sites
  - 13 established at the 0 m point along the 100 m habitat monitoring transects (Sites 01 – 13)
  - 7 at SW corner of weed monitoring plots (Sites 14 – 20)

At each of the 13 habitat monitoring sites (Sites 01 – 13), a 1.8 m capped galvanised star picket is installed at the start (0 m) and central (50 m) points of the 100 m transect. At each of the standalone weed monitoring plots (Sites 14 – 20), a single 1.8 m capped galvanised star picket is installed at the SW corner of the plot. GPS locations are recorded for each of the sites in GDA94, Zone 55 projection.

Refer to Table A-3 in Appendix A for detailed locations of each of the monitoring sites at the Lexington offset site.

Table 5: Monitoring locations at the Lexington offset site, surveyed as part of the 2020/21 dry season surveys.

Site	Biomass monitoring
01 – 20	✓

148°1'0"E
148°2'0"E
148°3'0"E
23°55'0"S
23°56'0"S
23°57'0"S

P03
C01
C05
01
14
ML 70145
C06
C02
02
P01
15
C07
ML 70376
19
C03
03
16
C08
P02
04
17
C04
C09
06
P07
P06
05
C10
P04
07
C12
C13
18
P05
08
C11

Sojitz Coal Mining Pty Ltd - Lexington offset

Figure 5
Lexington offset monitoring sites - west

- Minerva lots (lot 10 & 11 DN40126)
- Existing offset area (Category A area)
- Mining leases (ML70376 and ML70145)
- Offset area
- Access tracks
- Lexington existing fences

Regional ecosystem
- RE 11.8.11
- RE 11.8.11a
- RE 11.8.4
- RE 11.8.5

- Pest animal camera site
- Pest animal survey tracks
- Habitat monitoring sites
- Habitat monitoring plot
- Weed monitoring plots
- Rabbit monitoring plots
- Pig monitoring plots

DATA SOURCE:
The following datasets are © State of Qld:
- Cadastral Data
- Mining Lease
- Existing offset area

0 0.25 0.5 0.75 1
Kilometres

N

CO2 Australia

Date: 11/27/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:15,000@A3

Location diagram

Path: P:\GIS\Data\Projects\Sojitz\922_20201106_Lex_MDS_dry_season_20200201127 - Figure 5 - Lexington monitoring sites west.mxd

148°3'0"E
148°4'0"E
148°5'0"E
23°55'0"S
23°56'0"S
23°57'0"S
ML 70376
ML 70145
R09
11
12
C15
20
R10
13
C14
R08
10
09
09
C13
R07
08

Figure 6
Lexington offset monitoring sites - east

- Minerva lots (lot 10 & 11 DN40126)
- Existing offset area (Category A area)
- Mining leases (ML70376 and ML70145)
- Offset area
- Access tracks
- Lexington existing fences

Regional ecosystem
- RE 11.8.11
- RE 11.8.11a
- RE 11.8.4
- RE 11.8.5

- Pest animal camera site
- Pest animal survey tracks
- Habitat monitoring sites
- Habitat monitoring plot
- Weed monitoring plots
- Rabbit monitoring plots
- Pig monitoring plots

DATA SOURCE:
The following datasets are © State of Qld:
- Cadastral Data
- Mining Lease
- Existing offset area

Date: 11/27/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:15,000@A3

0 0.25 0.5 0.75 1
Kilometres

N

CO2 Australia

Sojitz Coal Mining Pty Ltd - Lexington offset

Location diagram

Brisban

Path: P:\GISData\Projects\Sojitz\922_20201106_Lex_MDS_dry_season_20201127 - Figure 6 - Lexington monitoring sites east.mxd

2.1.4 Lexington Rail Loop offset site

Dry season monitoring activities at the Lexington Rail Loop offset site comprised monitoring of the following:

- General offset site monitoring
- Weed monitoring
- Biomass monitoring

Table 6 shows activities at each monitoring location established at the Lexington Rail Loop offset site; divided into three 'paddocks' across the north of Lexington – 'North Promenade', 'Harry's' and 'Contours'. A total of 12 permanent monitoring sites/plots are monitored across the three paddocks (refer to Figure 7 and Figure 8). Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 6), according to the following:

- 12 x weed monitoring plots (1 ha)
  - collocated with the seven habitat monitoring sites (Sites LEXRL01 – LEXRL07)
  - five additional, standalone weed monitoring plots (Sites LEXRL08 – LEXRL12)
- 12 x biomass monitoring plots
  - seven established at the 0 m point along the 100 m habitat monitoring transects (Sites LEXRL01 – LEXRL07)
  - five at SW corner of standalone weed monitoring plots (Sites LEXRL08 – LEXRL12).

At each of the seven habitat monitoring sites (Sites LEXRL01 – LEXRL07), a 1.8 m capped galvanised star picket is installed at the start (0 m) and central (50 m) points of the 100 m transect. At each of the standalone weed monitoring plots (Sites LEXRL08 – LEXRL12), a single 1.8 m capped galvanised star picket is installed at the SW corner of the plot. GPS locations are recorded for each of the sites in GDA94, Zone 55 projection.

Refer to Table A-4 in Appendix A for detailed locations of each of the monitoring sites at the Lexington Rail Loop offset site.

Table 6: Monitoring locations at the Lexington Rail Loop offset site, surveyed as part of the 2020/21 dry season surveys.

Site	Weed monitoring	Biomass monitoring
North Promenade paddock		
LEXRL01 – LEXRL02	✓	✓
LEXRL08 – LEXRL09		✓
Harry's paddock		
LEXRL03 – LEXRL04	✓	✓
LEXRL10		✓
Contours paddock		

Site	Weed monitoring	Biomass monitoring
LEXRL05 – LEXRL07	✓	✓
LEXRL11 – LEXRL12		✓

148°1'30"E

148°2'E

23°54'30"S

23°55'S

LEXRL01

LEXRL09

North
Promenade

LEXRL08

LEXRL02

ML 70145

Sojitz Coal Mining Pty Ltd - Lexington Rail Loop offset

Location diagram

Brisbane

Figure 7
Lexington Rail Loop offset monitoring sites - west

- Lexington existing fences
- Access tracks
- ***Lexington Rail Loop offset***
- North Promenade paddock
- ***Observed vegetation***
- RE 11.8.11
- RE 11.8.5
- Lexington offset area
- Existing offset area (Category A area)
- Mining leases (ML70376 and ML70145)
- Habitat monitoring sites
- Habitat monitoring plots
- Weed monitoring plots

DATA SOURCE:
The following datasets are © State of Qld:
- Mining leases
The following datasets provided by Sojitz
- Lexington Rail Loop offset areas

0 50 100 150 200
Metres

N

CO2 Australia

Date: 11/27/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:6,000@A3

Path: P:\GIS\Data\Projects\Sojitz\922_20201106_Lex_MDS_dry_season_20200201127 - Figure 7 - LEXINGTON RAIL LOOP monitoring sites west.mxd

148°4'E 148°5'E 148°6'E

23°54'S 23°55'S 23°56'S

ML 70376 LEXRL03 Harry's LEXRL04 LEXRL10 ML 70145 ML 70376 LEXRL05 LEXRL12 LEXRL06 Contours LEXRL11 LEXRL07

Sojitz Coal Mining Pty Ltd - Lexington Rail Loop offset

Location diagram

Brisbane

Figure 8
Lexington Rail Loop offset monitoring sites - east

- Lexington existing fences
- Access tracks

Lexington Rail Loop offset

- Harry's paddock
- Contours paddock
- Lexington offset area
- Existing offset area (Category A area)
- Mining leases (ML70376 and ML70145)

Observed vegetation

- RE 11.8.11
- RE 11.8.5
- Habitat monitoring sites
- Habitat monitoring plots
- Weed monitoring plots

DATA SOURCE:
The following datasets are © State of Qld:
- Mining leases
The following datasets provided by Sojitz
- Lexington Rail Loop offset areas

0 200 400 600 800
Metres

N

CO2 Australia

Date: 11/27/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:17,500@A3

Path: P:\GISData\Projects\Sojitz\922_20201106_Lex_MDS_dry_season_20201127 - Figure 8 - LEXINGTON RAIL LOOP monitoring sites east.mxd

2.2 HABITAT CONDITION ASSESSMENT (MDS PROJECT SITE ONLY)

Habitat monitoring sites were established at the MDS Project site in December 2017 based on the requirements of the *Guide to determining terrestrial habitat quality* (Version 1.2; DEHP 2017). A total of 10 habitat monitoring sites (comprising N_S running 100 m x 50 m transect) were established (Sites 01 – 10), with the start and central points marked with a 1.8 m galvanised steel picket with plastic safety cap (refer to Figure 2 and Figure 3).

Habitat condition assessments for Brigalow TEC, Natural Grasslands TEC, bluegrass, king blue-grass, squatter pigeon and Australian painted snipe were undertaken at the habitat monitoring sites generally in accordance with the *Guide to determining terrestrial habitat quality* (DEHP 2017). Through the application of the guide, a habitat quality score was calculated for each MNES based on the following key indicators:

- site condition: a general condition assessment of vegetation compared to a benchmark
- site context: an analysis of the site in relation to the surrounding environment

In the absence of the *Guide to determining terrestrial habitat quality* (DEHP 2017) including a species habitat index for flora species, the habitat condition scores for the two MNES flora species (king blue-grass and bluegrass) included a species presence index out of three, whereby: 0 = absent/not confirmed, 2 = up to five tussocks confirmed, 2.5 = up to 20 tussocks confirmed, 3 = more than 20 tussocks confirmed. The habitat condition score for the two MNES flora species was then calculated as a combination of site condition and site context for the RE assessment unit (representing 80% of the score), with species stocking rate converted to a score out of 10 and contributing 20%.

2.3 PHOTO MONITORING (MDS PROJECT SITE ONLY)

Photo monitoring was undertaken at permanent sites established as part of baseline surveys on the MDS Project site, to give a representative indication of cover and species composition (including weeds) for the general area and enable visual assessment of habitat changes over time. Photo monitoring sites were established with a 1.8 m galvanised steel picket with plastic safety cap.

At each of the photo monitoring points, five photos were taken from 1.5 m height above ground level looking north, east, south and west with a ground photo taken looking down at an angle of 45° to the north-west of the star picket.

At the MDS Project site, photo monitoring was undertaken at 30 sites, including two at each of the 10 habitat condition assessment sites (0 m and 50 m points: Site 01 – 10), with single photo monitoring points at the SW corner of the remaining 10 weed monitoring plots (Site 11 – 20) identified in Table 3 and shown in Figure 2 and Figure 3.

A record of the photographs for the MDS Project site is shown in Appendix C. While not required to be collected as part of the dry season surveys, photos monitoring was also undertaken at the MDS Rail Loop site (Appendix D), Lexington offset site (Appendix E) and Lexington Rail Loop offset site (Appendix F) primarily to collate information to inform the biomass assessment.

2.4 WEED MONITORING (MDS RAIL LOOP SITE AND LEXINGTON RAIL LOOP SITE)

For the purposes of this assessment, weeds were taken as any species of plant not considered by the Queensland Herbarium as being native to Queensland (i.e. not listed as either least concern, special least concern, near threatened, vulnerable, endangered, critically endangered or presumed extinct in the wild

under the *Nature Conservation Act 1992* (Qld); NC Act), as well as species of plant not considered locally endemic to the region.

Weed monitoring at the MDS Rail Loop site and Lexington Rail Loop offset site had previously been undertaken as part of the post-wet season baseline monitoring in June 2020. While dry season weed monitoring is only required to be undertaken every two years (i.e. not until the 2021/2022 monitoring year), it was undertaken as part of the current year 1 dry season monitoring report in order to fulfil the requirement for establishing baseline dry season weed monitoring which was not completed prior to the December 2019 EPBC approval. Following the current dry season survey, it is anticipated that 2 yearly monitoring will commence with the dry season survey of the 2021/2022 monitoring year (i.e. Nov/Dec 2021).

Weed monitoring was undertaken at five permanent plots established at the MDS Rail Loop site and 12 permanent plots established at the Lexington Rail Loop offset site. Weed monitoring plots were located to incorporate natural variability such as aspect (e.g. a mix of north-, east-, south- and west-facing monitoring sites) and community type, while also targeting trafficable areas (e.g. entry gates, creek crossings, stock watering points) to monitor potential introduction and/or irruptions of prohibited and restricted weed species. At each weed monitoring plot, 3 x 100 m transects (traversing in an east-west direction) were traversed, keeping them parallel to one another, 50 m apart.

Figure 4 shows the MDS Rail Loop site weed monitoring plots and Figure 7 and Figure 8 shows the Lexington Rail Loop offset site weed monitoring plots.

At each of the permanent weed monitoring plots, monitoring of weeds was undertaken in accordance with the following method:

- At 10 m intervals along each of the three transects, a 2 m x 2 m plot frame was used to record the presence, species and cover of weeds
- Weed cover at each 2 m x 2 m survey site was recorded as one of five cover classes: 1 = 0%; 2 = 0-5%; 3 = 6-25%; 4 = 26-50%; 5 = 51-100% (Auld 2009)
- An average cover score for each weed species for each 1 ha site was calculated
- The average cover score was then calculated as the average percentage from the 30 plots surveyed from the three 100 m transects
- The mean cover score across all weed monitoring sites was then calculated.

For the purposes of the calculation of average percentage cover of weeds, each of the five weed cover classes (0 – 5) were converted to a quantitative weed cover value based on the average value of the range corresponding to that weed cover class, as outlined below:

- Weed cover class 1 (0%) retained a value of 0%
- Weed cover class 2 (0-5%) was converted to a value of 2.5%
- Weed cover class 3 (6-25%) was converted to a value of 15%
- Weed cover class 4 (26-50%) was converted to a value of 37.5%
- Weed cover class 5 (51-100%) was converted to a value of 75%.

In addition to permanent weed monitoring plots, where relevant, incidental observations were collated as part of general site monitoring, recording details of weeds (including location, species and extent) and areas of significant weed cover.

2.5 BIOMASS MONITORING FOR FIRE MANAGEMENT (ALL SITES)

Biomass monitoring for fire management is undertaken annually to determine the risk of fire and to inform fire management strategies. Biomass is at its greatest at the end of the wet season (around April) with fire risk greatest towards the end of the dry season (September/October). Biomass is monitored using appropriate photo standards[1] to determine dry matter yields and subsequently fuel loads. Biomass monitoring is undertaken at permanent weed monitoring sites at the MDS Project site, MDS Rail Loop site, Lexington offset site and Lexington Rail Loop offset site.

2.6 GENERAL SITE INSPECTIONS (ALL SITES)

General site inspections across all project and offset sites was undertaken, to assess:

- Observations of fencing condition, including any repair/upgrades
- Access track conditions, including location of watercourse crossings, grids, erosion, etc
- Fire management, including assessment of existing firebreaks, access tracks and roads, fuel loads, and any recent burning activities
- Livestock management including assessment of signs of land degradation and over-grazing
- Erosion management, including assessment of the incidence of erosion, especially around permanent and semi-permanent water bodies or areas subject to inundation or waterlogging
- Incidental fauna observations, including presence, traces and/or abundance of pest animals
- Signs of dust deposition on vegetation located adjacent to the MDS Project and MDS Rail Loop footprints
- Locations of known king blue-grass and bluegrass specimens throughout all sites
- Any additional risks to fauna (i.e. evidence of vehicle strike)

[1] See https://futurebeef.com.au/knowledge-centre/pastures-forage-crops/pasture-photo-standards/

3 RESULTS: MDS PROJECT SITE

3.1 HABITAT CONDITION ASSESSMENT

Results of the habitat condition assessments identified an average site condition score of 7.29 out of 10 across all ten habitat monitoring sites, with scores ranging between 4.56 (Site 09) and 8.94 (Site 10). Table B-1 and Table B-2 of Appendix B outline details of the site condition assessments, summarised below in Table 7.

Table 7: MDS Project site habitat monitoring sites: site condition and site context scores calculated in accordance with the *Guide to determining terrestrial habitat quality* (DEHP 2017).

Site	RE	Site condition score (/10)	Site context score (/10)
01	11.8.5	7.88	7.69
02	11.8.11	8.00	6.92
03	11.8.5	8.50	7.69
04	11.8.11	7.00	7.69
05	11.8.5	5.81	7.69
06	11.8.11	8.00	7.31
07	11.4.3	6.25	7.69
08	11.8.11	8.00	7.31
09	11.3.3a	4.56	7.69
10	11.8.5	8.94	7.69
Average score		**7.29**	**7.54**

MNES habitat condition assessments

Based on the results of the site condition, site context and relevant species habitat assessments, habitat condition scores for the six MNES ranged between 4.14 (Australian painted snipe) and 7.55 (Natural Grassland TEC) out of 10 (Table 8). The comparatively low score for Australian painted snipe habitat is in part attributable to the low site condition for RE 11.3.3a habitat (4.56), but also the low fauna species habitat index (1.6), reflecting an absence of appropriate foraging and shelter habitat for the species at the time of surveying. In contrast, Natural Grasslands TEC habitat had the highest habitat condition score (7.55), attributable in large part to low weed cover and high species richness for grasses at each of the contributing RE 11.8.11 sites.

Refer to Table B-1 of Appendix B for site condition raw data contributing to site condition score in Table B-2.

Table 8: MDS Project site monitoring sites showing their habitat condition scores contributing to MNES.

Site	RE	Brigalow TEC	Natural Grasslands TEC	King blue-grass	Bluegrass	Squatter pigeon	Australian painted snipe
01	11.8.5	-	-	-	-	7.24	-

Site	RE	Brigalow TEC	Natural Grasslands TEC	King blue-grass	Bluegrass	Squatter pigeon	Australian painted snipe
02	11.8.11	-	7.50	6.00	6.00	-	-
03	11.8.5	-	-	-	-	8.21	-
04	11.8.11	-	7.32	5.86	5.86	-	-
05	11.8.5	-	-	-	-	6.19	-
06	11.8.11	-	7.68	6.14	6.14	-	-
07	11.4.3	6.60	-	-	-	-	-
08	11.8.11	-	7.68	6.14	6.14	-	-
09	11.3.3a	-	-	-	-	-	4.14
10	11.8.5	-	-	-	-	8.43	-
Average score		**6.60**	**7.55**	**6.04**	**6.04**	**7.52**	**4.14**

Natural Grasslands, king blue-grass and bluegrass habitat

As discussed above, areas of Natural Grasslands TEC, represented by RE 11.8.11, were all in very good condition, likely as a consequence of some evidence of rainfall in early November. Habitat condition scores for the four assessment sites ranged between 7.32 and 7.68. The four assessment sites supported six TEC indicator grass species (Table 9), ranging between three and six species per site. While additional species are likely to have been present, some individuals could not be identified to species level due to a lack of fertile material this early in the season.

Table 9: Natural Grasslands TEC indicator species.

Scientific name	Common name	Site			
		02	04	06	08
Aristida latifolia	Feather-top wiregrass	✓	✓	✓	
Aristida leptopoda	White speargrass	✓	✓	✓	
Astrebla elymoides	Hoop mitchell grass				
Astrebla lappacea	Curly mitchell grass				
Astrebla squarrosa	Bull mitchell grass				
Bothriochloa erianthoides	Satin-top grass	✓	✓	✓	✓
Dichanthium queenslandicum	King blue-grass				
Dichanthium sericeum	Queensland bluegrass	✓		✓	✓
Eriochloa crebra	Cup grass				
Panicum decompositum	Native millet	✓	✓	✓	✓
Panicum queenslandicum	Yabila grass				
Paspalidium globoideum	Shot grass	✓		✓	
Thellungia advena	Coolibah grass				

Scientific name	Common name	Site			
		02	04	06	08
	TOTAL	6	4	6	3

Squatter pigeon

Incidental searches for the squatter pigeon were conducted opportunistically from over 92 km of driving during the 3 days of field surveys on the MDS project site, during which no squatter pigeons were recorded. Further targeted surveys will be undertaken during the post-wet season survey when birds are more likely to be actively foraging for grass seed.

Australian painted snipe

No surveying was undertaken for Australian painted snipe during the dry season survey monitoring. Surveys will be next be undertaken during the wet season (defined as between 1 November in one year to 31 May in the following year), following a significant inundation event during the Year 5 (2021/2022) monitoring period.

3.2 PHOTO MONITORING

Photo monitoring on the MDS Project site showed a variety of levels of cover ranging from dense understorey (Site 15: Photo C-125 in Appendix C) through to relatively open areas with evidence of grazing (Site 20: Photo C-150 in Appendix C). Overall, the condition of habitat at photo monitoring sites was good, with appreciable grass cover in most sites, likely due to higher than average rainfall in October and November. The results of the photo monitoring are presented in Appendix C.

3.3 BIOMASS MONITORING

Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for monitoring sites comprising RE 11.8.11, whilst photo monitoring results from areas of RE 11.8.5 were assessed against 'Eucalypt woodlands', RE 11.4.3 was assessed against 'Blue grass, wire grass' and RE 11.3.3a was assessed against 'Alluvial' photo standards (Table 10). The photo standards used to calculate biomass are different to previous years' assessments, although these photo standards are considered more representative of the actual vegetation communities observed on the MDS Project site. Where the observed biomass at a site was mid-way between two photos within a given biomass standard, the middle of the corresponding range was reported (i.e. observed biomass between 2,500 kg/ha and 3,600 kg/ha 'Eucalypt woodlands' photo standards was reported as 3,050 kg/ha).

Ground photos used to assign biomass at the MDS Project site are shown in Appendix C.

Table 10: Results of biomass monitoring on the MDS Project site using Brigalow Belt Future Beef pasture photo standards.

Photo monitoring site*	RE type	Brigalow Belt Future Beef pasture photo standard type				Biomass kg/ha
		Eucalypt woodlands	Blue grass, wire grass	Alluvial	Downs country	
01	11.8.5	✓				1,800
02	11.8.11				✓	4,445
03	11.8.5	✓				3,050

Photo monitoring site*	RE type	Brigalow Belt Future Beef pasture photo standard type				Biomass kg/ha
		Eucalypt woodlands	Blue grass, wire grass	Alluvial	Downs country	
04	11.8.11				✓	4,445
05	11.8.5	✓				3,050
06	11.8.11				✓	3,433
07	11.4.3		✓			1,170
08	11.8.11				✓	4,445
09	11.3.3a			✓		3,405
10	11.8.5	✓				2,500

3.4 GENERAL SITE INSPECTION

The condition of all fencing and access gates across the MDS Project site was good, with no requirement for repair at the time of surveying. A number of existing access tracks and firebreaks had clearly been subject to minor rutting as a consequence of rainfall in November, and will require re-grading following the 2021 wet season.

Field traverses in the south-west of the MDS Project site in June 2020 noted areas of RE 11.8.11a under stress, with the majority of *Melaleuca bracteata* in these areas showing signs of dieback. At the time of the November 2020 dry season surveys, there was additional evidence of epicormic regrowth, further lending weight to the suggestion that the vegetation community is in a state of recovery following the drought prior to the 2019/2020 wet season. The condition of these communities will need to continue to be monitored to exclude alternative reasons for the dieback (e.g. whether a consequence of hydrological changes).

Site traverses as part of all monitoring activities on the MDS Project site showed no obvious evidence of any dust deposition, nor any impacts attributable to dust deposition on king blue-grass, bluegrass or other vegetation communities.

3.4.1 Significant species

While targeted survey for *Dichanthium queenslandicum* (king blue-grass) and *D. setosum* were not scheduled to be undertaken at the MDS Project site as part of the dry season surveys, populations of both species was confirmed at the site. A population of *D. queenslandicum* was confirmed adjacent Site 8, with a population of *D. setosum* confirmed along the habitat condition transect at Site 3 (Figure 3).

Detailed surveys for king blue-grass and blue grass are scheduled to be undertaken along pre-determined survey transects as part of the post-wet season surveys in April 2021.

4 RESULTS: MDS RAIL LOOP SITE

4.1 WEED MONITORING

A total of eight weed species were identified from the five weed monitoring plots. No additional species of weeds were observed on the site outside of those identified within the weed monitoring plots. Across the five weed monitoring plots, the average number of weed species observed per plot was 5.6 species, ranging between four species (Site MDSRL05) and seven species (Site MDSRL04), with only one weed species (*Leucaena leucocephala*) encountered at a single site. Weed cover across the five weed monitoring plots averaged 8.3%; ranging between 2.9% (Site MDSRL05) and 14% (Site MDSRL02)(Table 11 and Figure 9).

The most commonly encountered weeds were *Setaria incrassata* and *Physalis lanceifolia*, each recorded from all five sites (Table 11). However, while encountered at all sites, the average cover of *Physalis lanceifolia* across those five encountered sites averaged only 0.4%, whereas *Setaria incrassata* had the highest average cover of 5.4%. *Cenchrus ciliaris* was encountered at three of the five sites, but had the second highest average cover, averaging 2.1% cover across the three sites it was recorded from (Table 11).

Table 11: Results of weed monitoring assessments at the MDS Rail Loop site.

Scientific name	Common name	Family name	Percentage cover of weed species from given site					# sites	Avg cover (%)[a]
			MDSRL01	MDSRL02	MDSRL03	MDSRL04	MDSRL05		
Alternanthera pungens	Khaki weed	Amaranthaceae	0.1	0.1	0.2	0.5		4	0.2
Parthenium hysterophorus	Parthenium weed	Asteraceae	0.6		0.1	0.9		3	0.5
Leucaeana leucocephala	Leucaena	Fabaceae		0.1				1	0.1
Cenchrus ciliaris	Buffel grass	Poaceae	1.3	4.8		0.1		3	2.1
Melinis repens	Red natal grass	Poaceae	1.4		0.1	1.5	0.1	4	0.8
Setaria incrassata	Purple pigeon grass	Poaceae	2.6	8.5	7.4	6.9	1.7	5	5.4
Physalis lanceifolia	Gooseberry	Solanaceae	0.1	0.5	0.2	0.4	0.6	5	0.4
Verbena officinalis	Common verbena	Verbenaceae			0.2	0.1	0.5	3	0.3
		# species	**6**	**5**	**6**	**7**	**4**		
		Weed cover (%)[b]	**6.0**	**14.0**	**8.2**	**10.4**	**2.9**		

[a] Avg cover (%) represents the average percentage cover of a given weed species across encountered sites.

[b] Weed cover represents the sum of the average weed cover percentages of all weed species.

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148°26'E

148°27'E

24°22'S

24°23'S

MDSRL01 6

MDSRL02 5

MDSRL03 6

MDSRL04 7

MDSRL05 4

5 Number of weed species within weed monitoring plot

Weed monitoring plot symbolising % weed cover

09 Weed monitoring plot number

Sojitz Coal Mining Pty Ltd - MDS Rail Loop

Location diagram

Brisbane

Figure 9
MDS Rail Loop
Weed monitoring results

Disturbance areas
MDS Rail Loop site
Watercourse

Ground-truthed REs
RE 11.8.11
RE 11.8.11/11.8.5
RE 11.3.3a

Weed monitoring plots

Weed cover (%)
< 5
6 - 10
11 - 15
16 - 25
26 - 50
51 - 100

DATA SOURCE:
The following datasets provided by Sojitz
- Disturbance areas
- Ground-truthed REs

0 100 200 300 400
Metres

N

CO2 Australia

Date: 11/27/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:9,000@A3

Path: P:\GIS\Data\Projects\Sojitz\922_20201106_Lex_MDS_dry_season_20200201127 - Figure 9 - MDS RAIL LOOP weed monitoring plots.mxd

4.2 BIOMASS MONITORING

Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for monitoring all four of the sites comprising RE 11.8.11 (Table 12). Where the observed biomass at a site was mid-way between two photos within a given biomass standard, the middle of the corresponding range was reported (i.e. observed biomass between 2,140 kg/ha and 3,015 kg/ha 'Downs country' photo standards was reported as 2,578 kg/ha).

Photo monitoring showed limited variability in biomass of ground cover across the monitoring sites. Overall, there was moderate biomass for the vegetation type and time of year, ranging between 2,140 kg/ha and 2,578 kg/ha. This higher than expected biomass is likely a consequence of some rainfall at the site in the weeks prior to the survey.

Ground photos used to assign biomass at the MDS Rail Loop site are shown in Appendix D.

Table 12: Results of biomass monitoring on the MDS Project site using Brigalow Belt Future Beef pasture photo standards.

		Brigalow Belt Future Beef pasture photo standard type	
Photo monitoring site*	RE type	Downs country	Biomass kg/ha
MDSRL01	11.8.11	✓	2,578
MDSRL02	11.8.11	✓	2,140
MDSRL03	11.8.11	✓	2,140
MDSRL04	11.8.11	✓	2,578

* taken from the 50 m point of the permanent habitat monitoring transect.

4.3 GENERAL SITE INSPECTION

Construction of the MDS Rail Loop was complete at the time of the dry season survey. No development was observed outside of the extent of disturbance, and no rubbish or other matters likely to impact on the monitoring area was observed. This included no evidence of dust or other particulate material on the vegetation within the MDS Rail Loop monitoring area.

5 RESULTS: LEXINGTON OFFSET SITE

5.1 BIOMASS MONITORING

Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for offset areas comprising of RE 11.8.11 and RE 11.8.11a, whilst photo monitoring results from areas of RE 11.8.4 and RE 11.8.5 were assessed against 'Narrow-leaved Ironbark' photo standards (Table 13).

Photo monitoring showed some variability in the biomass of ground cover. Sites in RE 11.8.11 and 11.8.11a were all at least 2,578 kg/ha and up to 4,445 kg/ha (Site 01), while biomass in RE 11.8.4 and RE 11.8.5 ranged between 1,475 kg/ha in rockier upslope areas (Site 02) and 5,000 kg/ha (Site 11) associated with more open grassy woodland areas (Table 13). The biomass across all sites was higher than expected for the end of the dry season, likely a consequence of rain during mid- to late October.

Ground photos used to assign biomass at the Lexington offset site are shown in Appendix E.

Table 13: Results of biomass monitoring on the Lexington offset site using Brigalow Belt Future Beef pasture photo standards.

		Brigalow Belt pasture photo standard type		
Photo monitoring site*	RE type	Narrow-leaved ironbark	Downs country	Biomass kg/ha
01	11.8.11		✓	4,445
02	11.8.4	✓		1,475
03	11.8.11		✓	2,578
04	11.8.5	✓		2,000
05	11.8.4	✓		1,750
06	11.8.11		✓	2,578
07	11.8.4	✓		1,750
08	11.8.11a		✓	2,578
09	11.8.11a		✓	3,850
10	11.8.11a		✓	3,015
11	11.8.5	✓		5,000
12	11.8.11		✓	3,850
13	11.8.11		✓	3,850
14	11.8.5	✓		3,625
15	11.8.4	✓		2,000
16	11.8.11		✓	3,015
17	11.8.11		✓	3,015
18	11.8.5	✓		3,625
19	11.8.4	✓		2,000

Photo monitoring site*	RE type	Brigalow Belt pasture photo standard type		Biomass kg/ha
		Narrow-leaved ironbark	Downs country	
20	11.8.11		✓	4,445

* taken from the 0 m point of the permanent habitat monitoring transects (Sites 01 – 12) and the SW corner of the standalone weed monitoring plots (Sites 13 – 20).

5.2 GENERAL SITE INSPECTION

Ongoing upgrades and installations of fencing has occurred throughout the Lexington offset site since the post-wet season surveys in June 2020. Updated fencing and access tracks will be mapped and presented in the post-wet season reporting in 2021. Additional fencing extent and access tracks outside of the extent of traversed areas in November 2020 could not be confirmed and will need to be supplied.

It is understood that a share-farming agreement is in place to limit the head of cattle per paddock. However, past evidence of cattle were observed in the natural grassland areas in the west of the Lexington offset area during the dry season monitoring.

Outside of the weed monitoring plots assessed as part of the post-wet season surveys, there were a number of areas where weed infestation was considered serious. Most noticeably was the extent and density of weeds within and adjacent to the ephemeral drainage line and bore on Prickle Farm Road that flanks the western edge of the mining lease (ML 70376). As previously noted, the ephemeral drainage line continues to be densely infested by Noogoora burr (*Xanthium occidentale*), with areas away from the drainage line characterised by dense, monospecific stands of *Parthenium hysterophorus*. Furthermore, the coverage of *Vachellia farnesiana* appears to be increasing throughout the western Natural Grassland (RE 11.8.11) areas (Figure 10).

Figure 10: Extensive coverage of *Vachellia farnesiana* in natural Grassland areas (RE 11.8.11) in the west of the Lexington offset site.

5.2.1 Significant species

While targeted survey for *Dichanthium queenslandicum* (king blue-grass) and *D. setosum* were not scheduled to be undertaken at the Lexington offset site, numerous populations of both species was confirmed throughout the site. Specifically, a population of *D. queenslandicum* was confirmed from near the vicinity of Site 12 in Natural Grassland habitat (RE 11.8.11) in the east of the Lexington offset area (Figure 13).

The presence of non-flowering *D. setosum*[2] was also confirmed in areas of RE 11.8.5 and RE 11.8.4 in the west of the offset area. Similarly, large populations seen in June 2020 were again confirmed from the vicinity of weed monitoring plots near site 02, site 07 and site 19.

While flowering of *D. queenslandicum* and *D. setosum* is more typical during and after the wet season, the November rainfall is likely to have promoted the earlier than expected flush of growth.

Figure 11: A population of *Dichanthium queenslandicum* observed at Site 12 in the east of the Lexington offset area.

[2] Prior surveying by CO2 Australia ecologists in March 2018 confirmed the presence of a previously undescribed species of *Dichanthium* from the Lexington offset area. This species was given the interim name *Dichanthium sp. affine. sericeum* until such time as it is formally described. Since this initial 2018 survey, CO2 Australia ecologist Dr Jarrad Cousin has confirmed additional populations of this undescribed species from other properties in the greater Springsure - Rolleston area. While investigations into this undescribed species are continuing by botanists from the Queensland Herbarium, with assistance from CO2 Australia, discerning the two species in the field is difficult, especially when there is limited flowering material. Consequently, it is highly likely that many of the populations identified as *D. setosum* could in fact be the morphologically similar undescribed *Dichanthium* species. For the purposes of reporting however, and until such time as the species is formally described, any setosum-like species of *Dichanthium* is considered *D. setosum*.

6 RESULTS: LEXINGTON RAIL LOOP OFFSET SITE

6.1 WEED MONITORING

A total of 18 weed species were identified from the 12 weed monitoring plots. No additional species of weeds were observed on the site outside of those identified within the weed monitoring plots. Across the 12 weed monitoring plots, the average number of weed species observed per plot was 6.5 species, ranging between two species (Site LEXRL06 and LEXRL07) and 12 species (Site LEXRL09), with four weed species only encountered at single sites. Weed cover across the 12 weed monitoring plots averaged 10.2%; ranging between 1.2% (Site LEXRL05) and 29.2% (Site LEXRL09)(Table 14, Figure 12 and Figure 13).

The number of weed species differed by offset paddock, with the North Promenade paddock having a higher weed species richness and average cover (10 species and 20.6% cover) than Harry's (7 species and 7.5% cover), with Contours having the lowest weed species richness and average cover of all three paddocks (3.4 species and 3.4% cover).

The most commonly encountered weed was red natal grass (*Melinis repens*) which was recorded from all 12 sites (Table 14). *Parthenium hysterophorus* had the highest average cover of 5.7%, followed by sow thistle (*Sonchus oleracea*) which from the five sites it was encountered at, had an average cover of 3.1%. Eleven of the 18 weed species (61%) had average covers <0.5%.

Table 14: Results of weed monitoring assessments at the Lexington Rail Loop offset site.

Scientific name	Common name	Family name	Percentage cover of weed species from given site												# sites	Avg cover (%)[a]
			LEXRL01	LEXRL02	LEXRL03	LEXRL04	LEXRL05	LEXRL06	LEXRL07	LEXRL08	LEXRL09	LEXRL10	LEXRL11	LEXRL12		
Alternanthera pungens	Khaki weed	Amaranthaceae	0.1												1	0.1
Lactuca serriola	Prickly lettuce	Asteraceae	0.3	0.3	0.2					2.2	0.4				5	0.7
Parthenium hysterophorus	Parthenium weed	Asteraceae	12.3	1.4	1.3	4.2				4.8	11.1	3.8	7.2		8	5.7
Senecio madagascariensis	Fireweed	Asteraceae	4.0	1.8	0.4					2.3	3.2				5	2.3
Sonchus oleracea	Sow thistle	Asteraceae	4.7	1.5						2.1	7.0	0.1			5	3.1
Tridax procumbens	Tridax daisy	Asteraceae			0.3	0.2						1.1			3	0.5
Verbesina encelioides	Goldweed	Asteraceae			0.1										1	0.1
Cucumis myriocarpus	Paddy melon	Cucurbitaceae								0.1					1	0.1
Clitoria ternatea	Butterfly pea	Fabaceae			0.6	0.2									2	0.4
Vachellia farnesiana	Mimosa bush	Fabaceae	3.0	2.9				2.5		3.7	3.0				5	3.0
Sida spinosa	Sida	Malvaceae	0.1	0.1	0.1										3	0.1
Cenchrus ciliaris	Buffel grass	Poaceae		0.2		0.1	0.1			0.5	1.1			0.1	6	0.4
Megathyrsus maximus	Guinea grass	Poaceae			0.1						0.2		0.1	0.1	4	0.1
Melinis repens	Red natal grass	Poaceae	0.3	1.7	0.2	1.1	0.8	0.4	1.0	0.4	0.1	3.3	1.5	1.6	12	1.0
Sorghum halepense	Johnson grass	Poaceae			0.5						0.5		0.1		3	0.4
Rumex crispus	Curled dock	Polygonaceae									0.3				1	0.3
Physalis lanceifolia	Gooseberry	Solanaceae								0.1	1.5			0.1	3	0.6
Verbena officinalis	Common verbena	Verbenaceae	0.5	0.3	1.5		0.3		0.5	1.7	0.8	3.2	0.2	0.5	10	0.9
		# species	**9**	**9**	**11**	**5**	**3**	**2**	**2**	**10**	**12**	**5**	**5**	**5**		
		Weed cover (%)[b]	**25.3**	**10.2**	**5.3**	**5.8**	**1.2**	**2.9**	**1.5**	**17.9**	**29.2**	**11.5**	**9.1**	**2.4**		

[a] Avg cover (%) represents the average percentage cover of a given weed species across encountered sites.

[b] Weed cover represents the sum of the average weed cover percentages of all weed species.

148°1'30"E

148°2'E

23°54'30"S

23°55'S

North Promenade

9

12

10

9

ML 70145

Sojitz Coal Mining Pty Ltd - Lexington Rail Loop offset

Location diagram

Brisbane

Figure 12
Lexington Rail Loop offset
Weed monitoring results - west

Lexington existing fences
Access tracks
Lexington offset area
Mining leases (ML70376 and ML70145)

Lexington Rail Loop offset
North Promenade paddock

Observed vegetation
RE 11.8.11
RE 11.8.5

Weed monitoring plots

Weed cover (%)
< 5
6 - 10
11 - 15
16 - 25
26 - 50
51 - 100

DATA SOURCE:
The following datasets are © State of Qld:
- Mining leases
The following datasets provided by Sojitz
- Lexington Rail Loop offset areas

0 50 100 150 200
Metres

N

CO2 Australia

Date: 11/27/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:6,000@A3

Path: P:\GISData\Projects\Sojitz\922_20201106_Lex_MDS_dry_season_20200201127 - Figure 12 - LEXINGTON RAIL LOOP weed monitoring plots west.mxd

148°4'E 148°5'E 148°6'E

23°54'S 23°55'S 23°56'S

ML 70376

11
LEXRL03

5
LEXRL04

5
LEXRL10

Harry's

3
LEXRL05

5
LEXRL12

2
LEXRL06

Contours

5
LEXRL11

2
LEXRL07

ML 70145

ML 70376

Hwy

Sojitz Coal Mining Pty Ltd - Lexington Rail Loop offset

Figure 13
Lexington Rail Loop offset
Weed monitoring results - east

Lexington existing fences
Access tracks
Lexington Rail Loop offset
Harry's paddock
Contours paddock

Observed vegetation
RE 11.8.11
RE 11.8.5

Weed monitoring plots

Weed cover (%)
< 5
6 - 10
11 - 15
16 - 25
26 - 50
51 - 100

Location diagram

Brisbane

DATA SOURCE:
The following datasets are © State of Qld:
- Mining leases
The following datasets provided by Sojitz
- Lexington Rail Loop offset areas

0 200 400 600 800
Metres

N

CO2 Australia

Date: 11/27/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:17,500@A3

Path: P:\GISData\Projects\Sojitz\922_20201106_Lex_MDS_dry_season_20201201127 - Figure 13 - LEXINGTON RAIL LOOP weed monitoring plots east.mxd

6.2 BIOMASS MONITORING

Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for monitoring all twelve of the sites comprising RE 11.8.11 (Table 15). Where the observed biomass at a site was mid-way between two photos within a given biomass standard, the middle of the corresponding range was reported (i.e. observed biomass between 3,015 kg/ha and 3,850 kg/ha 'Downs country' photo standards was reported as 3,433 kg/ha).

Photo monitoring showed some variability in biomass of ground cover across all 12 photo monitoring sites. Overall, there was a high biomass for the grassland vegetation type. Aside from a single site supporting an estimated 1,610 kg/ha (Site LEXRL09), all sites supported at least 2,578 kg/ha, including one site (LEXRL12) supporting 5,040 kg/ha. The average biomass varied considerably between the offset paddocks, with the average biomass at Contours (4,564 kg/ha) greater than at Harry's (3,346 kg/ha) and greater again than at North Promenade (3,081 kg/ha).

Ground photos used to assign biomass at the Lexington Rail Loop offset site are shown in Appendix F.

Table 15: Results of biomass monitoring on the Lexington Rail Loop offset site using Brigalow Belt Future Beef pasture photo standards.

		Brigalow Belt Future Beef pasture photo standard type	
Photo monitoring site*	RE type	Downs country	Biomass kg/ha
LEXRL01 – North Promenade paddock	11.8.11	✓	3,015
LEXRL02 – North Promenade paddock	11.8.11	✓	3,850
LEXRL03 – Harry's paddock	11.8.11	✓	2,578
LEXRL04 – Harry's paddock	11.8.11	✓	3,015
LEXRL05 – Contours paddock	11.8.11	✓	4,445
LEXRL06 – Contours paddock	11.8.11	✓	4,445
LEXRL07 – Contours paddock	11.8.11	✓	4,445
LEXRL08 – North Promenade paddock	11.8.11	✓	3,850
LEXRL09 – North Promenade paddock	11.8.11	✓	1,610
LEXRL10 – Harry's paddock	11.8.11	✓	4,445
LEXRL11 – Contours paddock	11.8.11	✓	4,445
LEXRL12 – Contours paddock	11.8.11	✓	5,040

* taken from the 0 m point of the permanent habitat monitoring transects (Sites LEXRL01 – LEXRL07) and the SW corner of the standalone weed monitoring plots (Sites LEXRL08 – LEXRL12).

6.3 GENERAL SITE INSPECTION

It is understood that a share-farming agreement is in place to limit the head of cattle per paddock. A herd of 5 – 6 horses was encountered within Harry's Paddock, with evidence throughout the paddock of horse manure. Likewise, evidence of cattle was observed within Contours paddock and in the vicinity of the southern boundary of North Promenade paddock.

All fences bounding the paddocks were in good condition. Access to many of the monitoring sites in the Contours paddock was via an access track outside of and adjacent to the western boundary of the paddock,

whereas access to monitoring sites in Harry's paddock was via Wurba Road and access to the North Promenade monitoring sites was via existing access tracks into Lexington.

6.3.1 Significant species

While targeted survey for *Dichanthium queenslandicum* (king blue-grass) were not scheduled to be undertaken at the Lexington Rail Loop offset site, numerous populations of the species was confirmed. Most notably, a significant population of *D. queenslandicum* was noted throughout the LEXRL12 weed monitoring plot in the Contours paddock, with a population estimate of >250 tussocks (Figure 14). Further populations of *D. queenslandicum* were also confirmed from multiple locations within the LEXRL05 weed monitoring plot in the same paddock.

Figure 14: A population of more than 250 tussocks of *Dichanthium queenslandicum* observed at LEXRL12.

7 REFERENCES

Auld, B. (2009). *Guidelines for Monitoring Weed Control and Recovery of Native Vegetation*. NSW Department of Primary Industries. Bureau of Rural Sciences, Orange NSW.

CO2 Australia (2017). *MNESMP Baseline Monitoring Report – Meteor Downs South Coal Mine Project.* CO2 Australia, Brisbane, QLD.

CO2 Australia (2018). *Lexington Offset Area Initial Baseline Monitoring Report – Meteor Downs South Project*. CO2 Australia, Brisbane, QLD.

CO2 Australia (2020). *Post-wet Season Monitoring Report – Year 3 (2019/20).* CO2 Australia, Brisbane, QLD.

Department of Environment and Heritage Protection (DEHP). (2017). *Guide to determining terrestrial habitat quality – version 1.2.* Department of Environment and Heritage Protection (State of Queensland), Brisbane.

SLR Consulting (SLR) (2019). *Matters of National Environmental Significance Management Plan – Meteor Downs South Rail Loop Project.* A report prepared for Sojitz Coal Mining Pty Ltd. SLR Consulting, Townsville.

APPENDIX A MONITORING SITE LOCATIONS

MDS PROJECT SITE

Table A-1: Dry-season monitoring site locations and purpose on the MDS Project site.

Site	Start point name[a]	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Biomass monitoring
01	H01_0m	641462	7304249	✓	Squatter pigeon	✓	✓
	H01_50m	641462	7304301	✓		✓	
	W01_01	641462	7304249	✓		✓	
	W01_02	641462	7304301	✓			
	W01_03	641462	7304348				
02	H02_0m	640199	7303572	✓	Natural Grasslands TEC, King blue-grass, bluegrass	✓	✓
	H02_50m	640203	7303621	✓		✓	
	W02_01	640199	7303572	✓		✓	
	W02_02	640203	7303621	✓			
	W02_03	640210	7303627				
03	H03_0m	638418	7303259	✓	Squatter pigeon	✓	✓
	H03_50m	638425	7303308	✓		✓	
	W03_01	638418	7303259	✓		✓	
	W03_02	638425	7303308	✓			
	W03_03	638430	7303358				
04	H04_0m	637945	7300236	✓	Natural Grasslands TEC, King blue-grass, bluegrass	✓	✓

Site	Start point name[a]	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Biomass monitoring
	H04_50m	637951	7300287	✓		✓	
	W04_01	637945	7300236	✓		✓	
	W04_02	637951	7300287	✓			
	W04_03	637950	7300338				
05	H05_0m	638426	7299836	✓	Squatter pigeon	✓	✓
	H05_50m	638420	7299885	✓		✓	
	W05_01	638426	7299836	✓		✓	
	W05_02	638420	7299885	✓			
	W05_03	638416	7299937				
06	H06_0m	637445	7299566	✓	Natural Grasslands TEC, King blue-grass, bluegrass	✓	✓
	H06_50m	637447	7299615	✓		✓	
	W06_01	637445	7299566	✓		✓	
	W06_02	637447	7299615	✓			
	W06_03	637443	7299668				
07	H07_0m	638426	7298876	✓	Brigalow TEC	✓	✓
	H07_50m	638419	7298926	✓		✓	
	W07_01	638426	7298876	✓		✓	
	W07_02	638419	7298926	✓			
	W07_03	638423	7298974				
08	H08_0m	637032	7298735	✓	Natural Grasslands TEC, King blue-grass, bluegrass	✓	✓

Site	Start point name[a]	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Biomass monitoring
	H08_50m	637034	7298785	✓		✓	
	W08_01	637032	7298735	✓		✓	
	W08_02	637034	7298785	✓			
	W08_03	637039	7298835				
09	H09_0m	638387	7298599	✓	Australian painted snipe	✓	✓
	H09_50m	638380	7298648	✓		✓	
	W09_01	638387	7298599	✓		✓	
	W09_02	638380	7298648	✓			
	W09_03	638372	7298699				
10	H10_0m	636412	7297523	✓	Squatter pigeon	✓	✓
	H10_50m	636415	7297571	✓		✓	
	W10_01	636412	7297523	✓		✓	
	W10_02	636415	7297571	✓			
	W10_03	636413	7297617				
11	W11_01	642941	7304772	✓		✓	
	W11_02	642937	7304825				
	W11_03	642938	7304876				
12	W12_01	641428	7303597	✓		✓	
	W12_02	641426	7303646				
	W12_03	641429	7303696				

Site	Start point name[a]	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Biomass monitoring
13	W13_01	641896	7303196	✓		✓	
	W13_02	641899	7303247				
	W13_03	641900	7303297				
14	W14_01	638991	7303038	✓		✓	
	W14_02	638987	7303090				
	W14_03	638988	7303140				
15	W15_01	637797	7302245	✓		✓	
	W15_02	637796	7302296				
	W15_03	637796	7302347				
16	W16_01	638556	7300785	✓		✓	
	W16_02	638560	7300832				
	W16_03	638566	7300882				
17	W17_01	637029	7300184	✓		✓	
	W17_02	637028	7300231				
	W17_03	637024	7300282				
18	W18_01	637401	7300321	✓		✓	
	W18_02	637401	7300368				
	W18_03	637398	7300421				
19	W19_01	638301	7301720	✓		✓	
	W19_02	638295	7301771				

Site	Start point name[a]	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Biomass monitoring
	W19_03	638290	7301821				
20	W20_01	636740	7298674	✓		✓	
	W20_02	636746	7298723				
	W20_03	636752	7298771				

[a] Start points with prefix H = habitat assessment sites (HXX_0m and HXX_50m corresponds to 0 m and 50 m point of north-south habitat assessment transect), W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3).

MDS RAIL LOOP SITE

Table A-2: Dry-season monitoring site locations and purpose on the MDS Rail Loop site.

Site	Start point name[a]	Easting	Northing	Star picket?	Weed monitoring	Biomass monitoring
MDSRL01	W01_01	645575	7303101	✓	✓	
	W01_02	645575	7303151	✓	✓	✓
	W01_03	645575	7303201		✓	
MDSRL02	W02_01	646410	7303007	✓	✓	
	W02_02	646410	7303057	✓	✓	✓

Site	Start point name[a]	Easting	Northing	Star picket?	Weed monitoring	Biomass monitoring
	W02_03	646410	7303107		✓	
MDSRL03	W03_01	646666	7303114	✓	✓	
	W03_02	646666	7303164	✓	✓	✓
	W03_03	646666	7303214		✓	
MDSRL04	W04_01	646834	7303291	✓	✓	
	W04_02	646834	7303341	✓	✓	✓
	W04_03	646834	7303391		✓	
MDSRL05	W05_01	646409	7303255	✓	✓	
	W05_02	646409	7303305		✓	
	W05_03	646409	7303355		✓	

[a] Start points with prefix W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3).

LEXINGTON OFFSET SITE

Table A-3: Dry-season monitoring site locations and purpose on the Lexington offset site.

Site	Start point name[a]	Easting	Northing	Star picket?	Biomass monitoring
01	W01_01	604331	7354000	✓	✓
	W01_02	604331	7353950	✓	
	W01_03	604331	7353900		
02	W02_01	603925	7353100	✓	✓
	W02_02	603908	7353053	✓	
	W02_03	603892	7353005		
03	W03_01	604380	7352577	✓	✓
	W03_02	604380	7352527	✓	
	W03_03	604380	7352477		
04	W04_01	603904	7351791	✓	✓
	W04_02	603904	7351741	✓	
	W04_03	603904	7351691		
05	W05_01	603360	7351127	✓	✓
	W05_02	603345	7351079	✓	
	W05_03	603330	7351031		
06	W06_01	604790	7351295	✓	✓
	W06_02	604790	7351245	✓	
	W06_03	604790	7351195		

Site	Start point name[a]	Easting	Northing	Star picket?	Biomass monitoring
07	W07_01	604649	7350850	✓	✓
	W07_02	604649	7350800	✓	
	W07_03	604649	7350750		
08	W08_01	606488	7350461	✓	✓
	W08_02	606488	7350411	✓	
	W08_03	606488	7350361		
09	W09_01	607401	7351233	✓	✓
	W09_02	607401	7351183	✓	
	W09_03	607401	7351133		
10	W10_01	607175	7351671	✓	✓
	W10_02	607175	7351621	✓	
	W10_03	607175	7351571		
11	W11_01	609631	7353204	✓	✓
	W11_02	609631	7353154	✓	
	W11_03	609631	7353104		
12	W12_01	610371	7353217	✓	✓
	W12_02	610371	7353167	✓	
	W12_03	610371	7353117		
13	W13_01	610237	7352615	✓	✓
	W13_02	610237	7352565	✓	
	W13_03	610237	7352515		

Site	Start point name[a]	Easting	Northing	Star picket?	Biomass monitoring
14	W14_01	604883	7354051	✓	✓
	W14_02	604883	7354001		
	W14_03	604883	7353951		
15	W15_01	604543	7352984	✓	✓
	W15_02	604543	7352934		
	W15_03	604543	7352884		
16	W16_01	604604	7352289	✓	✓
	W16_02	604604	7352239		
	W16_03	604604	7352189		
17	W17_01	604503	7351656	✓	✓
	W17_02	604503	7351606		
	W17_03	604503	7351556		
18	W18_01	604074	7350714	✓	✓
	W18_02	604074	7350664		
	W18_03	604074	7350614		
19	W19_01	603812	7352530	✓	✓
	W19_02	603798	7352482		
	W19_03	603784	7352434		
20	W20_01	610453	7352923	✓	✓
	W20_02	610453	7352873		
	W20_03	610453	7352823		

[a] Start points with prefix W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3).

LEXINGTON RAIL LOOP OFFSET SITE

Table A-4: Dry-season monitoring site locations and purpose on the Lexington Rail Loop offset site.

Site	Start point name[a]	Easting	Northing	Star picket?	Weed monitoring	Biomass monitoring
LEXRL01	W01_01	604390	7355247	✓	✓	✓
	W01_02	604390	7355297		✓	
	W01_03	604390	7355347		✓	
LEXRL02	W02_01	604758	7354797	✓	✓	✓
	W02_02	604758	7354847		✓	
	W02_03	604758	7354897		✓	
LEXRL03	W03_01	608595	7355228	✓	✓	✓
	W03_02	608595	7355278		✓	
	W03_03	608595	7355328		✓	
LEXRL04	W04_01	609262	7355036	✓	✓	✓
	W04_02	609262	7355086		✓	
	W04_03	609262	7355136		✓	
LEXRL05	W05_01	612011	7354575	✓	✓	✓
	W05_02	612011	7354625		✓	
	W05_03	612011	7354675		✓	
LEXRL06	W06_01	611834	7354280	✓	✓	✓
	W06_02	611834	7354330		✓	

Site	Start point name[a]	Easting	Northing	Star picket?	Weed monitoring	Biomass monitoring
	W06_03	611834	7354380		✓	
LEXRL07	W07_01	611215	7353711	✓	✓	✓
	W07_02	611215	7353761		✓	
	W07_03	611215	7353811		✓	
LEXRL08	W08_01	604126	7354813	✓	✓	✓
	W08_02	604126	7354863		✓	
	W08_03	604126	7354913		✓	
LEXRL09	W09_01	604978	7355196	✓	✓	✓
	W09_02	604978	7355246		✓	
	W09_03	604978	7355296		✓	
LEXRL10	W010_01	609785	7355039	✓	✓	✓
	W010_02	609785	7355089		✓	
	W010_03	609785	7355139		✓	
LEXRL11	W11_01	611630	7353857	✓	✓	✓
	W11_02	611630	7353907		✓	
	W11_03	611630	7353957		✓	
LEXRL12	W12_01	612344	7354534	✓	✓	✓
	W12_02	612344	7354584		✓	
	W12_03	612344	7354634		✓	

[a] Start points with prefix W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3).

APPENDIX B MDS PROJECT SITE YEAR 4 HABITAT CONDITION ASSESSMENT

The following tables provide details of the habitat condition assessments undertaken during the Year 4 monitoring period at the MDS Project site (Meteor Downs South). Habitat condition scores were calculated in accordance with the *Guide to Determining Terrestrial Habitat Quality version 1.2* (DEHP, 2017). The data required to inform the site condition, fauna species habitat index scores and flora species stocking rates were collected as part of detailed field surveys in December 2019. The site context score was calculated based on a desktop assessment following the method prescribed in the *Guide to Determining Terrestrial Habitat Quality version 1.2* (DEHP, 2017), incorporating ground-truthed regional ecosystem mapping within the extent of ML70452.

Table B-1: Site condition raw data for each RE assessment unit

Ecological condition indicators	Site 01 RE 11.8.5			Site 02 RE 11.8.11			Site 03 RE 11.8.5			Site 04 RE 11.8.11			Site 05 RE 11.8.5			Site 06 RE 11.8.11			Site 07 RE 11.4.3			Site 08 RE 11.8.11			Site 09 RE 11.3.3a			Site 10 RE 11.8.5		
	Raw data	Benchmark (11.8.5)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.5)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.5)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.4.3)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.3.3)	Score	Raw data	Benchmark (11.8.5)	Score
Recruitment of woody perennial species	100	100	5		-	-	100	100	5		-	-	100	100	5		-	-	100	100	5		-	-	100	100	5	100	100	5
Native plant species richness - trees	2	2	5		-	-	4	2	5		-	-	1	2	3		-	-	6	2	5		-	-	2	3	3	2	2	5
Native plant species richness - shrubs	1	3	3		-	-	2	3	3		-	-	1	3	3		-	-	5	10	3		-	-	1	5	2.5	2	3	3
Native plant species richness - grasses	9	6	5	9	11	3	7	6	5	6	11	3	8	6	5	9	11	3	10	4	5	8	11	3	7	12	3	6	6	5
Native plant species richness - forbs	9	16	3	6	17	3	13	16	3	8	17	3	13	16	3	11	17	3	15	13	5	7	17	3	9	15	3	8	16	3
Tree canopy height	14.2	15	5		-	-	17.1	15	5		-	-	10.9	15	2.5		-	-	11.7	24	3		-	-	8.8	18	1.5	15.5	15	5
Tree sub canopy height	6.4	5			-		6.5	5			-		0	5			-						-		0	10		6.2	5	
Tree canopy cover	3.6	13	1		-	-	15.3	13	5		-	-	0	13	0		-	-	33.9	70	2		-	-	19.5	28	2.5	6.9	13	2.5
Tree sub canopy cover	0	4			-		2.2	4			-		0	4			-						-		0	5		0	4	
Shrub canopy cover	1.1	3	3		-	-	0	3	0		-	-	0	3	0		-	-	2.5	48	0		-	-	0.9	4	3	1.3	3	3
Native perennial grass cover	54	60	3	50	43	5	69	60	5	60	43	5	36	60	3	41	43	5	10.4	6	5	46	43	5	40	45	3	61	60	5
Organic litter	38.2	25	5	41	13	3	23	25	5	20	13	5	46	25	5	45	13	3	72.2	75	5	37	13	3	39	30	5	32.6	25	5
Large eucalypt trees	6	6	10		-	-	12	6	15		-	-	2	6	5		-	-		0	0		-	-	0	10	0	8	6	15
Large non-eucalypt trees	0	0			-		0	0			-		0	0			-		0	80			-		0	0		0	0	
Coarse woody debris	133	250	5		-	-	542	250	2		-	-	63	250	2		-	-	769	1752	2		-	-	0	285	0	196	250	5
Non-native plant cover	0.2	0	10	0.75	0	10	0.1	0	10	15.3	0	5	0.5	0	10	0.3	0	10	0	0	10	0.4	0	10	7.5	0	5	3.05	0	10
Total			63			24			68			21			46.5			24			50			24			36.5			71.5
/10			**7.88**			**8.00**			**8.50**			**7.00**			**5.81**			**8.00**			**6.25**			**8.00**			**4.56**			**8.94**

Table B-2: Summary of the site condition, site context and fauna species habitat index scores used to calculate the habitat condition score for each RE assessment unit

MNES values	Site 01 11.8.5 Squatter pigeon	Site 02 11.8.11 Natural Grasslands TEC, King blue-grass, Bluegrass	Site 03 11.8.5 Squatter pigeon	Site 04 11.8.11 Natural Grasslands TEC, King blue-grass, Bluegrass	Site 05 11.8.5 Squatter pigeon	Site 06 11.8.11 Natural Grasslands TEC, King blue-grass, Bluegrass	Site 07 11.4.3 Brigalow TEC	Site 08 11.8.11 Natural Grasslands TEC, King blue-grass, Bluegrass	Site 09 11.3.3a Australian painted snipe	Site 10 11.8.5 Squatter pigeon
Site condition										
Recruitment of woody perennial species	5	-	5	-	5	-	5	-	5	5
Native plant species richness - trees	5	-	5	-	3	-	5	-	3	5
Native plant species richness - shrubs	3	-	3	-	3	-	3	-	2.5	3
Native plant species richness - grasses	5	3	5	3	5	3	5	3	3	5
Native plant species richness - forbs	3	3	3	3	3	3	5	3	3	3
Tree canopy height	5	-	5	-	2.5	-	3	-	1.5	5
Tree canopy cover	1	-	5	-	0	-	2	-	2.5	2.5
Shrub canopy cover	3	-	0	-	0	-	0	-	3	3
Native perennial grass cover	3	5	5	5	3	5	5	5	3	5
Organic litter	5	3	5	5	5	3	5	3	5	5
Large trees	10	-	15	-	5	-	0	-	0	15
Coarse woody debris	5	-	2	-	2	-	2	-	0	5
Non-native plant cover	10	10	10	5	10	10	10	10	5	10
Total of BioCondition attributes	63	24	68	21	46.5	24	50	24	36.5	71.5
MAX ecological condition score	80	30	80	30	80	30	80	30	80	80
Score /10	**7.88**	**8.00**	**8.50**	**7.00**	**5.81**	**8.00**	**6.25**	**8.00**	**4.56**	**8.94**
Site context										
Size of patch (fragmented bioregions)	10	10	10	10	10	10	10	10	10	10
Connectivity (fragmented bioregions)	5	4	5	5	5	5	5	5	5	5
Context (fragmented bioregions)	5	4	5	5	5	4	5	4	5	5
Distance to permanent watering point (intact bioregions)	-	-	-	-	-	-	-	-	-	-
Ecological corridors	0	0	0	0	0	0	0	0	0	0
Total of site context attributes	20	18	20	20	20	19	20	19	20	20
MAX site condition score	26	26	26	26	26	26	26	26	26	26
Score /10	**7.69**	**6.92**	**7.69**	**7.69**	**7.69**	**7.31**	**7.69**	**7.31**	**7.69**	**7.69**
Fauna species habitat index										
Threats to species	7	-	7	-	7	-	-	-	1	7
Quality and availability of food and foraging habitat	5	-	5	-	5	-	-	-	5	5
Quality and availability of shelter	5	-	5	-	5	-	-	-	5	5
Species mobility capacity	10	-	10	-	10	-	-	-	1	10

MNES values	Site 01 11.8.5 Squatter pigeon	Site 02 11.8.11 Natural Grasslands TEC, King blue-grass, Bluegrass	Site 03 11.8.5 Squatter pigeon	Site 04 11.8.11 Natural Grasslands TEC, King blue-grass, Bluegrass	Site 05 11.8.5 Squatter pigeon	Site 06 11.8.11 Natural Grasslands TEC, King blue-grass, Bluegrass	Site 07 11.4.3 Brigalow TEC	Site 08 11.8.11 Natural Grasslands TEC, King blue-grass, Bluegrass	Site 09 11.3.3a Australian painted snipe	Site 10 11.8.5 Squatter pigeon
Role of site location to species overall population in the state	3	-	3	-	3	-	-	-	4	3
Total of fauna species habitat index	30	-	30	-	30	-	-	-	16	30
MAX fauna habitat index score	50	-	50	-	50	-	-	-	50	50
Score /10	**6.00**	**-**	**6.00**	**-**	**6.00**	**-**	**-**	**-**	**3.20**	**6.00**

Table B-3: Summary of the species stocking rate index for king blue-grass and bluegrass

Species stocking rate /3[a]	Site 01 11.8.5	Site 02 11.8.11	Site 03 11.8.5	Site 04 11.8.11	Site 05 11.8.5	Site 06 11.8.11	Site 07 11.4.3	Site 08 11.8.11	Site 09 11.3.3a	Site 10 11.8.5
King blue-grass	-	0	-	0	-	0	-	0	-	-
Bluegrass	-	0	-	0	-	0	-	0	-	-

[a] species stocking rate contributes 20% toward the habitat condition score for the two MNES flora species, with the remaining 80% made up of site condition and site context.

Table B-4: Summary of the MNES habitat condition score for each RE assessment unit

Assessment unit habitat condition score /10	Site 01 11.8.5	Site 02 11.8.11	Site 03 11.8.5	Site 04 11.8.11	Site 05 11.8.5	Site 06 11.8.11	Site 07 11.4.3	Site 08 11.8.11	Site 09 11.3.3a	Site 10 11.8.5	FINAL MNES habitat quality score
Brigalow TEC	-	-	-	-	-	-	6.60	-	-	-	**6.60**
Natural Grasslands TEC	-	7.50	-	7.32	-	7.68	-	7.68	-	-	**7.54**
King blue-grass	-	6.00	-	5.86	-	6.14	-	6.14	-	-	**6.04**
Bluegrass	-	6.00	-	5.86	-	6.14	-	6.14	-	-	**6.04**
Squatter pigeon	7.24	-	8.21	-	6.19	-	-	-	-	8.43	**7.52**
Australian painted snipe	-	-	-	-	-	-	-	-	4.14	-	**4.14**

APPENDIX C MDS PROJECT SITE PHOTO MONITORING

SITE 01 – H01_0M

Photo C-1 North

Photo C-2 East

Photo C-3 South

Photo C-4 West

Photo C-5 Ground

SITE 01 – H01_50M

Photo C-6 North

Photo C-7 East

Photo C-8 South

Photo C-9 West

Photo C-10 Ground

SITE 02 – H02_0 M

Photo C-11 North

Photo C-12 East

Photo C-13 South

Photo C-14 West

Photo C-15 Ground

SITE 02 – H02_50M

Photo C-16 North

Photo C-17 East

Photo C-18 South

Photo C-19 West

Photo C-20 Ground

SITE 03 – H03_0M

Photo C-21 North

Photo C-22 East

Photo C-23 South

Photo C-24 West

Photo C-25 Ground

SITE 03 – H03_50M

Photo C-26 North

Photo C-27 East

Photo C-28 South

Photo C-29 West

Photo C-30 Ground

SITE 04 – H04_0M

Photo C-31 North

Photo C-32 East

Photo C-33 South

Photo C-34 West

Photo C-35 Ground

SITE 04 – H04_50M

Photo C-36 North

Photo C-37 East

Photo C-38 South

Photo C-39 West

Photo C-40 Ground

SITE 05 – H05_0M

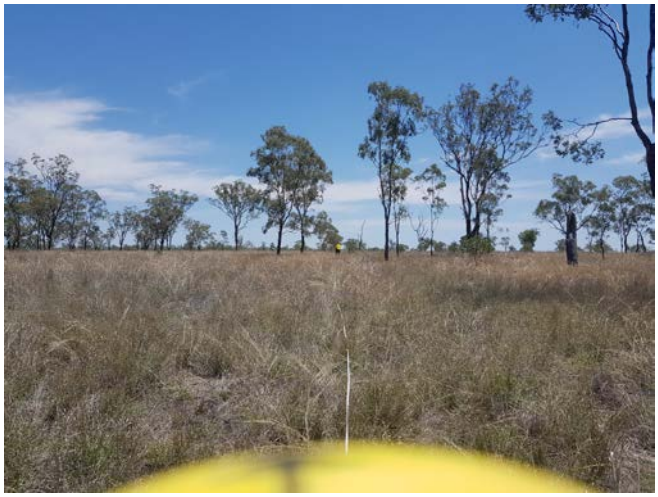


Photo C-41 North

Photo C-42 East

Photo C-43 South

Photo C-44 West

Photo C-45 Ground

SITE 05 – H05_50M

Photo C-46 North

Photo C-47 East

Photo C-48 South

Photo C-49 West

Photo C-50 Ground

SITE 06 – H06_0M

Photo C-51 North

Photo C-52 East

Photo C-53 South

Photo C-54 West

Photo C-55 Ground

SITE 06 – H06_50M

Photo C-56 North

Photo C-57 East

Photo C-58 South

Photo C-59 West

Photo C-60 Ground

SITE 07 – H07_0M

Photo C-61 North

Photo C-62 East

Photo C-63 South

Photo C-64 West

Photo C-65 Ground

SITE 07 – H07_50M

Photo C-66 North

Photo C-67 East

Photo C-68 South

Photo C-69 West

Photo C-70 Ground

SITE 08 – H08_0M

Photo C-71 North

Photo C-72 East

Photo C-73 South

Photo C-74 West

Photo C-75 Ground

SITE 08 – H08_50M

Photo C-76 North

Photo C-77 East

Photo C-78 South

Photo C-79 West

Photo C-80 Ground

SITE 09 – H09_0M

Photo C-81 North

Photo C-82 East

Photo C-83 South

Photo C-84 West

Photo C-85 Ground

SITE 09 – H09_50M

Photo C-86 North

Photo C-87 East

Photo C-88 South

Photo C-89 West

Photo C-90 Ground

SITE 10 – H10_0M

Photo C-91 North

Photo C-92 East

Photo C-93 South

Photo C-94 West

Photo C-95 Ground

SITE 10 – H10_50M

Photo C-96 North

Photo C-97 East

Photo C-98 South

Photo C-99 West

Photo C-100 Ground

SITE 11 – W11_0

Photo C-101 North

Photo C-102 East

Photo C-103 South

Photo C-104 West

Photo C-105 Ground

SITE 12 – W12_0

Photo C-106 North

Photo C-107 East

Photo C-108 South

Photo C-109 West

Photo C-110 Ground

SITE 13 – W13_0

Photo C-111 North

Photo C-112 East

Photo C-113 South

Photo C-114 West

Photo C-115 Ground

SITE 14 – W14_0

Photo C-116 North

Photo C-117 East

Photo C-118 South

Photo C-119 West

Photo C-120 Ground

SITE 15 – W15_0

Photo C-121 North

Photo C-122 East

Photo C-123 South

Photo C-124 West

Photo C-125 Ground

SITE 16 – W16_0

Photo C-126 North

Photo C-127 East

Photo C-128 South

Photo C-129 West

Photo C-130 Ground

SITE 17 – W17_0

Photo C-131 North

Photo C-132 East

Photo C-133 South

Photo C-134 West

Photo C-135 Ground

SITE 18 – W18_0

Photo C-136 North

Photo C-137 East

Photo C-138 South

Photo C-139 West

Photo C-140 Ground

SITE 19 – W19_0

Photo C-141 North

Photo C-142 East

Photo C-143 South

Photo C-144 West

Photo C-145 Ground

SITE 20 – W20_0

Photo C-146 North

Photo C-147 East

Photo C-148 South

Photo C-149 West

Photo C-150 Ground

APPENDIX D MDS RAIL LOOP SITE PHOTO MONITORING

SITE MDSRL01 – H01_0M

Photo D-1 North

Photo D-2 East

Photo D-3 South

Photo D-4 West

Photo D-5 Ground

SITE MDSRL01 – H01_50M

Photo D-6 North

Photo D-7 East

Photo D-8 South

Photo D-9 West

Photo D-10 Ground

SITE MDSRL02 – H02_0 M

Photo D-11 North

Photo D-12 East

Photo D-13 South

Photo D-14 West

Photo D-15 Ground

SITE MDSRL02 – H02_50M

Photo D-16 North

Photo D-17 East

Photo D-18 South

Photo D-19 West

Photo D-20 Ground

SITE MDSRL03 – H03_0M

Photo D-21 North

Photo D-22 East

Photo D-23 South

Photo D-24 West

Photo D-25 Ground

SITE MDSRL03 – H03_50M

Photo D-26 North

Photo D-27 East

Photo D-28 South

Photo D-29 West

Photo D-30 Ground

SITE MDSRL04 – H04_0M

Photo D-31 North

Photo D-32 East

Photo D-33 South

Photo D-34 West

Photo D-35 Ground

SITE MDSRL04 – H04_50M

Photo D-36 North

Photo D-37 East

Photo D-38 South

Photo D-39 West

Photo D-40 Ground

SITE MDSRL05 – W05_0

Photo D-41 North

Photo D-42 East

Photo D-43 South

Photo D-44 West

Photo D-45 Ground

APPENDIX E LEXINGTON OFFSET SITE PHOTO MONITORING

SITE 01 – H01_0M

Photo E-1 North

Photo E-2 East

Photo E-3 South

Photo E-4 West

Photo E-5 Ground

SITE 01 – H01_50M

Photo E-6 North

Photo E-7 East

Photo E-8 South

Photo E-9 West

Photo E-10 Ground

SITE 02 – H02_0M

Photo E-11 North

Photo E-12 East

Photo E-13 South

Photo E-14 West

Photo E-15 Ground

SITE 02 – H02_50M

Photo E-16 North

Photo E-17 East

Photo E-18 South

Photo E-19 West

Photo E-20 Ground

SITE 03 – H03_0M

Photo E-21 North

Photo E-22 East

Photo E-23 South

Photo E-24 West

Photo E-25 Ground

SITE 03 – H03_50M

Photo E-26 North

Photo E-27 East

Photo E-28 South

Photo E-29 West

Photo E-30 Ground

SITE 04 – H04_0M

Photo E-31 North

Photo E-32 East

Photo E-33 South

Photo E-34 West

Photo E-35 Ground

SITE 04 – H04_50M

Photo E-36 North

Photo E-37 East

Photo E-38 South

Photo E-39 West

Photo E-40 Ground

SITE 05 – H05_0M

Photo E-41 North

Photo E-42 East

Photo E-43 South

Photo E-44 West

Photo E-45 Ground

SITE 05 – H05_50M

Photo E-46 North

Photo E-47 East

Photo E-48 South

Photo E-49 West

Photo E-50 Ground

SITE 06 – H06_0M

Photo E-51 North

Photo E-52 East

Photo E-53 South

Photo E-54 West

Photo E-55 Ground

SITE 06 – H06_50M

Photo E-56 North

Photo E-57 East

Photo E-58 South

Photo E-59 West

Photo E-60 Ground

SITE 07 – H07_0M

Photo E-61 North

Photo E-62 East

Photo E-63 South

Photo E-64 West

Photo E-65 Ground

SITE 07 – H07_50M

Photo E-66 North

Photo E-67 East

Photo E-68 South

Photo E-69 West

Photo E-70 Ground

SITE 08 – H08_0M

Photo E-71 North

Photo E-72 East

Photo E-73 South

Photo E-74 West

Photo E-75 Ground

SITE 08 – H08_50M

Photo E-76 North

Photo E-77 East

Photo E-78 South

Photo E-79 West

Photo E-80 Ground

SITE 09 – H09_0M

Photo E-81 North

Photo E-82 East

Photo E-83 South

Photo E-84 West

Photo E-85 Ground

SITE 09 – H09_50M

Photo E-86 North

Photo E-87 East

Photo E-88 South

Photo E-89 West

Photo E-90 Ground

SITE 10 – H10_0M

Photo E-91 North

Photo E-92 East

Photo E-93 South

Photo E-94 West

Photo E-95 Ground

SITE 10 – H10_50M

Photo E-96 North

Photo E-97 East

Photo E-98 South

Photo E-99 West

Photo E-100 Ground

SITE 11 – H11_0M

Photo E-101 North

Photo E-102 East

Photo E-103 South

Photo E-104 West

Photo E-105 Ground

SITE 11 – H11_50M

Photo E-106 North

Photo E-107 East

Photo E-108 South

Photo E-109 West

Photo E-110 Ground

SITE 12 – H12_0M

Photo E-111 North

Photo E-112 East

Photo E-113 South

Photo E-114 West

Photo E-115 Ground

SITE 12 – H12_50M

Photo E-116 North

Photo E-117 East

Photo E-118 South

Photo E-119 West

Photo E-120 Ground

SITE 13 – H13_0M

Photo E-121 North

Photo E-122 East

Photo E-123 South

Photo E-124 West

Photo E-125 Ground

SITE 13 – H13_50M

Photo E-126 North

Photo E-127 East

Photo E-128 South

Photo E-129 West

Photo E-130 Ground

SITE 14 – W14_0

Photo E-131 North

Photo E-132 East

Photo E-133 South

Photo E-134 West

Photo E-135 Ground

SITE 15 – W15_0

Photo E-136 North

Photo E-137 East

Photo E-138 South

Photo E-139 West

Photo E-140 Ground

SITE 16 – W16_0

Photo E-141 North

Photo E-142 East

Photo E-143 South

Photo E-144 West

No photo available.

Biomass derived from north, east, south and west photos

Photo E-145 Ground

SITE 17 – W17_0

Photo E-146 North

Photo E-147 East

Photo E-148 South

Photo E-149 West

Photo E-150 Ground

SITE 18 – W18_0

Photo E-151 North

Photo E-152 East

Photo E-153 South

Photo E-154 West

Photo E-155 Ground

SITE 19 – W19_0

Photo E-156 North

Photo E-157 East

Photo E-158 South

Photo E-159 West

Photo E-160 Ground

SITE 20 – W20_0

Photo E-161 North

Photo E-162 East

Photo E-163 South

Photo E-164 West

Photo E-165 Ground

APPENDIX F LEXINGTON RAIL LOOP OFFSET SITE PHOTO MONITORING

SITE LEXRL01 – H01_0M

Photo F-1 North

Photo F-2 East

Photo F-3 South

Photo F-4 West

Photo F-5 Ground

SITE LEXRL01 – H01_50M

Photo F-6 North

Photo F-7 East

Photo F-8 South

Photo F-9 West

Photo F-10 Ground

SITE LEXRL02 – H02_0M

Photo F-11 North

Photo F-12 East

Photo F-13 South

Photo F-14 West

Photo F-15 Ground

SITE LEXRL02 – H02_50M

Photo F-16 North

Photo F-17 East

Photo F-18 South

Photo F-19 West

Photo F-20 Ground

SITE LEXRL03 – H03_0M

Photo F-21 North

Photo F-22 East

Photo F-23 South

Photo F-24 West

Photo F-25 Ground

SITE LEXRL03 – H03_50M

Photo F-26 North

Photo F-27 East

Photo F-28 South

Photo F-29 West

Photo F-30 Ground

SITE LEXRL04 – H04_0M

Photo F-31 North

Photo F-32 East

Photo F-33 South

Photo F-34 West

Photo F-35 Ground

SITE LEXRL04 – H04_50M

Photo F-36 North

Photo F-37 East

Photo F-38 South

Photo F-39 West

Photo F-40 Ground

SITE LEXRL05 – H05_0M

Photo F-41 North

Photo F-42 East

Photo F-43 South

Photo F-44 West

Photo F-45 Ground

SITE LEXRL05 – H05_50M

Photo F-46 North

Photo F-47 East

Photo F-48 South

Photo F-49 West

Photo F-50 Ground

SITE LEXRL06 – H06_0M

Photo F-51 North

Photo F-52 East

Photo F-53 South

Photo F-54 West

Photo F-55 Ground

SITE LEXRL06 – H06_50M

Photo F-56 North

Photo F-57 East

Photo F-58 South

Photo F-59 West

Photo F-60 Ground

SITE LEXRL07 – H07_0M

Photo F-61 North

Photo F-62 East

Photo F-63 South

Photo F-64 West

Photo F-65 Ground

SITE LEXRL07 – H07_50M

Photo F-66 North

Photo F-67 East

Photo F-68 South

Photo F-69 West

Photo F-70 Ground

SITE LEXRL08 – W08_0

Photo F-71 North

Photo F-72 East

Photo F-73 South

Photo F-74 West

Photo F-75 Ground

SITE LEXRL09 – W09_0

Photo F-76 North

Photo F-77 East

Photo F-78 South

Photo F-79 West

Photo F-80 Ground

SITE LEXRL10 – W10_0

Photo F-81 North

Photo F-82 East

Photo F-83 South

Photo F-84 West

Photo F-85 Ground

SITE LEXRL11 – W11_0

Photo F-86 North

Photo F-87 East

Photo F-88 South

Photo F-89 West

Photo F-90 Ground

SITE LEXRL12 – W12_0

Photo F-91 North

Photo F-92 East

Photo F-93 South

Photo F-94 West

Photo F-95 Ground

APPENDIX B POST-WET SEASON MONITORING REPORT (2020/21) (CO2 AUSTRALIA 2021)

Post-wet Season Monitoring Report (2020/21)

Year 4

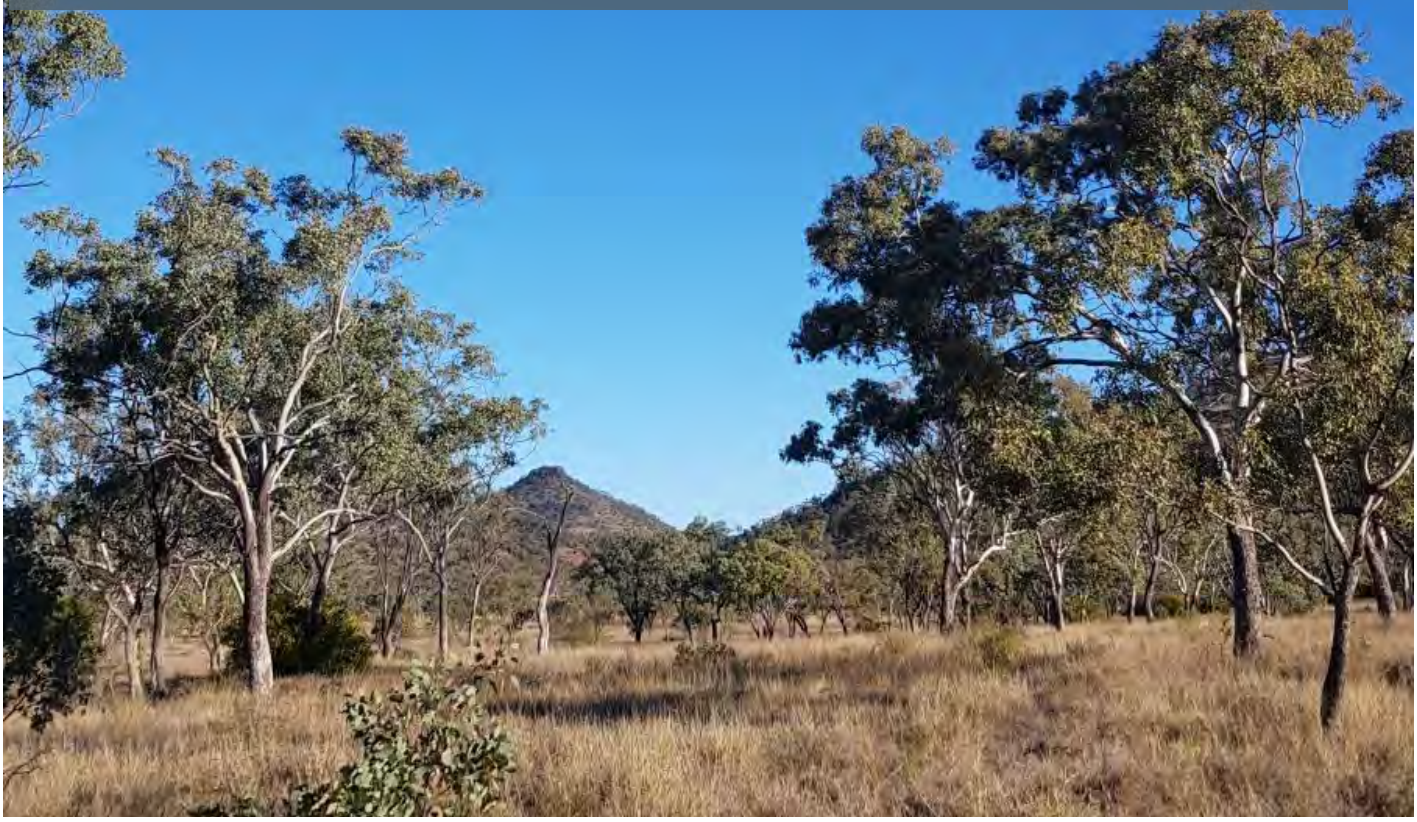
- *MDS Project site*
- *Lexington offset site*

Year 2

- *MDS Rail Loop site*
- *Lexington Rail Loop offset site*

Meteor Downs South Coal Mine Project

Sojitz Blue Pty Ltd



Rev	Date	Description
0	4 June 2021	First draft issued to client
1	25 June 2021	Final report addressing client comments

	Name	Position	Date
ORIGINATORS	Dean Orrick Dr Jarrad Cousin	Ecologist Principal Ecologist	25 June 2021
APPROVER	Tara D'arcy-Evans	Head of Ecosystem Markets and Innovation	25 June 2021

CO2 Australia recognises the First Nations of Australia. We acknowledge the Traditional Custodians who have lived on and cared for Country, and their continuing connection to the land, and extend our respects to all First Nations Peoples.

CONTENTS

1 INTRODUCTION

U&D Mining Industry (Australia) Pty (U&D) has approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to develop and operate the Meteor Downs South (MDS) Coal Mine Project (the MDS Project) (Figure 1). U&D is in a joint venture with Sojitz Blue Pty Ltd (Sojitz Blue) to develop and operate the MDS Project.

1.1 MDS PROJECT AND CORRESPONDING OFFSETS

Under the Project EPBC Act approval (EPBC 2013/6779), the MDS Project has prepared the following documents:

- Matters of National Environmental Significance Management Plan (MNESMP)
  - to address EPBC 2013/6779 conditions 2, 3 and 4 with respect to the direct and indirect impacts of the MDS Project on matters of national environmental significance (MNES) at the MDS Project site
- Offset Management Plan (OMP)
  - to address EPBC 2013/6779 conditions 5 and 6 with respect to environmental offsets at the Lexington offset site (Figure 1) for significant residual impacts of the MDS Project on MNES and matters of state environmental significance (MSES)

The MNESMP and OMP outline annual biodiversity monitoring requirements at each site, as summarised in Table 1. The baseline (Year 1) management periods for the MDS Project site and the Lexington offset site are considered to be June 2017 – June 2018 (Project site) and October 2017 – October 2018 (Lexington offset site).

The current report includes the Year 4 (2020/2021) post-wet season monitoring report for the MDS Project site and the Lexington offset site.

Table 1: Summary of MDS Project and offset site biodiversity monitoring requirements.

Site	Monitoring activity	Management plan	Frequency	Timing
MDS Project site	Habitat condition assessment	MNESMP Section 13.3	Annually	Dry season
	Photo monitoring	MNESMP Section 13.4	Annually	
	Targeted surveys for king blue-grass and bluegrass	MNESMP Section 13.5	Annually	End of the wet season and/or when most detectable
	Habitat availability assessment for Australian painted snipe	MNESMP Section 13.6	Every 2 years	Wet season or following inundation event
	Pest animal monitoring	MNESMP Section 13.7	Every 2 years	Dry season and post-wet season
	Weed monitoring	MNESMP Section 13.8	Every 2 years	
Lexington offset site	General offset site monitoring	OMP Section 7.1	Annual	Post-wet season
	Habitat condition assessment and photo monitoring	OMP Section 7.2	Every 2 years for first 10 years and then every 5 years thereafter until 31 October 2037	Post-wet season

Site	Monitoring activity	Management plan	Frequency	Timing
	Weed monitoring	OMP Section 7.4	Every 2 years	Dry season and post-wet season
	Pest animal monitoring	OMP Section 7.5	Every 2 years (dry season and post wet season surveys)	Dry season and post-wet season
	Biomass monitoring	OMP Section 7.6	Annually	Post wet season prior to and during grazing events

1.2 MDS RAIL LOOP AND CORRESPONDING OFFSETS

In December 2019, Sojitz Blue received approval under the EPBC Act to develop and operate the Meteor Downs South Mine Rail Loop (MDS Rail Loop). Under the Project EPBC Act approval (EPBC 2019/8482), Sojitz Blue has prepared the following documents:

- Matters of National Environmental Significance Management Plan (Rail Loop MNESMP)
  - to address EPBC 2019/8482 condition 6 with respect to the direct and indirect impacts of the MDS Rail Loop project on matters of national environmental significance (MNES) at the MDS Rail Loop site
- Offset Management Plan (OMP)
  - to address EPBC 2019/8482 conditions 2, 3, 4 and 5 with respect to environmental offsets at the Lexington Rail Loop offset site (Figure 1) for significant residual impacts of the MDS Rail Loop on MNES.

The Rail Loop MNESMP and OMP outline annual biodiversity monitoring requirements at each site, as summarised in Table 2. This report incorporates the Year 2 (2020/2021) post-wet season monitoring report for both the MDS Rail Loop and the corresponding Lexington offset site.

Table 2: Summary of MDS Project Rail Loop and Lexington Rail Loop offset biodiversity monitoring requirements.

Site	Monitoring activity	Management plan	Frequency	Timing
MDS Rail Loop site	General site inspection	Rail Loop MNESMP Section 7.2	Biannually	End of the dry season and end of the wet season
	Habitat quality assessments and photo monitoring	Rail Loop MNESMP Section 7.3	Annually	Post-wet season
	Targeted surveys for king blue-grass	Rail Loop MNESMP Section 7.4	Annually	
	Weed monitoring	Rail Loop MNESMP Section 7.5	Biannually within habitat quality assessment plots Every 2 years at each of the weed monitoring plots	End of the dry season and post-wet season

Site	Monitoring activity	Management plan	Frequency	Timing
	Biomass monitoring for fire management	Rail Loop MNESMP Section 7.6	Biannually	End of the dry season and end of the wet season
Lexington Rail Loop offset site	General offset site monitoring	OMP Section 7.1	Annually	Post-wet season
	Habitat condition assessment and photo monitoring	OMP Section 7.2	Every 2 years for first 10 years and then every 5 years thereafter until 31 October 2039	Post-wet season
	King blue-grass surveys	OMP Section 7.3	Every 5 years from baseline (2019)	End of the wet season and/or when most detectable
	Weed monitoring	OMP Section 7.4	Baseline in 2020 (Year 1), then every 2 years	Dry season and post-wet season
	Biomass monitoring	OMP Section 7.6	Annually	Post wet season prior to and during grazing events

148°0'0"E
148°10'0"E
148°20'0"E
24°0'0"S
24°10'0"S
24°20'0"S

Fernlees
Minerva
Arcturus
Springsure
Cairdbeign
Orion
Albinia
Wealwandangie
Minerva Hills National Park
5 Mile Reserve
Joes Plain Reserve
Meteor Park
Mount Hope State Forest

Sojitz Blue Pty Ltd

Figure 1
Location of the MDS project, MDS Rail Loop and corresponding offsets

- Population centres

Roads

- State-controlled roads
- Regional access
- Local access
- Minerva lots (lot 10 & 11 DN40126)
- MDS Project (ML70452)
- MDS Rail Loop
- Lexington offset
- Lexington Rail Loop offset

DATA SOURCE:
The following datasets are © State of Qld:
- Cadastral Data (Qld DCDB)
- Mining Lease

Information provided by Sojitz
- Rail Loop project area
- Lexington Rail Loop offset

0 2.5 5 7.5 10
Kilometres

N

CO2 Australia

Location diagram

Date: 6/3/2021 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:200,000@A3

Path: P:\GIS\Data\Projects\Sojitz\923_20210603_Lex_MDS_post_wet_season_2021_reporting\2106003 - Figure 1 - Site context.mxd

2 METHODOLOGY

Field surveys were undertaken by two tertiary-qualified ecologists (Dean Orrick and Julian Radford-Smith) between 10 – 14 May 2021. Due to Covid-19 concerns, surveys were delayed beyond the optimal post-wet season survey period leading to drier than average conditions. It is acknowledged that surveying beyond the optimal post-wet season conditions has likely impacted the detectability of several grass species, including the EPBC-listed *Dichanthium queenslandicum* (king blue-grass) and *D. setosum* (bluegrass). Permanent monitoring sites were established at each site for the MDS Project and Lexington offset site as part of the baseline surveys carried out between December 2017 and April 2018, detailed in the following:

- *MNESMP Baseline Monitoring Report – Meteor Downs South Coal Mine Project.* A report prepared by CO2 Australia in 2017 (CO2 Australia 2017) – baseline monitoring sites established in December 2017
- *Lexington Offset Area Initial Baseline Monitoring Report – Meteor Downs South.* A report prepared by CO2 Australia in 2018 (CO2 Australia 2018) – baseline monitoring sites established in April 2018.

Permanent monitoring sites for the MDS Rail Loop and the Lexington Rail Loop offset were established as part of Year 1 surveys carried out during the post-wet season field surveys (June/July 2020), detailed in the following:

- *Post-wet Season Monitoring Report – Year 3 (2019/20)*. A report prepared by CO2 Australia in 2020 (CO2 Australia 2020) – baseline monitoring sites established in June 2020.

2.1 MONITORING LOCATIONS

2.1.1 MDS Project site

Post-wet season monitoring activities at the MDS Project site comprised:

- General site inspection
- Targeted squatter pigeon surveys
- Targeted king blue-grass and bluegrass surveys
- Biomass monitoring

Table 3 shows activities at each monitoring location at the MDS Project site. A total of 30 permanent sites/plots were monitored across the balance of ML70452 outside of the MDS project (refer to Figure 2 and Figure 3). Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 3), according to the following:

- 30 x biomass monitoring sites
  - established at 0 m and 50 m points along 100 m habitat monitoring transect (Sites 01 – 10) and at SW corner of weed monitoring plots (Sites 11 – 20)

At 10 of the biomass monitoring sites (Sites 01 – 10, corresponding to habitat monitoring sites), a 1.8 m capped galvanised star picket is installed at the start (0 m) and central (50 m) points of the 100 m transect (equating to 20 of the 30 biomass monitoring sites). At each of the remaining 10 biomass monitoring sites (corresponding to standalone weed monitoring plots – Sites 11 – 20), a single 1.8 m capped galvanised star picket is installed at the SW corner of the plot. GPS locations are recorded for each of the sites in GDA94, Zone 55 projection.

Refer to Table A-1 in Appendix A for detailed locations of each of the monitoring sites at the MDS Project site.

Table 3: Monitoring locations at the MDS Project site, surveyed as part of the 2020/21 post-wet season surveys.

Site	King blue-grass and bluegrass	Biomass monitoring
01 – 20		✓
Established grass transects	✓	

148°22'E 148°23'E 148°24'E

24°21'S 24°22'S 24°23'S

11 01 02 12 13 14

C01 C02 C03 C05

P07 P08

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Location diagram

Figure 2
MDS Project monitoring sites - north

- Mining Lease
- Disturbance areas
- Access tracks
- Watercourse
- Brigalow TEC
- Natural Grassland TEC
- Habitat for King blue-grass and bluegrass
- Habitat for squatter pigeon
- Habitat for Australian painted snipe
- Habitat monitoring site
- Habitat monitoring plots
- Weed monitoring plots
- Rabbit monitoring plots
- Pig monitoring plots
- Pest animal survey tracks
- Pest animal camera sites

0 0.25 0.5 0.75 1
Kilometres

N

CO2 Australia

DATA SOURCE:
The folowing datasets are © State of Qld:
- Mining Lease
The following datasets provided by Sojitz
- Disturbance areas
- Ground-truthed regional ecosystem mapping

Date: 6/3/2021 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:17,500@A3

Path: P:\GISData\Projects\Sojitz\923_20210603_Lex_MDS_post_wet_season_2021_reporting\210603 - Figure 2 - MDS monitoring sites north.mxd

148°21'E
148°22'E
148°23'E
24°23'S
24°24'S
24°25'S

03
P07
C03
14
15
C04
19
C05
P06
16
C09
18
04
17
C10
C06
05
P05
06
C07
C11
P04
07
C08
08
P03
20
C12
P02
09
C13
C14
10
P01
C15

Sojitz Blue Pty Ltd

Location diagram

Figure 3
MDS Project
monitoring sites - south

- Mining Lease
- Disturbance areas
- Access tracks
- Watercourse
- Brigalow TEC
- Natural Grassland TEC
- Habitat for King blue-grass and bluegrass
- Habitat for squatter pigeon
- Habitat for Australian painted snipe
- Habitat monitoring site
- Habitat monitoring plots
- Weed monitoring plots
- Rabbit monitoring plots
- Pig monitoring plots
- Pest animal survey tracks
- Pest animal camera sites

0 0.25 0.5 0.75 1
Kilometres

N

CO2 Australia

DATA SOURCE:
The folowing datasets are © State of Qld:
- Mining Lease
The following datasets provided by Sojitz
- Disturbance areas
- Ground-truthed regional ecosystem mapping

Date: 6/3/2021 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:17,500@A3

Path: P:\GISData\Projects\Sojitz\923_20210603_Lex_MDS_post_wet_season_2021_reporting\210603 - Figure 3 - MDS monitoring sites south.mxd

2.1.2 MDS Rail Loop site

Post-wet season monitoring activities at the MDS Rail Loop site comprised monitoring of the following:

- General offset site monitoring
- Habitat quality assessments (including assessment of Natural Grassland thresholds)
- Photo monitoring
- Targeted king blue-grass surveys
- Biomass monitoring

Table 4 shows activities at each monitoring location established at the MDS Rail Loop site. A total of five permanent monitoring sites/plots are monitored (refer to Figure 4). While the Rail Loop MNESMP (SLR 2019a) stipulated one of the weed monitoring plots to be established in the *Leucaena* plantation, consultation with Sojitz Blue indicated the safety issues related to monitoring sites within the centre of the rail loop requiring crossing of the rail line. Instead, all plots were established on the outside of the rail loop (refer to Figure 4). Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 4), according to the following:

- 4 x habitat quality assessment sites (50 m x 10 m)
  - collocated with weed monitoring plots, grassland assessment sites and king blue-grass survey sites (Sites MDSRL01 – MDSRL04)
- 4 x Natural Grasslands TEC monitoring sites (50 m x 20 m)
- collocated with habitat quality assessment sites, assessing Natural Grassland indicators (Sites MDSRL01 – MDSRL04)
- 4 x targeted King blue-grass surveys (50m x 10m)
  - collocated with habitat quality assessment plots and grassland assessment sites (Sites MDSRL01 – MDSRL04)
- 9 x photo monitoring sites
  - established at 0 m and 50 m points along 50 m habitat monitoring transect (Sites MDSRL01 – MDSRL04) and at SW corner of standalone weed monitoring plot (Site MDSRL05)
- 4 x biomass monitoring sites
  - assessed from the 50 m point of the habitat monitoring transect at each of the four habitat monitoring sites (Sites MDSRL01 – MDSRL04)

Table 4: Monitoring locations at the MDS Rail Loop site, surveyed as part of the 2020/21 post-wet season surveys.

Site	Habitat quality assessment	Natural Grasslands TEC monitoring	King blue-grass surveys	Photo monitoring	Biomass monitoring
MDSRL01 – MDSRL04	✓	✓	✓	✓	✓
MDSRL05				✓	

148°26'E

148°27'E

24°22'S

24°23'S

MDSRL01

MDSRL02

MDSRL03

MDSRL04

MDSRL05

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Figure 4
MDS Rail Loop
- monitoring sites

Disturbance areas
MDS Rail Loop site
Watercourse

Ground-truthed REs
RE 11.8.11
RE 11.8.11/11.8.5
RE 11.3.3a

Habitat monitoring site
Habitat monitoring plots
Weed monitoring plots

DATA SOURCE:
The following datasets provided by Sojitz
- Disturbance areas
- Ground-truthed REs

0 100 200 300 400
Metres

N

CO2 Australia

Date: 6/3/2021 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:9,000@A3

Location diagram

Brisbane

Path: P:\GISData\Projects\Sojitz\923_20210603_Lex_MDS_post_wet_season_2021_reporting\210603 - Figure 4 - MDS RAIL LOOP monitoring sites.mxd

2.1.3 Lexington offset site

Post-wet season monitoring activities at the offset site comprised:

- General offset site monitoring
- Habitat condition assessments
- Photo monitoring
- Biomass monitoring

Table 5 shows activities at each monitoring location at the offset site. A total of 33 permanent monitoring sites/plots were monitored across the offset site (refer to Figure 5 and Figure 6). Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 5), according to the following:

- 13 x habitat monitoring sites (100 m x 50 m)
  - collocated with weed and rabbit monitoring plots
- 33 x photo monitoring sites
  - 26 established at 0 m and 50 m points along 100 m habitat monitoring transect (Sites 01 – 13)
  - 7 at SW corner of standalone weed monitoring plots (Sites 14 – 20)

At each of the 13 habitat monitoring sites (Sites 01 – 13), a 1.8 m capped galvanised star picket is installed at the start (0 m) and central (50 m) points of the 100 m transect. At each of the standalone weed monitoring plots (Sites 14 – 20), a single 1.8 m capped galvanised star picket is installed at the SW corner of the plot. GPS locations are recorded for each of the sites in GDA94, Zone 55 projection.

Refer to Table A-2 in Appendix A for detailed locations of each of the monitoring sites at the Lexington offset site.

Table 5: Monitoring locations at the Lexington offset site, surveyed as part of the 2020/21 post-wet season surveys.

Site	Habitat condition assessments	Biomass monitoring	Photo monitoring
01 – 13	✓	✓	✓
14 – 20		✓	✓

148°1'0"E
148°2'0"E
148°3'0"E
23°55'0"S
23°56'0"S
23°57'0"S

P03
C01
C05
01
14
ML 70145
C06
C02
02
P01
15
C07
ML 70376
19
03
C03
C08
16
P02
04
P07
C04
17
C09
06
P06
05
C12
C13
C10
P04
07
18
P05
08
C11

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Location diagram

Figure 5
Lexington offset monitoring sites - west

- Minerva lots (lot 10 & 11 DN40126)
- Existing offset area (Category A area)
- Mining leases (ML70376 and ML70145)
- Offset area
- Access tracks
- Lexington existing fences

Regional ecosystem

- RE 11.8.11
- RE 11.8.11a
- RE 11.8.4
- RE 11.8.5

- Pest animal camera site
- Pest animal survey tracks
- Habitat monitoring sites
- Habitat monitoring plot
- Weed monitoring plots
- Rabbit monitoring plots
- Pig monitoring plots

DATA SOURCE:
The following datasets are © State of Qld:
- Cadastral Data
- Mining Lease
- Existing offset area

0 0.25 0.5 0.75 1
Kilometres

N

CO2 Australia

Date: 6/3/2021 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:15,000@A3

Path: P:\GISData\Projects\Sojitz\923_20210603_Lex_MDS_post_wet_season_2021_reporting\210603 - Figure 5 - Lexington monitoring sites west.mxd

148°3'0"E
148°4'0"E
148°5'0"E
23°55'0"S
23°56'0"S
23°57'0"S
ML 70376
ML 70145
R09
11
12
C15
20
R10
13
C14
R08
10
09
09
C13
R07
08

Sojitz Blue Pty Ltd

Figure 6
Lexington offset monitoring sites - east

- Minerva lots (lot 10 & 11 DN40126)
- Existing offset area (Category A area)
- Mining leases (ML70376 and ML70145)
- Offset area
- Access tracks
- Lexington existing fences

Regional ecosystem
- RE 11.8.11
- RE 11.8.11a
- RE 11.8.4
- RE 11.8.5

- Pest animal camera site
- Pest animal survey tracks
- Habitat monitoring sites
- Habitat monitoring plot
- Weed monitoring plots
- Rabbit monitoring plots
- Pig monitoring plots

DATA SOURCE:
The following datasets are © State of Qld:
- Cadastral Data
- Mining Lease
- Existing offset area

Date: 6/3/2021 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:15,000@A3

0 0.25 0.5 0.75 1
Kilometres

N

CO2 Australia

Location diagram

Brisban

Path: P:\GISData\Projects\Sojitz\923_20210603_Lex_MDS_post_wet_season_2021_reporting\210603 - Figure 6 - Lexington monitoring sites east.mxd

2.1.4 Lexington Rail Loop offset site

Post-wet season monitoring activities at the Lexington Rail Loop offset site comprised establishment and monitoring of the following:

- Biomass monitoring

Table 6 shows activities at each monitoring location established at the Lexington Rail Loop offset site; divided into three 'paddocks' across the north of Lexington – 'North Promenade', 'Harry's' and 'Contours'. A total of 12 permanent monitoring sites/plots are monitored across the three paddocks (refer to Figure 7 and Figure 8). Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 6), according to the following:

- 19 x biomass monitoring sites
  - 14 established at 0 m and 50 m points along habitat monitoring transect (Sites LEXRL01 – LEXRL07)
  - 5 at SW corner of standalone weed monitoring plots (Sites LEXRL08 – LEXRL12)

Table 6: Monitoring locations at the Lexington Rail Loop offset site, surveyed as part of the 2020/21 post-wet season surveys.

Site	Biomass monitoring
North Promenade paddock	
LEXRL01 – LEXRL02	✓
LEXRL08 – LEXRL09	✓
Harry's paddock	
LEXRL03 – LEXRL04	✓
LEXRL10	✓
Contours paddock	
LEXRL05 – LEXRL07	✓
LEXRL11 – LEXRL12	✓

148°1'30"E

148°2'E

23°54'30"S

23°55'S

LEXRL01

LEXRL09

North
Promenade

LEXRL08

LEXRL02

ML 70145

Sojitz Blue Pty Ltd

Location diagram

Figure 7
Lexington Rail Loop offset monitoring sites - west

- Lexington existing fences
- Access tracks

Lexington Rail Loop offset

- North Promenade paddock

Observed vegetation

- RE 11.8.11
- RE 11.8.5

- Lexington offset area
- Existing offset area (Category A area)
- Mining leases (ML70376 and ML70145)

- Habitat monitoring sites
- Habitat monitoring plots
- Weed monitoring plots

DATA SOURCE:
The following datasets are © State of Qld:
- Mining leases
The following datasets provided by Sojitz
- Lexington Rail Loop offset areas

Date: 6/3/2021 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:6,000@A3

0 50 100 150 200
Metres

N

CO2 Australia

Brisbane

Path: P:\GISData\Projects\Sojitz\923_20210603_Lex_MDS_post_wet_season_2021_reporting\210603 - Figure 7 - LEXINGTON RAIL LOOP monitoring sites west.mxd

148°4'E 148°5'E 148°6'E

23°54'S 23°55'S 23°56'S

ML 70376 LEXRL03 Harry's LEXRL04 LEXRL10 ML 70145 ML 70376 LEXRL05 LEXRL12 LEXRL06 Contours LEXRL11 LEXRL07

Sojitz Blue Pty Ltd

Location diagram

Brisbane

Figure 8
Lexington Rail Loop offset monitoring sites - east

- Lexington existing fences
- Access tracks

Lexington Rail Loop offset

- Harry's paddock
- Contours paddock
- Lexington offset area
- Existing offset area (Category A area)
- Mining leases (ML70376 and ML70145)

Observed vegetation

- RE 11.8.11
- RE 11.8.5
- Habitat monitoring sites
- Habitat monitoring plots
- Weed monitoring plots

0 200 400 600 800
Metres

N

CO2 Australia

DATA SOURCE:
The following datasets are © State of Qld:
- Mining leases
The following datasets provided by Sojitz
- Lexington Rail Loop offset areas

Date: 6/3/2021 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:17,500@A3

Path: P:\GSData\Projects\Sojitz\923_20210603_Lex_MDS_post_wet_season_2021_reporting\210603 - Figure 8 - LEXINGTON RAIL LOOP monitoring sites east.mxd

2.2 KING BLUE-GRASS AND BLUEGRASS SURVEYS (MDS PROJECT AND MDS RAIL LOOP SITES)

2.2.1 MDS Project site

Targeted surveys were undertaken for king blue-grass and bluegrass throughout the MDS Project site. This included incidental surveys while traversing the site on foot (e.g. biomass monitoring) as well as targeted surveys along established transects previously surveyed in March 2018. The survey period was later than the typical flowering season for king blue-grass and bluegrass (during summer months), and as such fertile material can be absent from the two species making it difficult for them to be confidently discerned from other grass species with similar morphology (particularly superficially-similar *Dichanthium* and *Bothriochloa* species).

Targeted transect surveys were undertaken along 12 of the 25 transects previously surveyed in March 2018 and June 2020, including the four transects with previously confirmed king blue-grass records (Sites 12, 19, 22 and 25) and one transect with previously confirmed bluegrass records (Site 07). Sites traversed in May 2021 are listed in Table 7. Threatened grass surveys were undertaken targeting the presence, distribution and abundance of king blue-grass and bluegrass within 2 m of the centreline of the 12 transects.

Where king blue-grass or bluegrass was encountered within 2 m of the centreline of a transect, an estimate was made of the number of tussocks of each species considered to be within a contiguous population. A tussock was defined as a tuft or clump of a given species of grass growing from a common origin, whereas a population was defined as a collection of contiguous tussocks of a given species. The number of tussocks comprising a population was still estimated where populations extended beyond 2 m of the transect centreline. The number of tussocks in a population was estimated by assigning a population size to one of six abundance categories:

- 1 – 2 tussocks
- ≥2 – 5 tussocks
- ≥5 – 20 tussocks
- ≥20 – 50 tussocks
- ≥50 – 100 tussocks
- 100+ tussocks

An estimate of population size of a given species was calculated by summing the lower range interval of each population's tussock abundance category to represent the minimum estimate of abundance, with the upper range interval of each population's tussock abundance category summed to give an upper estimate of abundance. The resulting range represents a conservative estimate of tussock abundance across the survey area (i.e. survey area with four populations: 1-2 tussocks, 2-5 tussocks, 20-50 tussocks and 100+ tussocks equates to a survey area abundance range estimate of 123 – 157 tussocks from four populations). Based on the number of populations, a calculation was also made of the number of populations per kilometre of transect, which in combination with the estimate of total population size within the survey area allows for a comparison with monitoring events in subsequent years.

Table 7: Threatened grass survey transect locations (UTM coordinates in GDA94) and lengths for the 12 transects surveyed in May 2021.

Transect	Start point		End point		Length (m)
	Easting	Northing	Easting	Northing	
01	641808	7304281	641593	7304187	234
03	640538	7303712	640191	7303704	347
05	639101	7302831	638977	7303111	306
06	638306	7303321	638238	7303185	152
07	637991	7302726	637926	7302590	151
09	637222	7300744	637258	7300413	333
12	637935	7300289	638196	7300219	270
17	637148	7299183	637319	7299064	208
18	636979	7299062	636876	7298806	277
19	637123	7298983	637002	7298677	329
22	636545	7298529	636783	7298451	251
25	637273	7297385	637498	7297339	230
				Total	**3,088**

2.2.2 MDS Rail Loop site

Targeted surveys for king blue-grass were undertaken within the 50 m x 10 m plot of each of the four habitat quality assessment sites (MDSRL01 – MDSRL02). As noted above, the survey period is later than the typical flowering season for king blue-grass and the species can be difficult to confidently discern from superficially-similar species. Where king blue-grass was encountered within the plot, an estimate was made of the number of tussocks considered to be within a contiguous population in accordance with the method outlined above (Section 2.2.1).

2.2.3 Habitat condition assessment (MDS Rail Loop and Lexington offset site)

Habitat condition assessment sites were established at the MDS Rail Loop site and Lexington Rail Loop offset sites based on the requirements of the *Guide to determining terrestrial habitat quality* (DEHP 2017). A total of four habitat condition assessment sites were established at the MDS Rail Loop site, with seven habitat condition assessment sites established at the Lexington Rail Loop offset site. Each of the habitat condition assessment sites comprise N – S running 100 m x 50 m transects, with the start (0 m) and central (50 m) points marked with a 1.8 m galvanised steel picket with plastic safety cap (refer to Figure 4, Figure 5 and Figure 6).

Habitat condition assessments for Natural Grasslands TEC and king blue-grass were undertaken at the habitat condition assessment sites generally in accordance with the *Guide to determining terrestrial habitat quality* (DEHP 2017). Through the application of the guide, a habitat quality score was calculated for each MNES based on the following key indicators:

- site condition: a general condition assessment of vegetation compared to a benchmark
- site context: an analysis of the site in relation to the surrounding environment

Natural Grasslands TEC habitat condition was determined according to the approved Commonwealth listing advice (TSSC 2009). As per the listing advice, five condition thresholds were used to classify a patch of Natural Grasslands TEC into 'best quality' and 'good quality', which are defined in Table 8.

In the absence of the *Guide to determining terrestrial habitat quality* (DEHP 2017) including a species habitat index for flora species, the habitat condition scores for the MNES flora species (king blue-grass) included a species presence index out of three, whereby: 0 = absent/not confirmed, 2 = up to five tussocks confirmed, 2.5 = up to 20 tussocks confirmed, 3 = more than 20 tussocks confirmed. The habitat condition score for the king blue-grass was then calculated as a combination of site condition and site context for the RE assessment unit (representing 80% of the score), with species stocking rate converted to a score out of 10 and contributing 20%.

Table 8: Condition Classes for the Natural Grasslands of the Queensland Central Highlands and the Northern Fitzroy Basin Ecological Community (TSSC 2009).

	Best quality	Good quality
Patch size	At least 1ha; **and**	At least 5ha; **and**
Grasses	**At least 4** native perennial grass species from the list of perennial native grass indicator species; **and**	**At least 3** native perennial grass species from the list of perennial native grass indicator species; **and**
Tussock cover	**At least 200** native grass tussocks; **and**	**At least 200** native grass tussocks; **and**
Woody shrub[1] cover	Total projected canopy cover of shrubs is **less than 30%; and**	Total projected canopy cover of shrubs is **less than 50%; and**
Introduced species	Perennial non-woody introduced species are **less than 5%** of the total projected perennial plant cover.	Perennial non-woody introduced species are **less than 30%** of the total projected perennial plant cover.
[1] The shrub layer is typically absent. However, where shrubs are present, they are defined as woody plants, more than 0.5 m tall that occupy the mid vegetation layer. The upper, or tree canopy layer, also is typically absent but may comprise scattered trees to less than 10% projective crown cover.		
Sampling should be based upon a quadrat size of 0.1ha (e.g. 50 m x 20 m) selected in an area with the most apparent native perennial grass species. Unless exceptional circumstances apply, to maximise the assessment of condition, sites must be assessed during a good season, two months after cessation of disturbance (fire/grazing/mowing/slashing) and within two months of effective rain.		

2.3 PHOTO MONITORING (MDS RAIL LOOP SITE AND LEXINGTON OFFSET SITE)

Photo monitoring was undertaken at permanent sites established as part of baseline surveys on the MDS Rail Loop site and Lexington offset site to give a representative indication of cover and species composition (including weeds) for the general area and enable visual assessment of habitat changes over time. Photo monitoring sites were established with a 1.8 m galvanised steel picket with plastic safety cap.

At each of the photo monitoring points, five photos were taken from 1.5 m height above ground level looking north, east, south and west with a ground photo taken looking down at an angle of 45° to the north-west of the star picket. Photo monitoring sites were delineated as follows:

- At the MDS Rail Loop site, photo monitoring was undertaken at nine sites, including two at each of the four habitat quality assessment sites (0 m and 50 m points: Site MDSRL01 – MDSRL04), with single photo monitoring point at the SW corner of the remaining one standalone weed monitoring plot (Site MDSRL05) identified in Table 4 and shown in Figure 4

- At the Lexington offset site, photo monitoring was undertaken at 33 sites, including two at each of the 13 habitat condition assessment sites (0 m and 50 m points: Site 01 – 13), with single photo monitoring points at the SW corner of the remaining seven weed monitoring plots (Site 14 – 20) identified in Table 5 and shown in Figure 5 and Figure 6

A record of the photographs is shown in Appendix D to Appendix G for the MDS Project, Lexington offset, MDS Rail Loop and Lexington Rail Loop offset sites, respectively.

2.4 BIOMASS MONITORING FOR FIRE MANAGEMENT (ALL SITES)

Biomass monitoring for fire management is undertaken annually to determine the risk of fire and to inform fire management strategies. Biomass is at its greatest at the end of the wet season (around April) with fire risk greatest towards the end of the dry season (September/October). Biomass is monitored using appropriate photo standards[1] to determine dry matter yields and subsequently fuel loads. Biomass monitoring is undertaken at permanent weed monitoring sites at the MDS Project site, MDS Rail Loop site, Lexington offset site and Lexington Rail Loop offset site.

2.5 GENERAL SITE INSPECTIONS (ALL SITES)

General site inspections across all project and offset sites was undertaken, to assess:

- Observations of fencing condition, including any repair/upgrades
- Access track conditions, including location of watercourse crossings, grids, erosion, etc
- Fire management, including assessment of existing firebreaks, access tracks and roads, fuel loads, and any recent burning activities
- Livestock management including assessment of signs of land degradation and over-grazing
- Erosion management, including assessment of the incidence of erosion, especially around permanent and semi-permanent water bodies or areas subject to inundation or waterlogging
- Incidental fauna observations, including presence, traces and/or abundance of pest animals
- Signs of dust deposition on vegetation located adjacent to the MDS Project and MDS Rail Loop footprints
- Locations of known king blue-grass and bluegrass specimens throughout all sites
- Any additional risks to fauna (i.e. evidence of vehicle strike)

[1] See https://futurebeef.com.au/knowledge-centre/pastures-forage-crops/pasture-photo-standards/

3 RESULTS: MDS PROJECT SITE

3.1 HABITAT MONITORING

Habitat condition assessments were undertaken in October as part of the 2020 dry-season surveys and were previously reported. Post-wet season, targeted surveys were undertaken for king blue-grass bluegrass and squatter pigeon; the results for which are described below.

3.1.1 King blue-grass and bluegrass

Targeted surveys confirmed the presence of king blue-grass at transects throughout the MDS Project site. Bluegrass was unable to be positively identified due to sub-optimal conditions for detection. Records of king blue-grass were confirmed from two (17%) of the 12 threatened grass survey transects (transects 22 and 25) (Table 9 and Figure 9), with no incidentally recorded populations detected. Two populations of king blue-grass were recorded along transect 25 (totalling 25-70 tussocks), compared with eight populations recorded in 2020. A single population was identified from transect 22, represented by 2-5 tussocks. The paucity of records during this 2021 post-wet season survey compared with previous surveys is likely a consequence of reduced detectability rather than a reduction (or otherwise) of king blue-grass and bluegrass throughout the MDS Project site.

Table 9: King blue-grass populations and their estimated size from transects at the MDS Project site in May 2021.

Transect number	King blue-grass population size range		Population per transect
22	2-5		2-5
25	5-20	20-50	25-70
Total survey area population (range)	**27-75**		
Number of populations (#/km)	**3 (0.97/km)**		

Records of bluegrass were not able to be detected from any of the 12 threatened grass survey transects, nor incidentally throughout the site (Figure 9 and Figure 10).

148°21'E 148°22'E 148°23'E 148°24'E 148°25'E

24°22'S 24°23'S 24°24'S 24°25'S 24°26'S

Sojitz Blue Pty Ltd

Figure 9
MDS Project
Threatened grass survey results overview

Mining Lease
Disturbance areas
Access tracks
Habitat for King blue-grass and bluegrass
Threatened grass survey area

Grass survey transects
Transect not surveyed
No threatened grasses
King blue-grass
Bluegrass

DATA SOURCE:
The folowing datasets are © State of Qld:
- Mining Lease
The following datasets provided by Sojitz
- Disturbance areas
- Habitat for king blue-grass and bluegrass

Date: 6/3/2021 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:27,500@A3

0 0.25 0.5 0.75 1
Kilometres

N

CO2 Australia

Location diagram

Brisbane

Path: P:\GISData\Projects\Sojitz\923_20210603_Lex_MDS_post_wet_season_2021_reporting\210603 - Figure 9 - MDS KBG BG survey overview.mxd

Transect 22

22

0 10 20 30 40
Metres

Scale: 1:1,000@A3

Transect 25

25

King blue-grass population size

1-2
>2-5
>5-20
>20-50
>50-100
>100

Bluegrass population size

1-2
>2-5
>5-20
>20-50
>50-100
>100

0 10 20 30 40
Metres

Scale: 1:1,000@A3

Sojitz Blue Pty Ltd

Figure 10
MDS Project
Threatened grass survey results - transect 22, 25

Mining Lease
Disturbance areas
Tracks
Threatened grass survey area
Grass survey transects

Location diagram

Brisbane

N

DATA SOURCE:
The folowing datasets are © State of Qld:
- Mining Lease
The following datasets provided by Sojitz MDS Mining Pty Ltd
- Disturbance areas

Date: 6/3/2021 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994

Path: P:\GIS\Data\Projects\Sojitz\923_20210603_Lex_MDS_post_wet_season_2021_reporting\2106603 - Figure 10 - MDS KBG BG survey transects_22_25.mxd

3.1.2 Squatter pigeon

Incidental searches for the squatter pigeon were conducted opportunistically from over 130 km of driving during the two days of field surveys on the project site, however, no squatter pigeons were recorded.

3.2 PHOTO MONITORING

Photo monitoring of the MDS Project site showed a variety of levels of cover ranging from dense grassy understorey (Site 05: refer to Photo D-43 in Appendix D) through to relatively open areas with evidence of grazing (occasionally overgrazed; see Site 17: Photo D-131 in Appendix D) resulting in reduced grass cover. The results of the photo monitoring in the MDS Project site is presented in Appendix D.

3.3 BIOMASS MONITORING

Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for monitoring sites comprising RE 11.8.11, whilst biomass monitoring results from areas of RE 11.8.5 were assessed against 'Eucalypt woodlands', RE 11.4.3 was assessed against 'Bluegrass, wiregrass', and RE 11.3.3a was assessed against 'Alluvial' photo standards (Table 10). Where the observed biomass at a site was mid-way between two photos within a given biomass standard, the middle of the corresponding range was reported (i.e. observed biomass between 2,500 kg/ha and 3,600 kg/ha 'Eucalypt woodlands' photo standards was reported as 3,050 kg/ha).

Photo monitoring showed some variability in biomass of ground cover across all 10 photo monitoring sites. Sites in RE 11.8.11 supported the greatest biomass (averaging 3,978 kg/ha), with Site 03 (RE 11.8.5) supporting the lowest biomass (1,800 kg/ha) (Table 10). Areas of RE 11.8.5 supported mostly ≥2,500 kg/ha (except for site 03), averaging 2,875 kg/ha, the one RE 11.3.3a photo monitoring site supported 3,405 kg/ha biomass and the one RE 11.4.3 supported 2,230 kg/ha.

Table 10: Results of biomass monitoring on the MDS Project site using Brigalow Belt Future Beef pasture photo standards.

		Brigalow Belt Future Beef pasture photo standard type				
Photo monitoring site*	RE type	Eucalypt woodlands	Blue grass, wire grass	Alluvial	Downs country	Biomass kg/ha
01	11.8.5	✓				3,050
02	11.8.11				✓	4,445
03	11.8.5	✓				1,800
04	11.8.11				✓	4,445
05	11.8.5	✓				3,050
06	11.8.11				✓	2,575
07	11.4.3		✓			2,230
08	11.8.11				✓	4,445
09	11.3.3a			✓		3,405
10	11.8.5	✓				3,600

* taken from the 0 m point of the permanent habitat monitoring transects.

3.4 GENERAL SITE INSPECTION

The condition of fencing and access gates across the MDS site was good, with no requirement for repair at the time of surveying. Existing access tracks, including firebreaks, were of a similar standard having recently been re-graded.

Field traverses in the south-west of the MDS Project site noted areas of RE 11.8.11a under stress, noted in previous monitoring periods. These areas are characterised by areas of dieback of *Melaleuca bracteata*, with little improvement. Notwithstanding, it was noted that much of this vegetation community was continuing to show evidence of epicormic regrowth. It is therefore likely that this vegetation community is in a state of recovery following the drought prior to the 2019/2020 wet season. The condition of these communities will need to continue to be monitored to exclude alternative reasons for the dieback (e.g. whether a consequence of hydrological changes).

Site assessments revealed that some areas in the west of the ML (near site 17) showed evidence of grazing pressure (e.g. reduced grass height, bare soil areas). These areas will require ongoing monitoring to ensure they recover adequately. Notwithstanding, it is acknowledged that MDS is responsible for the management of activities within the MDS Project site only and does not have any responsibility for grazing regimes in the mining lease area that is outside of the MDS Project site.

Site traverses as part of all monitoring activities on the MDS Project site showed no obvious evidence of any dust deposition, nor any impacts attributable to dust deposition on king blue-grass, bluegrass or other vegetation communities. Approximately 1 ha of cleared grassland (consistent with RE 11.8.11) was observed in the east of ML70452 associated with the mine's explosives cache. The area of clearing intersects a grass survey transect (site 12) where king blue-grass has previously been recorded.

Note that RE 11.8.11a is no longer a recognised regional ecosystem since the release of version 12 of the Regional Ecosystem Description Database (REDD) in March 2021 (Queensland Herbarium 2021). Instead all areas of RE 11.8.11a are now recognised as RE 11.3.25d. This constitutes not only a change in RE, but a change in landzone. Notwithstanding, all mention of RE 11.8.11a will continue given historical approval incorporating this regional ecosystem.

4 RESULTS: MDS RAIL LOOP SITE

4.1 HABITAT MONITORING

Results of habitat condition assessments identified an average site condition score of 5.17 out of 10 across all four habitat monitoring sites, with scores ranging between 3.17 (Site MDSRL04) and 6.17 (Site MDSRL02). Site context scores varied from 8.85 out of 10 (MDSRL02, MDSRL03 and MDSRL04) up to 10 out of 10 (MDSRL01). Site condition scores are lower than previous years, likely attributable to greater overall weed cover. However, it should be noted that the timing of the surveys, later in the post-wet season, may have resulted in reduced species richness and perennial grass cover, resulting in reduced habitat condition scores. Appendix B outline details of the site condition assessments, summarised below in Table 11.

Table 11: MDS Rail Loop site habitat monitoring sites: site condition and site context scores calculated in accordance with the *Guide to determining terrestrial habitat quality* (DEHP 2017).

Site	RE	Easting	Northing	Site condition score (/10)	Site context score (/10)
MDSRL01	11.8.11	645575	7303101	5.67	10.00
MDSRL02	11.8.11	646410	7303007	6.17	8.85
MDSRL03	11.8.11	646666	7303114	5.67	8.85
MDSRL04	11.8.11	646834	7303291	4.17	8.85
			Average score	**5.42**	**9.13**

MNES habitat condition assessments

Based on the results of the site condition and assessments, habitat condition scores for the two MNES averaged 7.14 out of 10 for Natural Grasslands TEC and 5.71 out of 10 for king blue-grass (Table 12). King blue-grass had the lower score of the two MNES (5.71) on account of the absence of any confirmed king-blue grass tussocks within the surveyed plots at the time of surveying. (refer to Appendix B for site condition raw data contributing to site condition score).

Table 12: MDS Rail Loop site monitoring sites showing their habitat condition scores contributing to MNES.

Site	RE	Natural Grasslands TEC	King blue-grass
MDSRL01	11.8.11	7.68	6.14
MDSRL 02	11.8.11	7.41	5.93
MDSRL 03	11.8.11	7.14	5.71
MDSRL 04	11.8.11	6.34	5.07
	Average score	**7.14**	**5.71**

Natural Grasslands habitat

Natural Grasslands TEC habitat condition scores for the four habitat monitoring sites ranged between 6.34 and 7.68 (Table 12). The four assessment sites supported between five and six TEC indicator grass species

(Table 13). While additional species are likely to have been present, some individuals could not be identified to species level primarily as a consequence of the lack of fertile material.

Table 13: Natural Grasslands TEC indicator species at the MDS Rail Loop site.

Scientific name	Common name	MDSRL01 RE 11.8.11	MDSRL02 RE 11.8.11	MDSRL03 RE 11.8.11	MDSRL04 RE 11.8.11
Aristida latifolia	Feather-top wiregrass	✓	✓	✓	✓
Aristida leptopoda	White speargrass	✓	✓	✓	✓
Astrebla elymoides	Hoop mitchell grass				
Astrebla lappacea	Curly mitchell grass				
Astrebla squarrosa	Bull mitchell grass				
Bothriochloa erianthoides	Satin-top grass	✓	✓	✓	✓
Dichanthium queenslandicum	King blue-grass				
Dichanthium sericeum	Queensland bluegrass	✓	✓	✓	✓
Eriochloa crebra	Cup grass				✓
Panicum decompositum	Native millet	✓	✓	✓	✓
Panicum queenslandicum	Yabila grass				
Paspalidium globoideum	Shot grass				
Thellungia advena	Coolibah grass				
	TOTAL	**5**	**5**	**5**	**6**

Natural Grassland quality assessments were conducted at each of the four habitat condition sites within a 50 m x 20 m plot. This included an assessment of the species richness of Natural Grassland TEC indicator species, density of grass tussocks, shrub cover and non-native plant cover as per the approved Commonwealth listing advice (TSSC 2009) (Table 8). The results of this assessment (Table 14) indicated that two of the condition sites (MDSRL02 and MDSRL03) were only in 'good' condition, with the remaining two sites (MDSRL01 and MDSRL04) being less than 'good' condition which is attributed to the high weed cover in these plots, particularly Melinis repens, *Setaria incrassata* and *Physalis lanceifolia*. According to the approved Commonwealth listing advice (TSSC 2009), MDSRL01 and MDSRL04 do not meet the criteria for 'good' or 'best' condition class on account of both sites having weed cover > 30%.

Table 14: Condition classes for the Natural Grasslands TEC

TEC quality criteria	MDSRL01 RE 11.8.11	MDSRL02 RE 11.8.11	MDSRL03 RE 11.8.11	MDSRL04 RE 11.8.11
Perennial indicator grass species	5	5	5	6
Number of native grass tussocks	>200	>200	>200	>200
Woody shrub canopy cover (%)	<5	<5	<5	<5
Perennial non-native plant cover (%)	35.7	12.8	19.45	41.85
Condition class	-	Good	**Good**	-

King blue-grass habitat

King blue-grass habitat condition scores for the four habitat monitoring sites ranged between 5.07 and 6.14 (Table 12). No King-blue grass were positively identified from the four habitat condition assessment plots at the time of surveying, accounting for the lower MNES habitat condition score compared with Natural Grassland TEC scores.

4.2 PHOTO MONITORING

Photo monitoring of the MDS Rail Loop site showed relatively consistent levels of biomass, characterised by a moderate grass cover. Whereas many areas of comparable RE 11.8.11 on the MDS project site showed dense grass cover, the MDS Rail Loop site was not consistent with this, despite being represented by the same vegetation community. This is likely a consequence of historical disturbance, with the current condition an indication that the site is in a state of recovery. Ongoing management and concurrent photo monitoring should detect that change over time, as the grassland continues to recover. The results of the photo monitoring in the MDS Rail Loop site is presented in Appendix E.

4.3 BIOMASS MONITORING

Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for monitoring all four of the sites comprising RE 11.8.11 (Table 15). Where the observed biomass at a site was mid-way between two photos within a given biomass standard, the middle of the corresponding range was reported (i.e. observed biomass between 3,015 kg/ha and 3,850 kg/ha 'Downs country' photo standards was reported as 3,433 kg/ha).

Photo monitoring showed limited variability in biomass of ground cover across all four photo monitoring sites. Overall, there was a moderate biomass for the vegetation type, with a biomass ranging between 3,015 kg/ha and 4,445 kg/ha.

Table 15: Results of biomass monitoring on the MDS Project site using Brigalow Belt Future Beef pasture photo standards.

		Brigalow Belt Future Beef pasture photo standard type	
Photo monitoring site*	RE type	Downs country	Biomass kg/ha
MDSRL01	11.8.11	✓	3,850
MDSRL02	11.8.11	✓	3,015
MDSRL03	11.8.11	✓	3,015
MDSRL04	11.8.11	✓	4,445

* taken from the 50 m point of the permanent habitat monitoring transect.

4.4 GENERAL SITE INSPECTION

Construction of the MDS Rail Loop was complete at the time of the 2021 wet season survey. No development was observed outside of the extent of disturbance, and no rubbish or other matters likely to impact on the monitoring area was observed. This included no evidence of dust or other particulate material on the vegetation within the MDS Rail Loop monitoring area. It is noted that BioCondition weed cover estimates appear to be higher than previous surveys at most sites, particularly at site 04 which is adjacent to the Dawson Highway. Non-native grass species form the majority of weed incursion in the MDS Rail Loop site Natural Grasslands TEC.

5 RESULTS: LEXINGTON OFFSET SITE

5.1 HABITAT MONITORING

Results of habitat condition assessments identified an average site condition score of 6.58 out of 10 across all 13 habitat monitoring sites, with scores ranging between 4.00 (Site LEX01) and 8.00 (Site LEX13). Site context scores varied from 2.69 out of 10 (LEX08 – LEX11) up to 10 out of 10 (LEX01 – LEX07). Appendix C outlines details of the site condition assessments, summarised below in Table 16.

Table 16: Lexington offset site habitat monitoring sites: site condition and site context scores calculated in accordance with the *Guide to determining terrestrial habitat quality* (DEHP 2017).

Site	RE	Easting	Northing	Site condition score (/10)	Site context score (/10)
LEX01	11.8.11	604331	7353900	4.00	10.00
LEX02	11.8.4	603892	7353005	7.75	10.00
LEX03	11.8.11	604380	7352477	7.33	10.00
LEX04	11.8.5	603904	7351691	6.75	10.00
LEX05	11.8.4	603426	7351001	5.50	10.00
LEX06	11.8.11	604789	7351195	5.00	10.00
LEX07	11.8.4	604649	7350750	7.75	10.00
LEX08	11.8.11a	606488	7350361	6.88	2.69
LEX09	11.8.11a	607401	7351133	7.13	2.69
LEX10	11.8.11a	607175	7351571	5.75	2.69
LEX11	11.8.5	609631	7353104	6.69	7.69
LEX12	11.8.11	610371	7353117	7.00	7.31
LEX13	11.8.11	610237	7352515	8.00	7.31
			Average score	6.58	**7.72**

MNES/MSES habitat condition assessments

Based on the results of the site condition assessments, habitat condition scores for the eight MNES/MSES ranged between 5.00 (of concern 11.8.11a and watercourse 11.8.11a) and 8.57 (Natural Grasslands TEC) out of 10 (Table 17). The comparatively low score for of concern 11.8.11a is in part attributable to a high percentage of non-native plant cover, but also the low connectivity afforded by the surrounding area. In contrast, Natural Grasslands TEC had the highest habitat score (8.57) at LEX03, attributable in large part to the species richness for grasses and non-native plant cover being equal to and greater than benchmark condition, respectively, as well as a perfect site context score of 10.00. (refer to Appendix C for site condition raw data).

Table 17: Lexington offset site monitoring sites showing their habitat condition scores contributing to MNES.

Site	RE	Natural Grasslands TEC	King blue-grass	Blue grass	Squatter pigeon	Watercourse 11.8.5	Watercourse 11.8.11	Watercourse 11.8.11a	Of Concern 11.8.11a
LEX01	11.8.11	6.79	5.43	5.43					
LEX02	11.8.4				7.95				
LEX03	11.8.11	8.57	6.86	6.86					
LEX04	11.8.5				7.44	7.55			
LEX05	11.8.4				6.47				
LEX06	11.8.11	7.32	5.86	5.86			7.32		
LEX 07	11.8.4				7.63				
LEX 08	11.8.11a								5.85
LEX 09	11.8.11a							6.04	6.04
LEX 10	11.8.11a							5.00	5.00
LEX 11	11.8.5				6.70				
LEX 12	11.8.11	7.14	5.71	5.71					
LEX 13	11.8.11	7.68	6.14	6.14					

Natural Grasslands habitat

Natural Grasslands TEC habitat condition scores for the five of concern RE 11.8.11 habitat monitoring sites ranged between 6.79 and 8.57 (Table 18). The five assessment sites supported between four and seven TEC indicator grass species (Table 18). It is possible that additional Natural Grasslands TEC indicator species were present, however some individuals could not be identified to species level due to the dry conditions and as a consequence, lack of fertile material.

Table 18: Natural Grasslands TEC indicator species at the MDS Rail Loop site.

Scientific name	Common name	LEX01 RE 11.8.11	LEX03 RE 11.8.11	LEX06 RE 11.8.11	LEX012 RE 11.8.11	LEX013 RE 11.8.11
Aristida latifolia	Feather-top wiregrass	✓	✓			
Aristida leptopoda	White speargrass	✓	✓	✓	✓	✓
Astrebla elymoides	Hoop mitchell grass					
Astrebla lappacea	Curly mitchell grass					
Astrebla squarrosa	Bull mitchell grass					
Bothriochloa erianthoides	Satin-top grass		✓		✓	✓
Dichanthium queenslandicum	King blue-grass					

Scientific name	Common name	LEX01 RE 11.8.11	LEX03 RE 11.8.11	LEX06 RE 11.8.11	LEX012 RE 11.8.11	LEX013 RE 11.8.11
Dichanthium sericeum	Queensland bluegrass	✓	✓	✓	✓	✓
Eriochloa crebra	Cup grass					
Panicum decompositum	Native millet	✓	✓	✓	✓	✓
Panicum queenslandicum	Yabila grass			✓	✓	✓
Paspalidium globoideum	Shot grass		✓	✓		✓
Thellungia advena	Coolibah grass		✓	✓	✓	
	TOTAL	**4**	**7**	**6**	**6**	**6**

Natural Grassland TEC habitat quality assessments were conducted at each of the five habitat monitoring sites within a 50 m x 20 m plot. This included an assessment of the species richness of Natural Grassland TEC indicator species, density of grass tussocks, shrub cover and non-native plant cover, as per the criteria listed in the approved Commonwealth listing advice (TSSC 2009). The results of this assessment (Table 19) indicated that two of the habitat monitoring sites (LEX03 and LEX13) were in 'best' condition, two sites (LEX06 and LEX12) were only in 'good' condition, and one site (LEX01) did not meet the threshold for 'best' or 'good' condition class as a consequence of a high weed cover (51.9%), particularly of *Melinis repens*, *Cenchrus ciliaris* and *Parthenium hysterophorus*.

Table 19: Condition classes for the Natural Grasslands TEC

TEC quality criteria	LEX01 RE 11.8.11	LEX03 RE 11.8.11	LEX06 RE 11.8.11	LEX012 RE 11.8.11	LEX013 RE 11.8.11
Perennial indicator grass species	4	7	6	6	6
Number of native grass tussocks	>200	>200	>200	>200	>200
Woody shrub canopy cover (%)	<5	<5	<5	<5	<5
Perennial non-native plant cover (%)	51.9	2.1	11.15	10.3	1
Condition class	-	**Best**	**Good**	**Good**	**Best**

King blue-grass habitat

King blue-grass habitat condition scores for the five habitat monitoring sites ranged between 5.43 and 6.86 (Table 18). No King-blue grass were positively identified from the five habitat condition assessment plots at the time of surveying, accounting for the lower MNES habitat condition score compared with Natural Grassland TEC scores.

Squatter pigeon surveys

Targeted squatter pigeon surveys were undertaken generally in accordance with the Survey Guidelines for Australia's Threatened Birds (DEWHA 2010). In the absence of specific seasonally-enhanced detectability of squatter pigeon, surveying was conducted over 3 days. In accordance with previous experience in the Brigalow Belt (J. Cousin, pers comm.2016), squatter pigeon was passively surveyed by flushing them while traversing the offset site by vehicle (on formed tracks) and by foot; recording the number (and abundance) of squatter pigeon encounters during any survey event. Despite more than 80 km of travel on site, no squatter pigeon were confirmed as part of the post-wet season field surveys.

5.2 PHOTO MONITORING

Photo monitoring of the Lexington offset site showed a variety of levels of cover consistent within the varying vegetation communities. Photo monitoring in natural grassland areas (RE 11.8.11) ranged from a dense understorey in the eastern parts of the offset (Site 20: refer to Photo F-158 in Appendix F) through to relatively open areas with evidence of weeds in the western areas (Site 06: F-55 in Appendix F) resulting in reduced grass cover. Even in upslope areas characterised by shallower skeletal soils over basalt, there was still an appreciable grass cover for the vegetation type (Site 05: refer to Photo F-50 in Appendix F); likely indicative of a favourable wet season. The results of the photo monitoring in the Lexington offset site is presented in Appendix F.

5.3 BIOMASS MONITORING

5.3.1 Biomass monitoring for fire management

Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for offset areas comprising of RE 11.8.11 and RE 11.8.11a, whilst photo monitoring results from areas of RE 11.8.4 and RE 11.8.5 were assessed against 'Narrow-leaved Ironbark' photo standards (Table 20).

Photo monitoring showed some variability in biomass of ground cover. Sites in RE 11.8.11 and 11.8.11a were all at least 2,140 kg/ha and up to 5,040 kg/ha (Site 20), while biomass in RE 11.8.4 and RE 11.8.5 ranged between 1,475 kg/ha (Site 02) and 5,000 kg/ha (Site 05), both in rockier upslope areas (Table 20).

Table 20: Results of biomass monitoring on the Lexington offset site using Brigalow Belt Future Beef pasture photo standards.

Photo monitoring site*	RE type	Brigalow Belt pasture photo standard type		Biomass (kg/ha)
		Narrow-leaved ironbark	Downs country	
01	11.8.11		✓	3,015
02	11.8.4	✓		1,475
03	11.8.11		✓	2,140
04	11.8.5	✓		2,000
05	11.8.4	✓		5,000
06	11.8.11		✓	2,578
07	11.8.4	✓		1,750
08	11.8.11a		✓	3,015
09	11.8.11a		✓	3,850

Photo monitoring site*	RE type	Brigalow Belt pasture photo standard type		Biomass (kg/ha)
		Narrow-leaved ironbark	Downs country	
10	11.8.11a		✓	2,578
11	11.8.5	✓		3,625
12	11.8.11		✓	3,850
13	11.8.11		✓	3,015
14	11.8.5	✓		3,625
15	11.8.4	✓		2,000
16	11.8.11		✓	2,578
17	11.8.11		✓	2,578
18	11.8.5	✓		2,250
19	11.8.4	✓		2,000
20	11.8.11		✓	5,040

* taken from the 0 m point of the permanent habitat monitoring transects (Sites 01 – 12) and the SW corner of the standalone weed monitoring plots (Sites 13 – 20).

5.3.2 Biomass monitoring for sustainable grazing

While cattle were observed within the north-west of the offset area as part of the post-wet season survey, the results of the current biomass monitoring will be utilised as part of the Annual Land Condition-Pasture Budget Assessment, to be completed by Sojitz Blue. This will include an assessment of any proposed grazing management regimes in the offset area.

5.4 SIGNIFICANT SPECIES

Targeted surveys for *Dichanthium queenslandicum* (king blue-grass) and *D. setosum* (bluegrass) were not scheduled to be undertaken during the post-west season surveys at the Lexington offset site. Notwithstanding, neither species was detected as part of habitat condition assessments or opportunistically while traversing the site.

5.5 GENERAL SITE INSPECTION

No additional fencing or access tracks were noted within of the extent of traversed areas in May 2021. Any additional fencing and tracks outside of traversed areas were not able to be confirmed and will need to be supplied for updating as part of future monitoring events.

It is understood that a share-farming agreement is in place to limit the head of cattle per paddock. However, past evidence of cattle were observed in the grassland areas in the west of the Lexington offset area during the post-wet season monitoring.

Outside of the weed monitoring plots assessed in previous surveys, there were a number of areas where weed infestation was considered serious. Most noticeably was the extent and density of weeds within and adjacent the ephemeral drainage line and bore on Prickle Farm Road that flanks the western edge of the mining lease (ML 70376). In this area, the ephemeral drainage line was densely infested by Noogoora burr (*Xanthium occidentale*), with areas away from the drainage line characterised by dense, monospecific stands of *Parthenium hysterophorus*. Furthermore, there is still considerable coverage of *Vachellia farnesiana*

throughout the western Natural Grassland (RE 11.8.11) areas. Observations near the bore mentioned above have also confirmed an ongoing leak over at least the last two survey periods.

6 RESULTS: LEXINGTON RAIL LOOP OFFSET SITE

6.1 BIOMASS MONITORING

Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for monitoring all twelve of the sites comprising RE 11.8.11 (Table 21). Where the observed biomass at a site was mid-way between two photos within a given biomass standard, the middle of the corresponding range was reported (i.e. observed biomass between 3,015 kg/ha and 3,850 kg/ha 'Downs country' photo standards was reported as 3,433 kg/ha).

Photo monitoring showed some variability in biomass of ground cover across all 12 photo monitoring sites. Overall, there was a high biomass for the grassland vegetation type, with a biomass ranging between 2,578 kg/ha and 5,040 kg/ha. The average biomass varied considerably between the offset paddocks, with the average biomass at Contours (5,040 kg/ha) greater than at Harry's (4,365 kg/ha) and greater again than at North Promenade (3,532 kg/ha).

Table 21: Results of biomass monitoring on the Lexington Rail Loop offset site using Brigalow Belt Future Beef pasture photo standards.

		Brigalow Belt Future Beef pasture photo standard type	
Biomass monitoring site*	RE type	Downs country	Biomass kg/ha
LEXRL01 – North Promenade paddock	11.8.11	✓	3,850
LEXRL02 – North Promenade paddock	11.8.11	✓	3,850
LEXRL03 – Harry's paddock	11.8.11	✓	3,015
LEXRL04 – Harry's paddock	11.8.11	✓	5,040
LEXRL05 – Contours paddock	11.8.11	✓	5,040
LEXRL06 – Contours paddock	11.8.11	✓	5,040
LEXRL07 – Contours paddock	11.8.11	✓	5,040
LEXRL08 – North Promenade paddock	11.8.11	✓	3,850
LEXRL09 – North Promenade paddock	11.8.11	✓	2,578
LEXRL10 – Harry's paddock	11.8.11	✓	5,040
LEXRL11 – Contours paddock	11.8.11	✓	5,040
LEXRL12 – Contours paddock	11.8.11	✓	5,040

* taken from the 0 m point of the permanent habitat monitoring transects (Sites LEXRL01 – LEXRL07) and the SW corner of the standalone weed monitoring plots (Sites LEXRL08 – LEXRL12).

6.2 GENERAL SITE INSPECTION

It is understood that a share-farming agreement is in place to limit the head of cattle per paddock. A herd of 5 – 6 horses was encountered on a number of days within Harry's Paddock, with evidence throughout the paddock of horse manure.

All fences bounding the paddocks were in good condition. Access to many of the monitoring sites in the Contours paddock was via an access track outside of and adjacent to the western boundary of the paddock, whereas access to monitoring sites in Harry's paddock was via Wurba Road and access to the North Promenade monitoring sites was via existing access tracks into Lexington.

7 REFERENCES

Auld, B. (2009). *Guidelines for Monitoring Weed Control and Recovery of Native Vegetation*. NSW Department of Primary Industries. Bureau of Rural Sciences, Orange NSW.

CO2 Australia (2017). *MNESMP Baseline Monitoring Report – Meteor Downs South Coal Mine Project.* CO2 Australia, Brisbane, QLD.

CO2 Australia (2018). *Lexington Offset Area Initial Baseline Monitoring Report – Meteor Downs South Project*. CO2 Australia, Brisbane, QLD.

CO2 Australia (2020). *Post-wet Season Monitoring Report – Year 3 (2019/20)*. CO2 Australia, Brisbane, QLD.

Cooke, B., McPhee, S., & Hart, Q. (1990). *Rabbits: a threat to conservation & natural resource management, how to rapidly assess a rabbit problem and take action.* Australia Bureau of Rural Sciences, Canberra.

Department of Environment and Heritage Protection (DEHP). (2017). *Guide to determining terrestrial habitat quality – version 1.2.* Department of Environment and Heritage Protection (State of Queensland), Brisbane.

Queensland Herbarium (2021). *Regional Ecosystem Description Database (REDD). Version 12 (March 2021)*. Queensland Government (Department of Environment and Science), Brisbane.

Department of the Environment, Water, Heritage and the Arts (DEWHA). (2010). *Survey Guidelines for Australia's Threatened Birds*. Department of the Environment, Water, Heritage and the Arts (Australian Government), Canberra.

Department of Environment, Water, Heritage and the Arts (DEWHA) (2010). *Survey Guidelines for Australia's Threatened Birds.* Department of Environment, Water, Heritage and the Arts, Canberra

Hone, J. (1988). Feral pig rooting in a mountain forest and woodland: Distribution, abundance and relationships with environmental variables. *Australian Journal of Ecology* **13:** 393-400

Mitchell, B., & Balogh, S. (2007a). *Monitoring Techniques for Vertebrate Pests: Wild Dogs.* NSW Department of Primary Industries. Bureau of Rural Sciences, Orange NSW.

Mitchell, B., & Balogh, S. (2007b). *Monitoring Techniques for Vertebrate Pests: Feral Pigs.* NSW Department of Primary Industries. Bureau of Rural Sciences, Orange NSW.

Northern Resources Consultants (NRC) (2019). *Lexington Offset Area – Pest and Biomass Monitoring – February 2019*. Northern Resources Consultants, Townsville, Qld.

SLR Consulting (SLR)(2019a). *Matters of National Environmental Significance Management Plan – Meteor Downs South Rail Loop Project.* A report prepared for Sojitz Coal Mining Pty Ltd. SLR Consulting, Townsville.

SLR Consulting (SLR)(2019b). *MDS Rail Loop Offset – Ecological Assessment Report.* A report prepared for Sojitz Coal Mining Pty Ltd. SLR Consulting, Townsville.

Threatened Species Scientific Committee (TSSC)(2009). *Commonwealth Listing Advice on Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin*. Department of the Environment, Water, Heritage and the Arts.

APPENDIX A MONITORING SITE LOCATIONS

MDS PROJECT SITE

Table A-1: Post-wet-season monitoring site locations and purpose on the MDS Project site.

Site	Start point name[a]	Easting	Northing	Star picket?	Biomass monitoring
01	H01_0m	641462	7304249	✓	✓
	H01_50m	641462	7304301	✓	
02	H02_0m	640199	7303572	✓	✓
	H02_50m	640203	7303621	✓	
03	H03_0m	638418	7303259	✓	✓
	H03_50m	638425	7303308	✓	
04	H04_0m	637945	7300236	✓	✓
	H04_50m	637951	7300287	✓	
05	H05_0m	638426	7299836	✓	✓
	H05_50m	638420	7299885	✓	
06	H06_0m	637445	7299566	✓	✓
	H06_50m	637447	7299615	✓	
07	H07_0m	638426	7298876	✓	✓
	H07_50m	638419	7298926	✓	
08	H08_0m	637032	7298735	✓	✓
	H08_50m	637034	7298785	✓	
09	H09_0m	638387	7298599	✓	✓
	H09_50m	638380	7298648	✓	
10	H10_0m	636412	7297523	✓	✓
	H10_50m	636415	7297571	✓	
11	W11_01	642941	7304772	✓	✓
12	W12_01	641428	7303597	✓	✓
13	W13_01	641896	7303196	✓	✓
14	W14_01	638991	7303038	✓	✓
15	W15_01	637797	7302245	✓	✓
16	W16_01	638556	7300785	✓	✓
17	W17_01	637029	7300184	✓	✓
18	W18_01	637401	7300321	✓	✓
19	W19_01	638301	7301720	✓	✓
20	W20_01	636740	7298674	✓	✓

[a] Start points with prefix H = habitat assessment sites (HXX_0m and HXX_50m corresponds to 0 m and 50 m point of north-south habitat assessment transect), W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3).

LEXINGTON OFFSET SITE

Table A-2: Post-wet season monitoring site locations and purpose on the Lexington offset site.

Site	Start point name[a]	Easting	Northing	Star picket?	Habitat condition MNES/MSES values	Photo monitoring	Biomass monitoring
01	H01_0m	604331	7353900	✓	Natural Grassland TEC, King-blue grass, bluegrass	✓	✓
	H01_50m	604331	7353950	✓		✓	
02	H02_0m	603892	7353005	✓	Squatter pigeon (southern)	✓	✓
	H02_50m	603908	7353053	✓		✓	
03	H03_0m	604380	7352477	✓	Natural Grassland TEC, King-blue grass, bluegrass	✓	✓
	H03_50m	604380	7352527	✓		✓	
04	H04_0m	603904	7351691	✓	Squatter pigeon, Watercourse RE 11.8.5	✓	✓
	H04_50m	603904	7351741	✓		✓	
05	H05_0m	603426	7351001	✓	Squatter pigeon	✓	✓
	H05_50m	603378	7351016	✓		✓	
06	H06_0m	604789	7351195	✓	Natural Grassland TEC, King-blue grass, bluegrass, Watercourse RE 11.8.11	✓	✓
	H06_50m	604789	7351245	✓		✓	
07	H07_0m	604649	7350750	✓	Squatter pigeon	✓	✓
	H07_50m	604649	7350800	✓		✓	
08	H08_0m	606488	7350361	✓	RE 11.8.11a	✓	✓
	H08_50m	606488	7350411	✓		✓	
09	H09_0m	607401	7351133	✓	RE 11.8.11a, Watercourse RE 11.8.11a	✓	✓
	H09_50m	607401	7351183	✓		✓	
10	H10_0m	607175	7351571	✓	RE 11.8.11a	✓	✓
	H10_50m	607175	7351621	✓		✓	
11	H11_0m	609631	7353104	✓	Squatter pigeon	✓	✓
	H11_50m	609631	7353154	✓		✓	
12	H12_0m	610371	7353117	✓	Natural Grassland TEC, King-blue grass, bluegrass	✓	✓
	H12_50m	610371	7353167	✓		✓	
13	H13_0m	610237	7352515	✓	Natural Grassland TEC, King-blue grass, bluegrass	✓	✓
	H13_50m	610237	7352565	✓		✓	
14	W14_01	604883	7354051	✓		✓	✓
15	W15_01	604543	7352984	✓		✓	✓
16	W16_01	604604	7352289	✓		✓	✓
17	W17_01	604503	7351656	✓		✓	✓
18	W18_01	604074	7350714	✓		✓	✓
19	W19_01	603812	7352530	✓		✓	✓

Site	Start point name[a]	Easting	Northing	Star picket?	Habitat condition MNES/MSES values	Photo monitoring	Biomass monitoring
20	W20_01	610453	7352923	✓		✓	✓

[a] Start points with prefix H = habitat assessment sites (HXX_0m and HXX_50m corresponds to 0 m and 50 m point of north-south habitat assessment transect), W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3).

MDS RAIL LOOP SITE

Table A-3: Post-wet-season monitoring site locations and purpose on the MDS Rail Loop site

Site	Start point name[a]	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Biomass monitoring
MDSRL01	H01_0m	645575	7303101	✓	Natural Grasslands TEC, King blue-grass	✓	
	H01_50m	645575	7303151	✓		✓	✓
MDSRL02	H02_0m	646410	7303007	✓	Natural Grasslands TEC, King blue-grass	✓	
	H02_50m	646410	7303057	✓		✓	✓
MDSRL03	H03_0m	646666	7303114	✓	Natural Grasslands TEC, King blue-grass	✓	
	H03_50m	646666	7303164	✓		✓	✓
MDSRL04	H04_0m	646834	7303291	✓	Natural Grasslands TEC, King blue-grass	✓	
	H04_50m	646834	7303341	✓		✓	✓
MDSRL05	W05_01	646409	7303255	✓	Natural Grasslands TEC, King blue-grass	✓	

[a] Start points with prefix H = habitat assessment sites (HXX_0m and HXX_50m corresponds to 0 m and 50 m point of north-south habitat assessment transect), W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3). Start points for habitat assessment and weed monitoring plots are the same for sites 01 – 04, with site 05 only corresponding to a standalone weed monitoring plot.

LEXINGTON RAIL LOOP SITE

Table A-4: Post-wet-season monitoring site locations and purpose on the MDS Rail Loop site

Site	Start point name[a]	Easting	Northing	Star picket?	Photo monitoring	Biomass monitoring
LEXRL01	H01_0m	604390	7355247	✓	✓	✓
	H01_50m	604390	7355297	✓	✓	
LEXRL02	H02_0m	604758	7354797	✓	✓	✓
	H02_50m	604758	7354847	✓	✓	
LEXRL03	H03_0m	608595	7355228	✓	✓	✓
	H03_50m	608595	7355278	✓	✓	
LEXRL04	H04_0m	609262	7355036	✓	✓	✓
	H04_50m	609262	7355086	✓	✓	
LEXRL05	H05_0m	612011	7354575	✓	✓	✓
	H05_50m	612011	7354625	✓	✓	
LEXRL06	H06_0m	611834	7354280	✓	✓	✓
	H06_50m	611834	7354330	✓	✓	
LEXRL07	H07_0m	611215	7353711	✓	✓	✓
	H07_50m	611215	7353761	✓	✓	
LEXRL08	W08_01	604126	7354813	✓	✓	✓
LEXRL09	W09_01	604978	7355196	✓	✓	✓
LEXRL10	W010_01	609785	7355039	✓	✓	✓
LEXRL11	W11_01	611630	7353857	✓	✓	✓
LEXRL12	W12_01	612344	7354534	✓	✓	✓

[a] Start points with prefix H = habitat assessment sites (HXX_0m and HXX_50m corresponds to 0 m and 50 m point of north-south habitat assessment transect), W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3). Start points for habitat assessment and weed monitoring plots are the same for sites 01 – 07, with sites 08 – 12 only corresponding to a standalone weed monitoring plot.

APPENDIX B MDS RAIL LOOP SITE – YEAR 2 HABITAT CONDITION ASSESSMENT

The following tables provide details of the habitat condition assessments undertaken during the Year 2 monitoring period at the MDS Rail Loop site. Habitat condition scores were calculated in accordance with the *Guide to Determining Terrestrial Habitat Quality version 1.2* (DEHP, 2017). The data required to inform the site condition and flora species stocking rates were collected as part of detailed field surveys in May 2021. The site context score was calculated in accordance with the method prescribed in the *Guide to Determining Terrestrial Habitat Quality version 1.2* (DEHP, 2017), derived from ground-truthed regional ecosystem mapping within the extent of the MDS Rail Loop, as presented in the MDS Rail Loop ecological assessment (SLR 2019b).

Table B-1: Site condition raw data for each RE assessment unit

Ecological condition indicators	Site MDSRL01 RE 11.8.11			Site MDSRL02 RE 11.8.11			Site MDSRL03 RE 11.8.11			Site MDSRL04 RE 11.8.11		
	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score
Recruitment of woody perennial species	-	-	-	-	-	-	-	-	-	-	-	-
Native plant species richness - trees	-	-	-	-	-	-	-	-	-	-	-	-
Native plant species richness - shrubs	-	-	-	-	-	-	-	-	-	-	-	-
Native plant species richness - grasses	6	11	3	7	11	3	7	11	3	9	11	3
Native plant species richness - forbs	5	17	3	3	17	2.5	5	17	3	4	17	2.5
Tree canopy height	-	-	-	-	-	-	-	-	-	-	-	-
Tree sub canopy height	-	-	-	-	-	-	-	-	-	-	-	-
Tree canopy cover	-	-	-	-	-	-	-	-	-	-	-	-
Tree sub canopy cover	-	-	-	-	-	-	-	-	-	-	-	-
Shrub canopy cover	-	-	-	-	-	-	-	-	-	-	-	-
Native perennial grass cover	30.6	43	3	32	43	3	34	43	3	16.6	43	1
Organic litter	16	13	5	16.6	13	5	27.6	13	3	30	13	3
Large eucalypt trees	-	-	-	-	-	-	-	-	-	-	-	-
Large non-eucalypt trees	-	-	-	-	-		-	-	-	-	-	
Coarse woody debris	-	-	-	-	-	-	-	-	-	-	-	-
Non-native plant cover	35.7	0	3	12.8	0	10	19.45	0	5	41.85	0	3
Total			17			18.5			17			12.5
/10			**5.67**			**6.17**			**5.67**			**4.17**

Table B-2: Summary of the site condition, site context and fauna species habitat index scores used to calculate the habitat condition score for each RE assessment unit

MNES values	Site MDSRL01 RE 11.8.11 Natural Grasslands TEC, King blue-grass	Site MDSRL02 RE 11.8.11 Natural Grasslands TEC, King blue-grass	Site MDSRL03 RE 11.8.11 Natural Grasslands TEC, King blue-grass	Site MDSRL04 RE 11.8.11 Natural Grasslands TEC, King blue-grass
Site condition				
Recruitment of woody perennial species	-	-	-	-
Native plant species richness - trees	-	-	-	-
Native plant species richness - shrubs	-	-	-	-
Native plant species richness - grasses	3	3	3	3
Native plant species richness - forbs	3	2.5	3	2.5
Tree canopy height	-	-	-	-
Tree canopy cover	-	-	-	-
Shrub canopy cover	-	-	-	-
Native perennial grass cover	3	3	3	1
Organic litter	5	5	3	3
Large trees	-	-	-	-
Coarse woody debris	-	-	-	-
Non-native plant cover	3	5	5	3
Total of BioCondition attributes	17	18.5	17	12.5
MAX ecological condition score	30	30	30	30
Score /10	**5.67**	**6.17**	**5.67**	**4.17**
Site context				
Size of patch (fragmented bioregions)	10	10	10	10
Connectivity (fragmented bioregions)	5	5	5	5
Context (fragmented bioregions)	5	4	4	4
Distance to permanent watering point (intact bioregions)	-	-	-	-
Ecological corridors	6	4	4	4
Total of site context attributes	26	23	23	23
MAX site condition score	26	26	26	26
Score /10	**10.00**	**8.85**	**8.85**	**8.85**

Table B-3: Summary of the species stocking rate index for king blue-grass

Species stocking rate /3[a]	Site MDSRL01 RE 11.8.11	Site MDSRL02 RE 11.8.11	Site MDSRL03 RE 11.8.11	Site MDSRL04 RE 11.8.11
King blue-grass – Absent/not confirmed = 0 – up to 2 tussocks = 2 – between 3 and 20 tussocks = 2.5 – 20 or more tussocks = 3	0	0	0	0

[a] species stocking rate contributes 20% toward the habitat condition score for King blue-grass, with the remaining 80% made up of site condition and site context.

Table B-4: Summary of the MNES habitat condition score for each RE assessment unit

Assessment unit habitat condition score /10	Site MDSRL01 RE 11.8.11	Site MDSRL02 RE 11.8.11	Site MDSRL03 RE 11.8.11	Site MDSRL04 RE 11.8.11	Average habitat condition score
Natural Grasslands TEC – calculated based on site condition (/80) + site context (/26) converted to score out of 10	7.68	7.41	7.14	6.34	**7.14**
King blue-grass – calculated based on combination of: – habitat quality (site condition + site context) – 80% – species stocking rate (score out of 3) – 20%	6.14	5.93	5.71	5.07	**5.71**

APPENDIX C LEXINGTON OFFSET SITE – YEAR 4 HABITAT CONDITION ASSESSMENT

The following tables provide details of the habitat condition assessments undertaken during the Year 4 monitoring period at the Lexington offset site. Habitat condition scores were calculated in accordance with the *Guide to Determining Terrestrial Habitat Quality version 1.2* (DEHP, 2017). The data required to inform the site condition and flora species stocking rates were collected as part of detailed field surveys in May 2021. The site context score was calculated in accordance with the method prescribed in the *Guide to Determining Terrestrial Habitat Quality version 1.2* (DEHP, 2017), derived from ground-truthed regional ecosystem mapping within the extent of the Lexington offset sites.

Table C-1: Site condition raw data for each RE assessment unit (Site 01-08)

Ecological condition indicators	Site 01 RE 11.8.11			Site 02 RE 11.8.4			Site 03 RE 11.8.11			Site 04 RE 11.8.5			Site 05 RE 11.8.4			Site 06 RE 11.8.11			Site 07 RE 11.8.4			Site 08 RE 11.8.11a		
	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.4)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.5)	Score	Raw data	Benchmark (11.8.4)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.4)	Score	Raw data	Benchmark (11.8.11a)	Score
Recruitment of woody perennial species		-	-	100	100	5		-	-	100	100	5	100	100	5		-	-	100	100	5	100	100	5
Native plant species richness - trees		-	-	6	4	5		-	-	3	2	5	8	4	5		-	-	14	4	5	8	7	5
Native plant species richness - shrubs		-	-	12	8	5		-	-	6	3	5	12	8	5		-	-	14	8	5	9	11	3
Native plant species richness - grasses	9	11	3	10	6	5	11	11	5	8	6	5	7	6	5	8	11	3	10	6	5	7	16	3
Native plant species richness - forbs	6	17	3	11	14	3	12	17	3	8	16	3	10	14	3	7	17	3	9	14	3	8	10	3
Tree canopy height		-	-	10.3	12	5		-	-	13.5	15	5	9.6	12	5		-	-	12	12	5	9	10	5
Tree sub canopy height		-						-		6	5						-							
Tree canopy cover		-	-	11.8	4.9	4		-	-	21.7	13	5	12.8	4.9	4		-	-	31.1	4.9	3	34.4	57.6	5
Tree sub canopy cover		-		10.2	5.9			-		3.5	4		6	5.9			-		16.4	5.9		15.6	0	
Shrub canopy cover		-	-	10.3	7.8	5		-	-	3.3	3	5	2	7.8	3		-	-	15.3	7.8	5	0.6	3.6	3
Native perennial grass cover	34	43	3	43	45	5	14.4	43	1	51	60	3	13	45	1	14.4	43	1	13.4	45	1	1.6	1.8	3
Organic litter	29	13	3	65	24	3	29	13	3	38.6	25	5	5	24	3	68	13	3	36.2	24	5	60.6	40.8	5
Large eucalypt trees		-	-	2	36	5		-	-	1	6	5	0	36	0		-	-	3	36	5	0	0	10
Large non-eucalypt trees		-						-			0						-					84	87	
Coarse woody debris		-	-	123	337	2		-	-	0	250	0	80	337	2		-	-	274	337	5	157	817	2
Non-native plant cover	51.9	0	0	0.4	0	10	2.1	0	10	41.75	0	3	34.75	0	3	11.15	0	5	1.4	0	10	26.75	0	3
Total			**12**			**62**			**22**			**54**			**44**			**15**			**62**			**55**
/10			**4.00**			**7.75**			**7.33**			**6.75**			**5.50**			**5.00**			**7.75**			**6.88**

Table C-2: Site condition raw data for each RE assessment unit (Site 09-13)

Ecological condition indicators	Site 09 RE 11.8.11a			Site 10 RE 11.8.11a			Site 11 RE 11.8.5			Site 12 RE 11.8.11			Site 13 RE 11.8.11		
	Raw data	Benchmark (11.8.11a)	Score	Raw data	Benchmark (11.8.11a)	Score	Raw data	Benchmark (11.8.11a)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score
Recruitment of woody perennial species	100	100	5	100	100	5	100	100	5		-	-		-	-
Native plant species richness - trees	16	7	5	10	7	5	9	2	5		-	-		-	-
Native plant species richness - shrubs	8	11	3	3	11	3	6	3	5		-	-		-	-
Native plant species richness - grasses	5	16	3	6	16	3	8	6	5	10	11	5	9	11	3
Native plant species richness - forbs	8	10	3	6	10	3	8	16	3	6	17	3	11	17	3
Tree canopy height	16.5	10	5	10.2	10	5	14	15	5		-	-		-	-
Tree sub canopy height							5.6	5			-			-	
Tree canopy cover	38.3	57.6	5	14.4	57.6	2	35.6	13	2.5		-	-		-	-
Tree sub canopy cover	66.2	0		10.5	0		1.5	4			-			-	
Shrub canopy cover	14	3.6	3	0.7	3.6	3	11.2	3	3		-	-		-	-
Native perennial grass cover	16	1.8	5	21	1.8	5	5.6	60	0	43.4	43	5	44	43	5
Organic litter	55.4	40.8	5	36.6	40.8	5	19.6	25	5	40.6	13	3	33.75	13	3
Large eucalypt trees	5	0	10	1	0	5	6	6	10		-	-		-	-
Large non-eucalypt trees	72	87		38	87			0			-			-	
Coarse woody debris	305	817	2	238	817	2	204	250	5		-	-		-	-
Non-native plant cover	29.1	0	3	51.75	0	0	71.45	0	0	10.3	0	5	1	0	10
Total			**57**			**46**			**53.5**			**21**			**24**
/10			**7.13**			**5.75**			**6.69**			**7.00**			**8.00**

Table C-3: Summary of the site condition, site context and fauna species habitat index scores used to calculate the habitat condition score for each RE assessment unit

MNES/MSES values	Site 01 RE 11.8.11 Natural Grassland TEC, King-blue grass, bluegrass	Site 02 RE 11.8.4 Squatter pigeon	Site 03 RE 11.8.11 Natural Grassland TEC, King-blue grass, bluegrass	Site 04 RE 11.8.5 Squatter pigeon, Watercourse RE 11.8.5	Site 05 RE 11.8.4 Squatter pigeon	Site 06 RE 11.8.11 Natural Grassland TEC, King-blue grass, bluegrass, Watercourse RE 11.8.11	Site 07 RE 11.8.4 Squatter pigeon	Site 08 RE 11.8.11a RE 11.8.11a	Site 09 RE 11.8.11a RE 11.8.11a, Watercourse RE 11.8.11a	Site 10 RE 11.8.11a RE 11.8.11a	Site 11 RE 11.8.5 Squatter pigeon (southern)	Site 12 RE 11.8.11 Natural Grassland TEC, King-blue grass, bluegrass	Site 13 RE 11.8.11 Natural Grassland TEC, King-blue grass, bluegrass
Site condition													
Recruitment of woody perennial species	-	5	-	5	5	-	5	5	5	5	5	-	-
Native plant species richness - trees	-	5	-	5	5	-	5	5	5	5	5	-	-
Native plant species richness - shrubs	-	5	-	5	5	-	5	3	3	3	5	-	-
Native plant species richness - grasses	3	5	5	5	5	3	5	3	3	3	5	5	3
Native plant species richness - forbs	3	3	3	3	3	3	3	3	3	3	3	3	3
Tree canopy height	-	5	-	5	5	-	5	5	5	5	5	-	-
Tree canopy cover	-	4	-	5	4	-	3	5	5	2	2.5	-	-
Shrub canopy cover	-	5	-	5	3	-	5	3	3	3	3	-	-
Native perennial grass cover	3	5	1	3	1	1	1	3	5	5	0	5	5
Organic litter	3	3	3	5	3	3	5	5	5	5	5	3	3
Large trees	-	5	-	5	0	-	5	10	10	5	10	-	-
Coarse woody debris	-	2	-	0	2	-	5	2	2	2	5	-	-
Non-native plant cover	0	10	10	3	3	5	10	3	3	0	0	5	10
Total of BioCondition attributes	**12**	**62**	**22**	**54**	**44**	**15**	**62**	**55**	**57**	**46**	**53.5**	**21**	**24**
MAX ecological condition score	**30**	**80**	**30**	**80**	**80**	**30**	**80**	**80**	**80**	**80**	**80**	**30**	**30**
Score /10	**4.00**	**7.75**	**7.33**	**6.75**	**5.50**	**5.00**	**7.75**	**6.88**	**7.13**	**5.75**	**6.69**	**7.00**	**8.00**
Site context													
Size of patch (fragmented bioregions)	10	10	10	10	10	10	10	5	5	5	10	10	10
Connectivity (fragmented bioregions)	5	5	5	5	5	5	5	0	0	0	5	5	5
Context (fragmented bioregions)	5	5	5	5	5	5	5	2	2	2	5	4	4
Distance to permanent watering point (intact bioregions)	-	-	-	-	-	-	-	-	-	-	-	-	-
Ecological corridors	6	6	6	6	6	6	6	0	0	0	0	0	0
Total of site context attributes	**26**	**26**	**26**	**26**	**26**	**26**	**26**	**7**	**7**	**7**	**20**	**19**	**19**
MAX site context score	**26**	**26**	**26**	**26**	**26**	**26**	**26**	**26**	**26**	**26**	**26**	**26**	**26**
Score /10	**10.00**	**10.00**	**10.00**	**10.00**	**10.00**	**10.00**	**10.00**	**2.69**	**2.69**	**2.69**	**7.69**	**7.31**	**7.31**
Fauna species habitat index													
Threats to species	-	7	-	7	7	-	7	-	-	-	7	-	-
Quality and availability of food and foraging habitat	-	5	-	5	5	-	5	-	-	-	5	-	-

MNES/MSES values	Site 01	Site 02	Site 03	Site 04	Site 05	Site 06	Site 07	Site 08	Site 09	Site 10	Site 11	Site 12	Site 13
	RE 11.8.11 Natural Grassland TEC, King-blue grass, bluegrass	RE 11.8.4 Squatter pigeon	RE 11.8.11 Natural Grassland TEC, King-blue grass, bluegrass	RE 11.8.5 Squatter pigeon, Watercourse RE 11.8.5	RE 11.8.4 Squatter pigeon	RE 11.8.11 Natural Grassland TEC, King-blue grass, bluegrass, Watercourse RE 11.8.11	RE 11.8.4 Squatter pigeon	RE 11.8.11a RE 11.8.11a	RE 11.8.11a RE 11.8.11a, Watercourse RE 11.8.11a	RE 11.8.11a RE 11.8.11a	RE 11.8.5 Squatter pigeon (southern)	RE 11.8.11 Natural Grassland TEC, King-blue grass, bluegrass	RE 11.8.11 Natural Grassland TEC, King-blue grass, bluegrass
Quality and availability of shelter	-	10	-	10	5	-	5	-	-	-	5	-	-
Species mobility capacity	-	10	-	10	10	-	10	-	-	-	10	-	-
Role of site location to species overall population in the state	-	4	-	4	4	-	4	-	-	-	4	-	-
Total of fauna species habitat index	**0**	**36**	**0**	**36**	**31**	**0**	**31**	**0**	**0**	**0**	**31**	**0**	**0**
MAX fauna habitat index score	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**
Score /10	**0.00**	**7.20**	**0.00**	**7.20**	**6.20**	**0.00**	**6.20**	**0.00**	**0.00**	**0.00**	**6.20**	**0.00**	**0.00**

Table C-4: Summary of the species stocking rate index for king blue-grass

Species stocking rate /3[a]	Site 01	Site 02	Site 03	Site 04	Site 05	Site 06	Site 07	Site 08	Site 09	Site 10	Site 11	Site 12	Site 13
	RE 11.8.11	RE 11.8.4	RE 11.8.11	RE 11.8.5	RE 11.8.4	RE 11.8.11	RE 11.8.4	RE 11.8.11a	RE 11.8.11a	RE 11.8.11a	RE 11.8.5	RE 11.8.11	RE 11.8.11
King blue-grass	0	-	0	-	-	0	-	-	-	-	-	0	0
Bluegrass	0	-	0	-	-	0	-	-	-	-	-	0	0

[a] species stocking rate contributes 20% toward the habitat condition score for King blue-grass, with the remaining 80% made up of site condition and site context.

Table C-5: Summary of the MNES/MSES habitat condition score for each RE assessment unit

Assessment unit habitat quality score /10	Site 01	Site 02	Site 03	Site 04	Site 05	Site 06	Site 07	Site 08	Site 09	Site 10	Site 11	Site 12	Site 13	FINAL MNES/MSES habitat quality score
	RE 11.8.11	RE 11.8.4	RE 11.8.11	RE 11.8.5	RE 11.8.4	RE 11.8.11	RE 11.8.4	RE 11.8.11a	RE 11.8.11a	RE 11.8.11a	RE 11.8.5	RE 11.8.11	RE 11.8.11	
Natural Grasslands TEC	6.79	-	8.57	-	-	7.32	-	-	-	-	-	7.14	7.68	**7.50**
King blue-grass	5.43	-	6.86	-	-	5.86	-	-	-	-	-	5.71	6.14	**6.00**
Bluegrass	5.43	-	6.86	-	-	5.86	-	-	-	-	-	5.71	6.14	**6.00**
Squatter pigeon	-	7.95	-	7.44	6.47	-	7.63	-	-	-	6.70	-	-	**7.24**
Of concern RE 11.8.11a (BVG 21b)	-	-	-	-	-	-	-	5.85	6.51	5.00	-	-	-	**5.79**
Watercourse RE 11.8.5 (BVG 11a)	-	-	-	7.55	-	-	-	-	-	-	-	-	-	**7.55**
Watercourse RE 11.8.11 (BVG 30b)	-	-	-	-	-	7.32	-	-	-	-	-	-	-	**7.32**
Watercourse RE 11.8.11a (BVG 21b)	-	-	-	-	-	-	-	-	6.51	5.00	-	-	-	**5.75**

APPENDIX D MDS PROJECT SITE PHOTO MONITORING

SITE 01 – H01_0M

Photo D-1 North

Photo D-2 East

Photo D-3 South

Photo D-4 West

Photo D-5 Ground

SITE 01 – H01_50M

Photo D-6 North

Photo D-7 East

Photo D-8 South

Photo D-9 West

Photo D-10 Ground

SITE 02 – H02_0 M

Photo D-11 North

Photo D-12 East

Photo D-13 South

Photo D-14 West

Photo D-15 Ground

SITE 02 – H02_50M

Photo D-16 North

Photo D-17 East

Photo D-18 South

Photo D-19 West

Photo D-20 Ground

SITE 03 – H03_0M

Photo D-21 North

Photo D-22 East

Photo D-23 South

Photo D-24 West

Photo D-25 Ground

SITE 03 – H03_50M

Photo D-26 North

Photo D-27 East

Photo D-28 South

Photo D-29 West

Photo D-30 Ground

SITE 04 – H04_0M

Photo D-31 North

Photo D-32 East

Photo D-33 South

Photo D-34 West

Photo D-35 Ground

SITE 04 – H04_50M

Photo D-36 North

Photo D-37 East

Photo D-38 South

Photo D-39 West

Photo D-40 Ground

SITE 05 – H05_0M

Photo D-41 North

Photo D-42 East

Photo D-43 South

Photo D-44 West

Photo D-45 Ground

SITE 05 – H05_50M

Photo D-46 North

Photo D-47 East

Photo D-48 South

Photo D-49 West

Photo D-50 Ground

SITE 06 – H06_0M

Photo D-51 North

Photo D-52 East

Photo D-53 South

Photo D-54 West

Photo D-55 Ground

SITE 06 – H06_50M

Photo D-56 North

Photo D-57 East

Photo D-58 South

Photo D-59 West

Photo D-60 Ground

SITE 07 – H07_0M

Photo D-61 North

Photo D-62 East

Photo D-63 South

Photo D-64 West

Photo D-65 Ground

SITE 07 – H07_50M

Photo D-66 North

Photo D-67 East

Photo D-68 South

Photo D-69 West

Photo D-70 Ground

SITE 08 – H08_0M

Photo D-71 North

Photo D-72 East

Photo D-73 South

Photo D-74 West

Photo D-75 Ground

SITE 08 – H08_50M

Photo D-76 North

Photo D-77 East

Photo D-78 South

Photo D-79 West

Photo D-80 Ground

SITE 09 – H09_0M

Photo D-81 North

Photo D-82 East

Photo D-83 South

Photo D-84 West

Photo D-85 Ground

SITE 09 – H09_50M

Photo D-86 North

Photo D-87 East

Photo D-88 South

Photo D-89 West

Photo D-90 Ground

SITE 10 – H10_0M

Photo D-91 North

Photo D-92 East

Photo D-93 South

Photo D-94 West

Photo D-95 Ground

SITE 10 – H10_50M

Photo D-96 North

Photo D-97 East

Photo D-98 South

Photo D-99 West

Photo D-100 Ground

SITE 11 – W11_0

Photo D-101 North

Photo D-102 East

Photo D-103 South

Photo D-104 West

Photo D-105 Ground

SITE 12 – W12_0

Photo D-106 North

Photo D-107 East

Photo D-108 South

Photo D-109 West

Photo D-110 Ground

SITE 13 – W13_0

Photo D-111 North

Photo D-112 East

Photo D-113 South

Photo D-114 West

Photo D-115 Ground

SITE 14 – W14_0

Photo D-116 North

Photo D-117 East

Photo D-118 South

Photo D-119 West

Photo D-120 Ground

SITE 15 – W15_0

Photo D-121 North

Photo D-122 East

Photo D-123 South

Photo D-124 West

Photo D-125 Ground

SITE 16 – W16_0

Photo D-126 North

Photo D-127 East

Photo D-128 South

Photo D-129 West

Photo D-130 Ground

SITE 17 – W17_0

Photo D-131 North

Photo D-132 East

Photo D-133 South

Photo D-134 West

Photo D-135 Ground

SITE 18 – W18_0

Photo D-136 North

Photo D-137 East

Photo D-138 South

Photo D-139 West

Photo D-140 Ground

SITE 19 – W19_0

Photo D-141 North

Photo D-142 East

Photo D-143 South

Photo D-144 West

Photo D-145 Ground

SITE 20 – W20_0

Photo D-146 North

Photo D-147 East

Photo D-148 South

Photo D-149 West

Photo D-150 Ground

APPENDIX E MDS RAIL LOOP SITE PHOTO MONITORING

SITE MDSRL01 – H01_0M

Photo E-1 North

Photo E-2 East

Photo E-3 South

Photo E-4 West

Photo E-5 Ground

SITE MDSRL01 – H01_50M

Photo E-6 North

Photo E-7 East

Photo E-8 South

Photo E-9 West

Photo E-10 Ground

SITE MDSRL02 – H02_0 M

Photo E-11 North

Photo E-12 East

Photo E-13 South

Photo E-14 West

Photo E-15 Ground

SITE MDSRL02 – H02_50M

Photo E-16 North

Photo E-17 East

Photo E-18 South

Photo E-19 West

Photo E-20 Ground

SITE MDSRL03 – H03_0M

Photo E-21 North

Photo E-22 East

Photo E-23 South

Photo E-24 West

Photo E-25 Ground

SITE MDSRL03 – H03_50M

Photo E-26 North

Photo E-27 East

Photo E-28 South

Photo E-29 West

Photo E-30 Ground

SITE MDSRL04 – H04_0M

Photo E-31 North

Photo E-32 East

Photo E-33 South

Photo E-34 West

Photo E-35 Ground

SITE MDSRL04 – H04_50M

Photo E-36 North

Photo E-37 East

Photo E-38 South

Photo E-39 West

Photo E-40 Ground

SITE MDSRL05 – W05_0

Photo E-41 North

Photo E-42 East

Photo E-43 South

Photo E-44 West

Photo E-45 Ground

APPENDIX F LEXINGTON OFFSET SITE PHOTO MONITORING

SITE 01 – H01_0M

Photo F-1 North

Photo F-2 East

Photo F-3 South

Photo F-4 West

Photo F-5 Ground

SITE 01 – H01_50M

Photo F-6 North

Photo F-7 East

Photo F-8 South

Photo F-9 West

Photo F-10 Ground

SITE 02 – H02_0M

Photo F-11 North

Photo F-12 East

Photo F-13 South

Photo F-14 West

Photo F-15 Ground

SITE 02 – H02_50M

Photo F-16 North

Photo F-17 East

Photo F-18 South

Photo F-19 West

Photo F-20 Ground

SITE 03 – H03_0M

Photo F-21 North

Photo F-22 East

Photo F-23 South

Photo F-24 West

Photo F-25 Ground

SITE 03 – H03_50M

Photo F-26 North

Photo F-27 East

Photo F-28 South

Photo F-29 West

Photo F-30 Ground

SITE 04 – H04_0M

Photo F-31 North

Photo F-32 East

Photo F-33 South

Photo F-34 West

Photo F-35 Ground

SITE 04 – H04_50M

Photo F-36 North

Photo F-37 East

Photo F-38 South

Photo F-39 West

Photo F-40 Ground

SITE 05 – H05_0M

Photo F-41 North

Photo F-42 East

Photo F-43 South

Photo F-44 West

Photo F-45 Ground

SITE 05 – H05_50M

Photo F-46 North

Photo F-47 East

Photo F-48 South

Photo F-49 West

Photo F-50 Ground

SITE 06 – H06_0M

Photo F-51 North

Photo F-52 East

Photo F-53 South

Photo F-54 West

Photo F-55 Ground

SITE 06 – H06_50M

Photo F-56 North

Photo F-57 East

Photo F-58 South

Photo F-59 West

Photo F-60 Ground

SITE 07 – H07_0M

Photo F-61 North

Photo F-62 East

Photo F-63 South

Photo F-64 West

Photo F-65 Ground

SITE 07 – H07_50M

Photo F-66 North

Photo F-67 East

Photo F-68 South

Photo F-69 West

Photo F-70 Ground

SITE 08 – H08_0M

Photo F-71 North

Photo F-72 East

Photo F-73 South

Photo F-74 West

Photo F-75 Ground

SITE 08 – H08_50M

Photo F-76 North

Photo F-77 East

Photo F-78 South

Photo F-79 West

Photo F-80 Ground

SITE 09 – H09_0M

Photo F-81 North

Photo F-82 East

Photo F-83 South

Photo F-84 West

Photo F-85 Ground

SITE 09 – H09_50M

Photo F-86 North

Photo F-87 East

Photo F-88 South

Photo F-89 West

Photo F-90 Ground

SITE 10 – H10_0M

Photo F-91 North

Photo F-92 East

Photo F-93 South

Photo F-94 West

Photo F-95 Ground

SITE 10 – H10_50M

Photo F-96 North

Photo F-97 East

Photo F-98 South

Photo F-99 West

Photo F-100 Ground

SITE 11 – H11_0M

Photo F-101 North

Photo F-102 East

Photo F-103 South

Photo F-104 West

Photo F-105 Ground

SITE 11 – H11_50M

Photo F-106 North

Photo F-107 East

Photo F-108 South

Photo F-109 West

Photo F-110 Ground

SITE 12 – H12_0M

Photo F-111 North

Photo F-112 East

Photo F-113 South

Photo F-114 West

Photo F-115 Ground

SITE 12 – H12_50M

Photo F-116 North

Photo F-117 East

Photo F-118 South

Photo F-119 West

Photo F-120 Ground

SITE 13 – H13_0M

Photo F-121 North

Photo F-122 East

Photo F-123 South

Photo F-124 West

Photo F-125 Ground

SITE 13 – H13_50M

Photo F-126 North

Photo F-127 East

Photo F-128 South

Photo F-129 West

Photo F-130 Ground

SITE 14 – W14_0

Photo F-131 North

Photo F-132 East

Photo F-133 South

Photo F-134 West

Photo F-135 Ground

SITE 15 – W15_0

Photo F-136 North

Photo F-137 East

Photo F-138 South

Photo F-139 West

Photo F-140 Ground

SITE 16 – W16_0

Photo F-141 North

Photo F-142 East

Photo F-143 South

Photo F-144 West

Photo F-145 Ground

SITE 17 – W17_0

Photo F-146 North

Photo F-147 East

Photo F-148 South

Photo F-149 West

Photo F-150 Ground

SITE 18 – W18_0

Photo F-151 North

Photo F-152 East

Photo F-153 South

Photo F-154 West

Photo F-155 Ground

SITE 19 – W19_0

Photo F-156 North

Photo F-157 East

Photo F-158 South

Photo F-159 West

Photo F-160 Ground

SITE 20 – W20_0

Photo F-161 North

Photo F-162 East

Photo F-163 South

Photo F-164 West

Photo F-165 Ground

APPENDIX G LEXINGTON RAIL LOOP OFFSET SITE PHOTO MONITORING

SITE LEXRL01 – H01_0M

Photo G-1 North

Photo G-2 East

Photo G-3 South

Photo G-4 West

Photo G-5 Ground

SITE LEXRL01 – H01_50M

Photo G-6 North

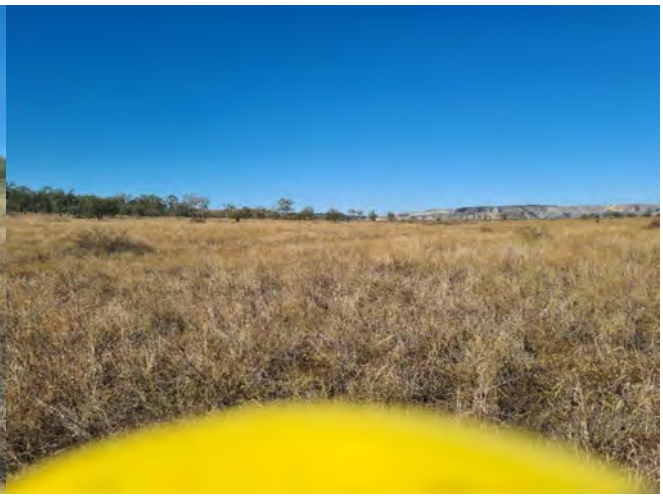

Photo G-7 East

Photo G-8 South

Photo G-9 West

Photo G-10 Ground

SITE LEXRL02 – H02_0M

Photo G-11 North

Photo G-12 East

Photo G-13 South

Photo G-14 West

Photo G-15 Ground

SITE LEXRL02 – H02_50M

Photo G-16 North

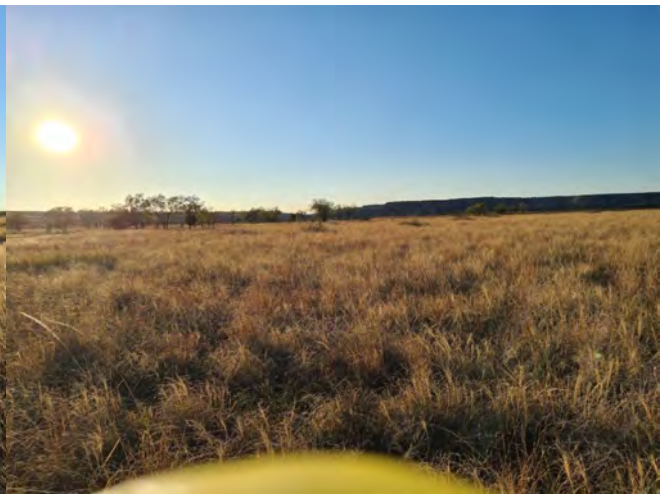

Photo G-17 East

Photo G-18 South

Photo G-19 West

Photo G-20 Ground

SITE LEXRL03 – H03_0M

Photo G-21 North

Photo G-22 East

Photo G-23 South

Photo G-24 West

Photo G-25 Ground

SITE LEXRL03 – H03_50M

Photo G-26 North

Photo G-27 East

Photo G-28 South

Photo G-29 West

Photo G-30 Ground

SITE LEXRL04 – H04_0M

Photo G-31 North

Photo G-32 East

Photo G-33 South

Photo G-34 West

Photo G-35 Ground

SITE LEXRL04 – H04_50M

Photo G-36 North

Photo G-37 East

Photo G-38 South

Photo G-39 West

Photo G-40 Ground

SITE LEXRL05 – H05_0M

Photo G-41 North

Photo G-42 East

Photo G-43 South

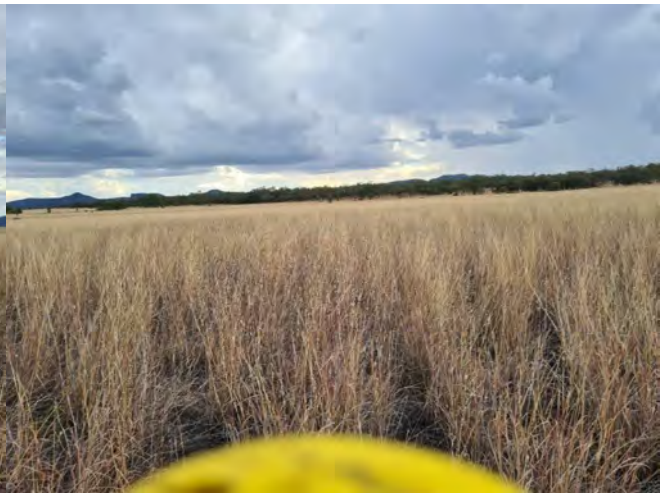

Photo G-44 West

Photo G-45 Ground

SITE LEXRL05 – H05_50M

Photo G-46 North

Photo G-47 East

Photo G-48 South

Photo G-49 West

Photo G-50 Ground

SITE LEXRL06 – H06_0M

Photo G-51 North

Photo G-52 East

Photo G-53 South

Photo G-54 West

Photo G-55 Ground

SITE LEXRL06 – H06_50M

Photo G-56 North

Photo G-57 East

Photo G-58 South

Photo G-59 West

Photo G-60 Ground

SITE LEXRL07 – H07_0M

Photo G-61 North

Photo G-62 East

Photo G-63 South

Photo G-64 West

Photo G-65 Ground

SITE LEXRL07 – H07_50M

Photo G-66 North

Photo G-67 East

Photo G-68 South

Photo G-69 West

Photo G-70 Ground

SITE LEXRL08 – W08_0

Photo G-71 North

Photo G-72 East

Photo G-73 South

Photo G-74 West

Photo G-75 Ground

SITE LEXRL09 – W09_0

Photo G-76 North

Photo G-77 East

Photo G-78 South

Photo G-79 West

Photo G-80 Ground

SITE LEXRL10 – W10_0

Photo G-81 North

Photo G-82 East

Photo G-83 South

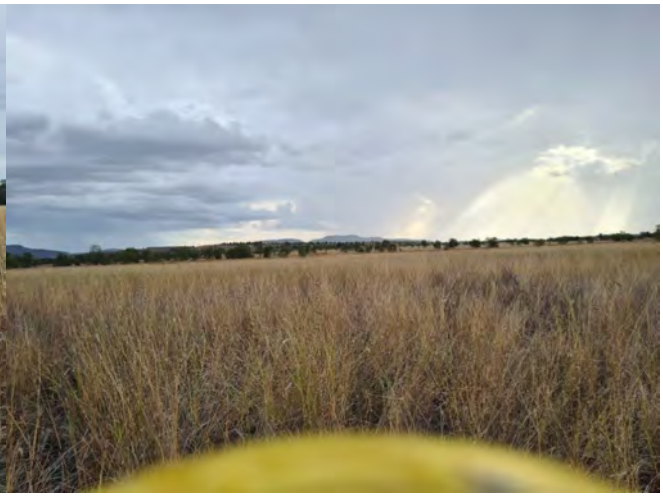

Photo G-84 West

Photo G-85 Ground

SITE LEXRL11 – W11_0

Photo G-86 North

Photo G-87 East

Photo G-88 South

Photo G-89 West

Photo G-90 Ground

SITE LEXRL12 – W12_0

Photo G-91 North

Photo G-92 East

Photo G-93 South

Photo G-94 West

Photo G-95 Ground