Matters of National Environmental Significance Management Plan

Annual Report - 2019/2020

Meteor Downs South Rail Loop Project

Sojitz Blue Pty Ltd

APPROVALS

Rev	Date	Description
0	18 August 2020	Final

	Name	Position	Date
ORIGINATORS	Dean Orrick/ Meghan Farr	Environmental Scientist	7 August 2020
APPROVER	Jarrad Cousin	Senior Ecologist	10 August 2020

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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) 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 (*Dicanthium queenslandicum*).

Condition 6 of the EPBC Act approval requires the implementation 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. As COVID-19 restrictions have resulted in the delay of some of the monitoring activities required to be undertaken during this reporting period, the submission date for this annual report has had to be pushed back.

This report has been prepared by CO2 Australia Limited (CO2 Australia) on behalf of Sojitz Blue for the reporting period from December 2019 (corresponding to the approval of the MDS Rail Loop Project) to June 2020. 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 2020 to June 2021).

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	Annalise Clarke Senior Environmental Advisor Sojitz Blue Pty Ltd aclarke@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

Coral

Brisbane

Figure 1
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

Information provided by Sojitz
- Rail Loop project area

Date: 8/6/2020 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\21_20200804_MDS_RailLoop_analysis\Figure_1_Rail_Loop_Location.mxd

3 CURRENT CONDITIONS

During the 2019/2020 reporting period, a total of 395 mm was recorded at the nearest weather station (Comet Street, Springsure #35065) which was only 57% of the long-term annual average of 686.5 mm. The five months in 2019 leading up to the wet season (August to December) saw only 44 mm of rain, representing only 17% of the long-term average of 257.2 mm (Figure 2). Notably, no rainfall was recorded in December.

The temperature data indicated mean maximum and minimum temperatures were greater than the long-term average from 10 of the 12 months, with the mean maximum and minimum temperatures during the reporting period ~3.2°C and 3.7°C above the long-term average, respectively. This included a particularly hot December 2019, where the maximum temperature averaged 41.7°C; being 7.6°C higher than the long term average (Figure 3). Minimum temperatures during the first four months of the reporting period (July – October 2019) averaged 7.7°C above the long term average, with the July 2019 mean minimum temperature (14.9°C) being 8.5°C higher than the long-term average of 6.4°C.

In summary, the climate conditions during the 2019/2020 reporting period could be characterised as being considerably warmer and drier than normal.

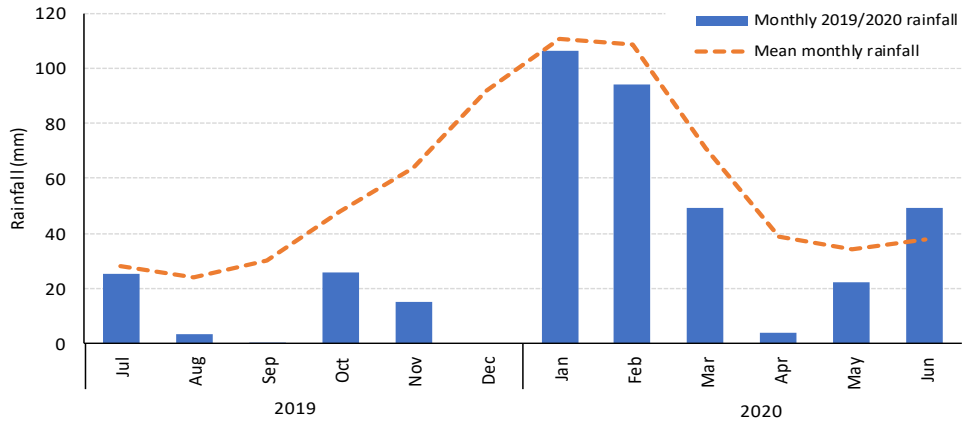

Figure 2: Rainfall recorded during the 2019/2020 reporting period

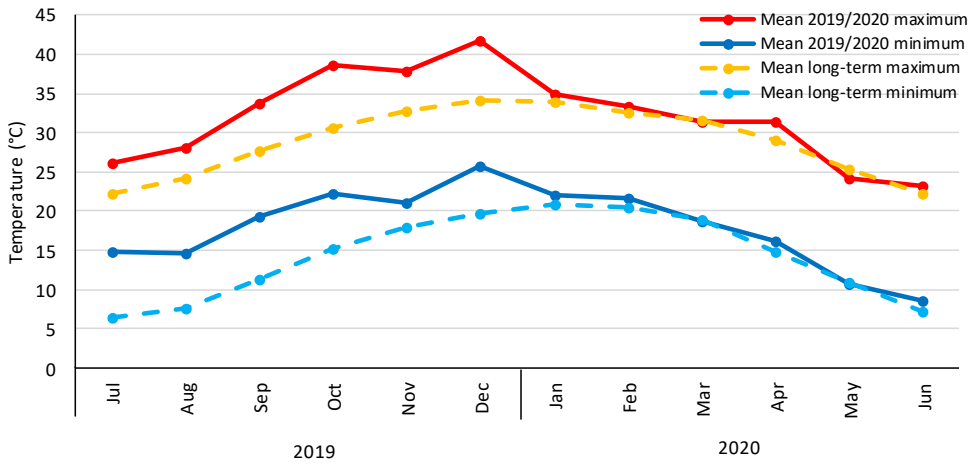

Figure 3: Temperature recorded during the 2019/2020 reporting period

4 REPORTING PERIOD ACTIVITIES

4.1 CONSTRUCTION AND OPERATION

Construction on the MDS Rail Loop Project site commenced in February 2020, with the first train being loaded on the 26 June 2020. All construction works were completed at the end of July 2020.

4.2 MITIGATION AND MANAGEMENT MEASURES

Sections 4.2.1 to 4.2.6 summarise the measures undertaken during the 2019/2020 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, commenced in February 2020. 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, or planned to be undertaken, to prevent the introduction, establishment and spread of weeds and pest on the MDS Rail Loop Project site:

- weed wash down facilities at Springsure are currently being used to wash down vehicles and machinery. A wash down bay is planned to be constructed on the MDS Project site during the latter half of 2020.
- 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. There was no evidence of dust issues during the June 2020 survey event when construction works were underway (Section 4.3.8).

4.2.5 Fire Prevention and Preparedness

No uncontrolled fires occurred on the MDS Rail Loop Project site during the 2019/2020 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 to date at the MDS Rail Loop Project site as final construction is taking place. When all construction is completed, rehabilitation of temporary areas will be scheduled.

4.3 MONITORING ACTIVITIES

Details and results of monitoring activities undertaken during the reporting period, and prior to the commencement of construction, 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
Dust monitoring	Sojitz Blue

4.3.1 Monitoring of Vegetation Clearing

All vegetation clearing works for the MDS Rail Loop Project has 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 2020	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 - MDS Rail Loop

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

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

0 100 200 300 400
Metres

N

CO_2 Australia

Date: 8/6/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:9,000@A3

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4.3.2 General Site Inspections

In accordance with the Rail Loop MNESMP, general site inspections are to be undertaken biannually – one post-dry season and one post-wet season. As construction of the MDS Rail Loop Project commenced in February 2020, the first general site inspection was undertaken as part of the post-wet season surveys in June 2020.

At the time of the post-wet season surveys, the rail loop was under construction, with extensive heavy machinery and earthworks. No development was observed outside of the extent of disturbance, and no rubbish or other matters likely to impact on MNES within the MDS Rail Loop Project site were observed. This included no evidence of dust or other particulate material on the vegetation within the MDS Rail Loop Project site.

4.3.3 Habitat Monitoring

Habitat condition assessments

Habitat condition assessments were conducted in June 2020 at four permanent monitoring sites established as part of the post-wet season survey. Figure 5 shows the locations of each habitat monitoring site. These surveys represent the first habitat condition assessments at these 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 – Year 3 (2019/2020) (CO2 Australia 2020) 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

Site	RE	Site condition score (/10)	Site context score (/10)
MDSRL01	11.8.11	8.50	10.00
MDSRL02	11.8.11	8.50	8.85
MDSRL03	11.8.11	4.83	8.85
MDSRL04	11.8.11	5.00	8.85
Average score		**6.71**	**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 2019/2020 reporting period for each MNES.

Based on the results of the site condition and assessments, habitat quality scores for the two MNES averaged 7.83 out of 10 for Natural grasslands TEC and 6.27 out of 10 for king blue-grass (Table 5). King blue-grass had the lower score of the two MNES (6.27) 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 Blue 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: 7/16/2020 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\918_20200627_Lex_MDS_post wet_monitoring_report\200710 - Figure 4 - 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	9.20	7.36
MDSRL 02	11.8.11	8.66	6.93
MDSRL 03	11.8.11	6.70	5.36
MDSRL 04	11.8.11	6.79	5.43
	Average score	**7.83**	**6.27**

4.3.4 Photo Monitoring

Photo monitoring was undertaken as part of the post-wet season surveys in June 2020. 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. 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 – Year 3 (2019/2020) (CO2 Australia 2020) in Appendix A.

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 2019). It is likely that king blue-grass was not detectable during the 2020 post-wet season surveys and may still be present. Further targeted searches for king blue-grass will be conducted during the 2021 annual monitoring surveys to confirm its presence.

4.3.6 Weed Monitoring

Weed surveys were undertaken as part of the post-wet season surveys in June 2020 at five permanent weed monitoring plots (Figure 5). These surveys represent the first weed monitoring surveys within the MDS Rail Loop Project area.

A total of 10 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 5.2 species, ranging between four species (Site MDSRL03 and MDSRL05) and seven species (Site MDSRL01), with four weed species only encountered at single sites. Weed cover across the five weed monitoring plots averaged 15.43%; ranging between 7.7% (Site MDSRL05) and 31.4% (Site MDSRL02) (Table 6 and Figure 6).

The most commonly encountered weeds were *Setaria incrassata* and *Verbena officinalis*, each recorded from all five sites. However, while encountered at a large number of sites, the average cover of *Verbena officinalis* across those five encountered sites averaged only 0.3%, whereas *Setaria incrassata* had the highest average cover of 9.0%. *Cenchrus ciliaris* was encountered at three of the five sites, but had the second highest average cover, averaging 5.4% 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	0.8	-	-	0.8	-	2	0.8
Parthenium hysterophorus	Parthenium weed	Asteraceae	0.9	-	0.5	1.3	-	3	0.9
Opuntia tomentosa	Velvety tree pear	Cactaceae	0.1	-	-	-	-	1	0.1
Cucumis myriocarpus	Paddy melon	Cucurbitaceae	-	0.1	-	-	-	1	0.1
Leucaeana leucocephala	Leucaena	Fabaceae	-	0.6	-	-	-	1	0.6
Cenchrus ciliaris	Buffel grass	Poaceae	0.3	15.6	-	-	0.4	3	5.4
Melinis repens	Red natal grass	Poaceae	-	1.2	-	-	-	1	1.2
Setaria incrassata	Purple pigeon grass	Poaceae	3.9	13.7	16.2	6.4	4.7	5	9.0
Physalis lanceifolia	Gooseberry	Solanaceae	2.4	-	1.7	2.3	1.7	4	2.0
Verbena officinalis	Common verbena	Verbenaceae	0.1	0.2	0.4	0.1	0.9	5	0.3
		# species	**7**	**6**	**4**	**5**	**4**		
		Weed cover (%)[b]	**8.5**	**31.4**	**18.8**	**10.9**	**7.7**		

[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

MDSRL01 7

MDSRL02 4

MDSRL03 4

MDSRL04 6

MDSRL05 5

5 Number of weed species within weed monitoring plot

Weed monitoring plot symbolising % weed cover

09 Weed monitoring plot number

Sojitz Blue Pty Ltd - MDS Rail Loop

Figure 6
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

Location diagram

Brisbane

Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:9,000@A3

Path: P:\GIS\Data\Projects\Sojitz\918_20200627_Lex_MDS_post wet_monitoring_report\200710 - Figure 22 - MDS RAIL LOOP weed monitoring plots.mxd

4.3.7 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 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).

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 2,140 kg/ha and 3,015 kg/ha.

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
MDSRL01	11.8.11	✓	3,015
MDSRL02	11.8.11	✓	2,578
MDSRL03	11.8.11	✓	2,140
MDSRL04	11.8.11	✓	3,015

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

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.

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 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	13 May 2020 to 11 June 2020
DMS7	Natural grassland TEC and king blue-grass habitat	5.0	5.1	4.4
DMS8	Natural grassland TEC and king blue-grass habitat	10.5	3.5	5.6

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, baseline habitat quality assessments were completed as part of the 2020 post-wet season surveys. Habitat quality will be assessed at the same sites as part of the 2021 annual monitoring surveys and the results will be compared against the results of the baseline assessments.	No corrective action required.
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. The results of future weed surveys will be compared against results of the baseline weed surveys.	No corrective action required.
Avoid and minimise the loss of King blue-	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	No corrective action required.

Management objective	Success metric	Adherence to success metric	Corrective action
grass within the management area of the project site.		king blue-grass was not detectable during the 2020 post-wet season surveys and may still be present. Further targeted searches for king blue-grass will be conducted during the 2021 annual monitoring surveys to confirm its presence.	
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 of dust issues during the June 2020 survey event when construction works were underway. As detailed in Section 4.3.3, no King blue-grass were positively identified from the 2020 post-wet season surveys. It is likely that king blue-grass was not detectable during the surveys and may still be present. As detailed in Section 4.3.3. habitat quality assessments within Natural Grasslands TEC were completed as part of the 2020 post-wet season surveys. Habitat quality will be assessed at the same sites as part of the 2021 annual monitoring surveys and the results will be compared against the results of the baseline assessments.	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 2019/2020 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.

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 – 2020/2021

To guide management, monitoring and reporting activities for the 2020/2021 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 2020/2021 reporting period

Action	Timing	2020						2021					
		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	2020						2021					
		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	2020						2021					
		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	2020						2021					
		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 (2020). *Post-wet Season Monitoring Report – Year 3 (2019/20)*. A report prepared for Sojitz Blue Mining Pty Ltd. CO2 Australia Limited, Brisbane.

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

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

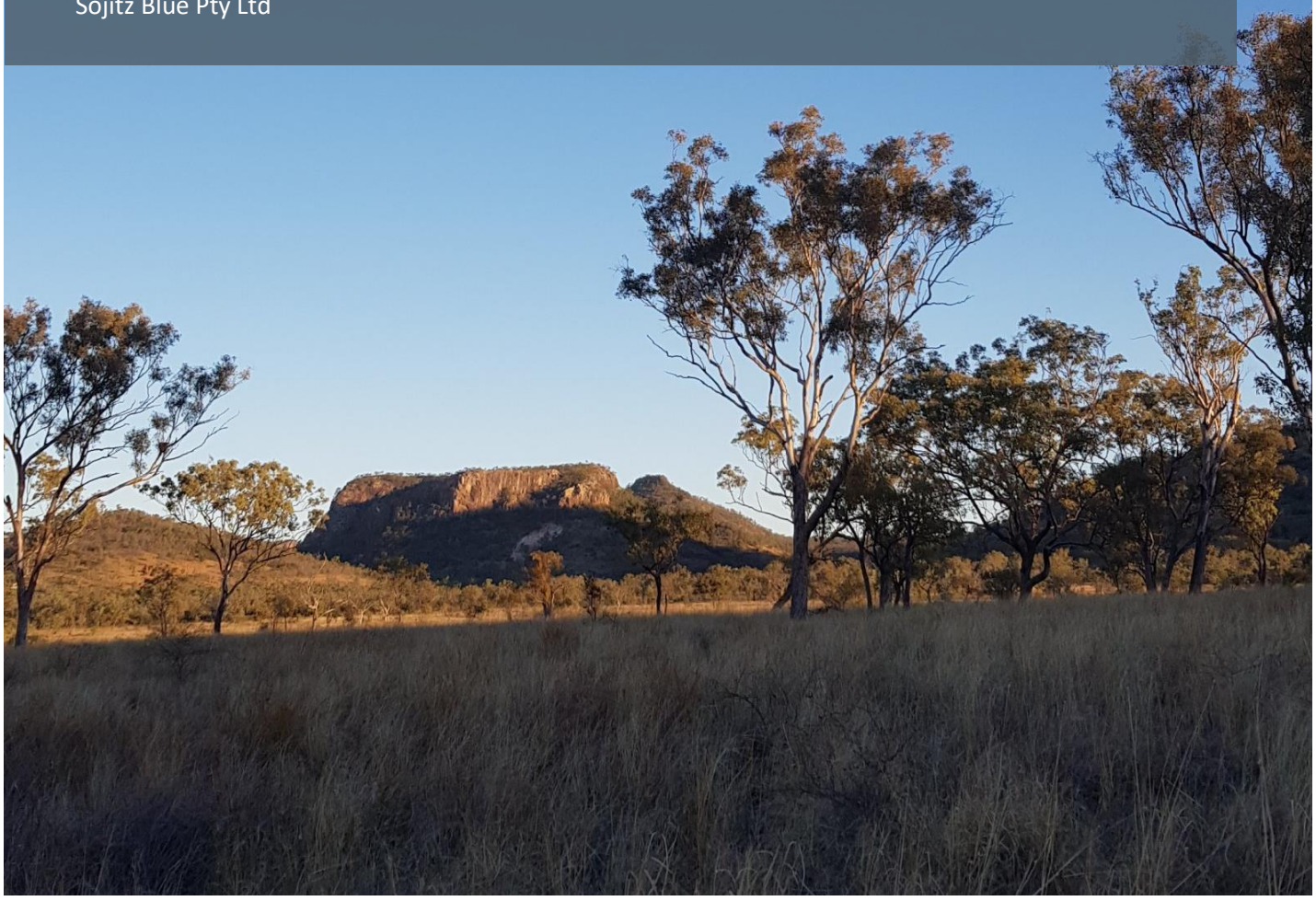
APPENDIX A POST-WET SEASON MONITORING REPORT – YEAR 3 (2019/20) (CO2 AUSTRALIA 2020)

Post-wet Season Monitoring Report – Year 3 (2019/20)

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

Meteor Downs South Coal Mine Project

Sojitz Blue Pty Ltd



Rev	Date	Description
0	17 July 2020	First draft issued to client
1	18 August 2020	Final issued to client

	Name	Position	Date
ORIGINATORS	Dr Jarrad Cousin	Senior Ecologist	17 July 2020
APPROVER	Christopher Ewing	Head of Ecosystem Markets and Innovation	17 July 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.

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 is the Year 3 (2019/2020) post-wet 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	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
	Weed monitoring	OMP Section 7.4	Every 2 years	Dry season and post-wet season

Site	Monitoring activity	Management plan	Frequency	Timing
	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

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 1 (2019/2020) post-wet season monitoring report for both the MDS Rail Loop and the corresponding Lexington offset site, including the establishment of monitoring sites at each.

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
	Biomass monitoring for fire management	Rail Loop MNESMP Section 7.6	Biannually	End of the dry season and end of the wet season
	General offset site monitoring	OMP Section 7.1	Annually	Post-wet season

Site	Monitoring activity	Management plan	Frequency	Timing
Lexington Rail Loop offset site	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
5 Mile Reserve
Cairdbeign
Joes Plain Reserve
Orion
Albinia
Wealwandangie
Minerva Hills National Park
Meteor Park
Mount Hope State Forest

Sojitz Blue 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

0 2.5 5 7.5 10
Kilometres

N

CO2 Australia

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

Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:200,000@A3

Path: P:\GISData\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 - Figure 1 - Site context.mxd

2 METHODOLOGY

Field surveys were undertaken by two tertiary-qualified ecologists (Dr Jarrad Cousin and peter lack) between 16 – 29 June 2020. 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 current post-wet season field surveys (June/July 2020), and are detailed herein.

2.1 MONITORING LOCATIONS

2.1.1 MDS Project site

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

- General site inspection
- Habitat availability assessment for Australian painted snipe
- Targeted squatter pigeon surveys
- Targeted king blue-grass and bluegrass surveys
- Biomass monitoring
- Photo monitoring
- Weed monitoring
- Pest animal monitoring.

Table 3 shows activities at each monitoring location at the MDS Project site. A total of 43 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:

- 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
- 10 x rabbit monitoring plots (2 ha)
  - collocated with habitat monitoring sites and weed monitoring plots (Sites R01 – R10)
- 8 x pig monitoring plots (15 ha) (Sites P01 – P08)

- 15 x pest animal fauna camera stations (Sites C01 – C15)
  - Located throughout the site adjacent existing access tracks

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. 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 2019/20 post-wet season surveys.

Site	King blue-grass and bluegrass	Australian painted snipe	Biomass monitoring	Photo monitoring	Weed monitoring	Pest animal monitoring		
						Rabbit plot	Feral pig plot	Camera trap
01 - 10			✓	✓	✓	✓		
11 – 20			✓	✓	✓			
P01 – P08							✓	
T01 – T20								✓
Established transects	✓							
Naroo Dam		✓						

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 Blue Pty Ltd - MDS Project

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

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: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:17,500@A3

Path: P:\GIS\Data\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 - 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 Blue 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

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: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:17,500@A3

Path: P:\GISData\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 - 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 establishment and monitoring of the following:

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

Table 3 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)
- 5 x weed monitoring plots (1 ha)
  - collocated with the habitat monitoring sites (Sites MDSRL01 – MDSRL 04), with a single 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 2019/20 post-wet season surveys.

Site	Habitat quality assessment	Natural Grasslands TEC monitoring	King blue-grass surveys	Photo monitoring	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 Blue 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: 7/16/2020 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\918_20200627_Lex_MDS_post wet_monitoring_report\200710 - 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
- Photo monitoring
- Weed monitoring
- Biomass monitoring
- Pest animal monitoring

Table 5 shows activities at each monitoring location at the offset site. A total of 43 permanent monitoring sites/plots were monitored across the offset site. Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 3), 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)
- 20 x weed monitoring plots (1 ha)
  - 13 sites collocated at all habitat monitoring sites (Sites 01 – 13),
  - 7 sites (Sites 14 – 20) standalone weed monitoring plots
- 10 x rabbit monitoring plots (2 ha)
  - collocated with 10 of the habitat monitoring sites (Sites 01-05, 07-08, 10-11 and 13) and weed monitoring plots
- 8 x pig monitoring plots (15 ha) (Sites P01 – P08)
- 15 x pest animal fauna camera stations (Sites C01 – C15)
  - fauna camera stations were established along pest animal survey tracks

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 2019/20 post-wet season surveys.

Site	Biomass monitoring	Photo monitoring	Weed monitoring	Pest animal monitoring		
				Rabbit plot	Feral pig plot	Camera trap
01 – 20	✓	✓	✓			
R01 – R10				✓		
P01 – P08					✓	
T01 – T20						✓

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
C08
16
P02
04
P07
C04
17
C09
06
P06
05
C12
C13
C10
P04
07
18
P05
08
C11

Sojitz Blue Pty Ltd - Lexington offset

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: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:15,000@A3

Path: P:\GIS\Data\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 - 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 - Lexington offset

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

0 0.25 0.5 0.75 1
Kilometres

N

CO2 Australia

Location diagram

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

Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:15,000@A3

Path: P:\GISData\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 - 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:

- General offset site monitoring
- Habitat condition assessments
- Weed monitoring
- Photo 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 3), according to the following:

- 7 x habitat monitoring sites (50 m x 10 m)
  - collocated with weed monitoring plots (Sites LEXRL01 – LEXRL07)
- 19 x photo 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)
- 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)

Table 6: Monitoring locations at the Lexington Rail Loop offset site, surveyed as part of the 2019/20 post-wet season surveys.

Site	Habitat monitoring	Photo monitoring	Weed monitoring	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 - 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: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:6,000@A3

Path: P:\GISData\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 - 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 - Lexington Rail Loop offset

Figure 8
Lexington Rail Loop offset monitoring sites - east

Location diagram

Brisbane

- 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: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:17,500@A3

Path: P:\GIS\Data\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 -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. weed monitoring, rabbit monitoring and pig monitoring plots) as well as targeted surveys along established transects previously surveyed in March 2018. While the survey period is later than the typical flowering season for king blue-grass and bluegrass, the two species can be successfully discerned from other grass species (particularly superficially-similar *Dichanthium* and *Bothriochloa* species) when not in flower through the morphology of the leaves and basal spikelet glumes.

Targeted transect surveys were undertaken along 12 of the 25 transects previously surveyed in March 2018, including the only two transects with previously confirmed records of the two species. 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 June 2020.

Transect	Start point		End point		Length (m)
	Easting	Northing	Easting	Northing	
02	640990	7303811	640698	7303848	294
07	637991	7302726	637926	7302590	151
08	637777	7302305	637857	7302105	215
10	638634	7300462	638640	7300700	238
11	637417	7300418	637561	7299986	456
12	637935	7300289	638196	7300219	270
13	638328	7300164	638659	7299995	372
14	637336	7299852	637459	7299556	321
19	637123	7298983	637002	7298677	329
20	638076	7298778	638159	7298929	172
22	636545	7298529	636783	7298451	251
24	636562	7297408	636656	7297343	114
25	637273	7297385	637498	7297339	230
				Total	**3,413**

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 although the species is able to be successfully discerned from superficially-similar species when not in flower through the morphology of the leaves and basal spikelet glumes. 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 method outlined above (Section 2.2.1)

2.3 HABITAT AVAILABILTY ASSESSMENT FOR AUSTRALIAN PAINTED SNIPE (MDS PROJECT SITE)

Monitoring of habitat availability for Australian painted snipe was undertaken during the post-wet season surveys, which included:

- systematic surveying for Australian painted snipe by traversing habitat areas with the aim of detecting by sight or by flushing. Surveys were undertaken on three mornings over a five day period, totalling approximately eight hours
- quantification of the area of Australian painted snipe habitat.

The systematic survey included multiple circumnavigations of fringing habitat surrounding Naroo Dam, with access granted by Glencore via the Rolleston Mine to those parts of Naroo Dam not within the MDS lease.

The extent of Australian painted snipe habitat on the site was identified and quantified in the field in accordance with the following criteria, consistent with the known ecology of the species:

- Shallow water foraging habitat – calculated as the area of open water habitat (on the lease and adjacent lease).

- Muddy substrate foraging habitat – calculated as 10 m buffer adjacent open water habitat (on the lease and adjacent lease).
- Area of appropriate shelter habitat – calculated as areas of rank emergent tussocks of grass, sedges, rushes or reeds, samphire, clumps of lignum (*Muehlenbeckia*), canegrass or Melaleuca within 50 m of the boundary of open water habitat.

2.4 HABITAT CONDITION ASSESSMENT (MDS RAIL LOOP AND LEXINGTON RAIL LOOP OFFSET SITES)

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 and Figure 7).

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

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%.

2.5 PHOTO MONITORING (ALL SITES)

Photo monitoring was undertaken at permanent sites established as part of baseline surveys on the MDS Project site, Lexington offset site, MDS Rail Loop site and Lexington Rail Loop 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 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
- 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
- At the Lexington Rail Loop offset site, photo monitoring was undertaken at 19 sites, including two at each of the seven habitat condition assessment sites (0 m and 50 m points: Site LEXRL01 – LEXRL07), with single photo monitoring points at the SW corner of the remaining five weed monitoring plots (Site LEXRL08 – LEXRL12) identified in Table 6 and shown in Figure 7 and Figure 8.

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.

2.6 WEED MONITORING (ALL SITES)

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 was undertaken at 20 permanent plots at the MDS Project site, 20 permanent plots at the Lexington offset site, 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 2 and Figure 3 show the location of the MDS Project site weed monitoring plots, Figure 4 shows the MDS Rail Loop weed monitoring plots, Figure 5 and Figure 6 show the Lexington offset site weed monitoring plots and Figure 7 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.

2.7 PEST ANIMAL MONITORING (MDS PROJECT SITE AND LEXINGTON OFFSET SITE)

For the purposes of this assessment, pest animals are defined as any species of fauna not native to Queensland, nor protected under the NC Act.

Pest animal monitoring was undertaken through a combination of:

- plot based monitoring, searching for direct presence (e.g. visual confirmation) or indirect evidence (e.g. tracks, diggings, scats, rubbings etc)
- infra-red, motion-detector fauna cameras, representing opportunities to visually confirm the presence of pest animals.

2.7.1 Rabbits

An assessment of the presence and impact of rabbits was undertaken generally in accordance with Cooke *et al.* (1990). Rabbit monitoring plots were established at the same location as habitat monitoring sites and weed monitoring plots (refer to Figure 2 and Figure 3 for locations at the MDS project site and Figure 5 and Figure 6 for locations at the Lexington offset site).

Each rabbit monitoring plot consisted of a 2 ha plot which was traversed for 15 to 20 minutes, assessing the following (refer to Cooke *et al.* 1990):

- Rabbit abundance – a measure of the presence and number of rabbit warrens and the abundance of any faecal pellets (including 'buck-heaps' or latrines) – measured on a scale of 0 – 5.
- Seedling abundance – a measure of the presence and abundance of native vegetation seedlings encountered during the 15-20-minute traverse – measured on a scale of 0 – 5.
- Rabbit damage – a measure of seedlings (< 0.5 m height) with evidence of rabbit damage, identified as 45˚ 'secateurs-like' cuts through smaller stems, defoliation and gnawing of bark – measured on a scale of 0 – 5.

From this assessment, a 'corrected regeneration score' was calculated from the seedling abundance and rabbit damage score in accordance with Table 8. This measure corrects for seedling regeneration as a function of observed rabbit damage and is subsequently used to calculate overall rabbit impact with the rabbit abundance score.

Table 8: Calculation of corrected regeneration score.

	Seedling abundance					
Rabbit damage	0	1	2	3	4	5
0	0.20	1.00	2.00	3.00	4.00	5.00
1	0.20	0.50	1.00	1.50	2.00	2.50
2	0.20	0.34	0.70	1.00	1.30	1.70
3	0.20	0.28	0.50	0.80	1.00	1.30
4	0.20	0.20	0.40	0.60	0.80	1.00
5	0.20	0.20	0.30	0.50	0.70	0.80

As illustrated in Figure 9, overall rabbit impact was assigned as one of three categories – 'acceptable', 'monitor closely' or 'unacceptable', as determined from a combination of the score for rabbit abundance and the corrected regeneration score. Note that it was assumed that any site with a rabbit abundance score of '0' was assumed to be 'acceptable', irrespective of corrected regeneration score. This is to avoid the situation where, with an absence of rabbits, and a corrected regeneration score of ≤2 (attributable to no rabbit damage and less than 20 seedlings), a given site may be identified as one to 'monitor closely' only by virtue of the fact that the few seedlings are attributable to the site being a grassland, rather than it reflecting rabbit grazing.

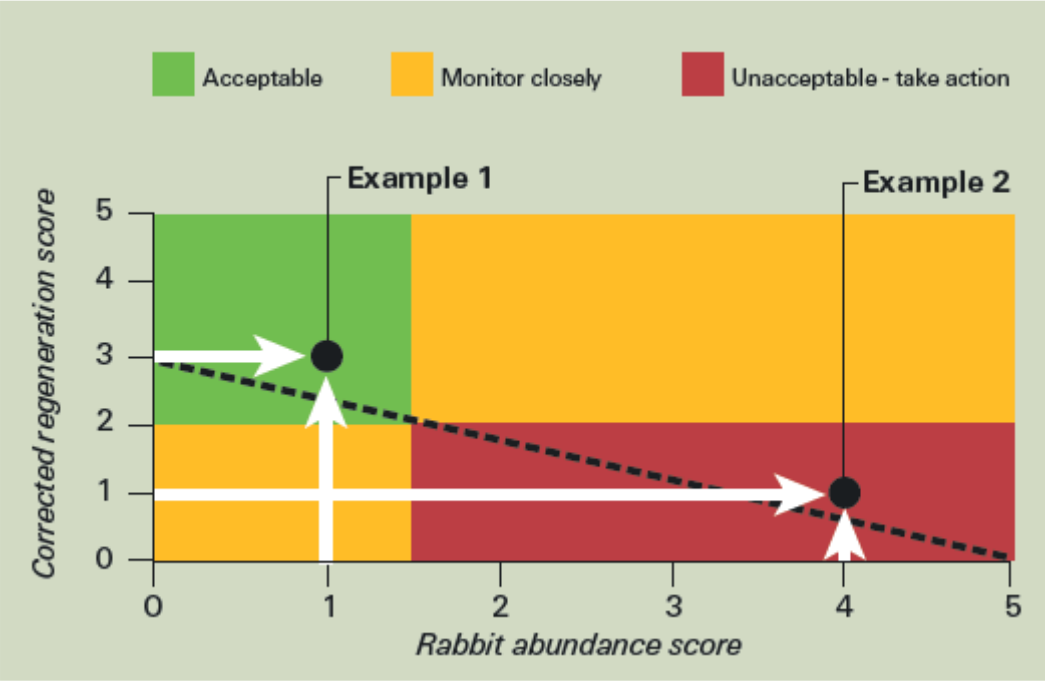


Figure 9: Calculation of overall rabbit impact based on rabbit abundance score and corrected regeneration score.

2.7.2 Fauna camera stations

An assessment of pest animal presence and activity was conducted using infra-red cameras. Infra-red fauna cameras were placed approximately 1.3 m above the ground at 15 fauna camera stations at the MDS Project site, and 15 fauna camera stations at the Lexington offset site. Once established, the fauna cameras were left unattended for a minimum of 3 days/nights to be able to intercept any active fauna using trails in the surveyed area.

Cameras were represented by 12 x Browning Dark Ops 940 HD 16 mega-pixel digital cameras (BTC-6HD-940) and three x LTL-6310 Acorn 12 mega-pixel digital cameras (LTL-6310M). Both camera models were supported by 940nm infra-red night vision and motion sensor capabilities to allow for capture of fauna during the day and night.

The camera settings were set to capture a series of images in succession following a motion trigger. If motion continued after this series of images were captured, then the camera would continue to capture images (in sets of four), followed by at least a one-minute pause, after which any new the camera could be triggered again. Secure Digital (SD) memory cards of 32 gigabyte capacity were used in the cameras for storing captured images.

For each pest animal species, a measure of pest animal presence/activity (Catling Index value) was calculated for the site by summing the number of operable fauna camera stations with evidence of the targeted pest animal by the sum of all operable station days/nights (refer to Mitchell and Balogh 2007a).

Refer to Figure 2 and Figure 3 for locations at the MDS Project site and Figure 5 and Figure 6 for locations at the Lexington offset site.

2.7.3 Feral pigs

An assessment of the presence of feral pig signs (as a measure of feral pig presence or activity) was undertaken generally in accordance with (Mitchell & Balogh 2007b) and (Hone 1988).

Randomly stratified, 500 m x 300 m (15 ha) plots were established in environments that are more regularly impacted included plots within and traversing ephemeral watercourses. A total of eight pig monitoring plots were established at the project site (Figure 2 and Figure 3) including plots within the immediate vicinity of Naroo Dam in the east of the site. Eight pig monitoring plots were also established at the offset site (Figure 4 and Figure 5), one of which was relocated (P03) following a recommendation in the 2018/19 monitoring report (NRC 2019).

Each 15-ha plot comprised 3 x 500 m transects spaced 100 m apart. At each plot, the following method was used for each of the transects:

- traversing in an east-west direction, surveying for the presence of any feral pig signs (rooting, wallows, dung, footprints, travel pads, plant damage and tree rubs, as well as the physical presence of feral pigs) 1 m either side of the transect in 50 m sections
- calculating an abundance score for each transect as the percentage of 'present' feral pig signs from the 10 sections along the 500 m transect
- calculating the mean abundance score (and variance) across all transects.

2.8 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.

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

2.9 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)

3 RESULTS: MDS PROJECT SITE

3.1 HABITAT MONITORING

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

3.1.1 King blue-grass and bluegrass

Targeted surveys confirmed the presence of king blue-grass and bluegrass at transects and incidentally throughout the MDS Project site. Records of king blue-grass were confirmed from four (33%) of the 12 threatened grass survey transects (transect 12, 19, 22 and 25)(Table 9 and Figure 10 to Figure 12), with two incidentally recorded populations in the vicinity of transect 19 and 22 (Figure 10). Eight populations of king blue-grass were recorded along transect 25, where two populations were confirmed in 2018. A further five populations were confirmed from the three other transects, reflecting a total population size of 95-275 tussocks across the 13 populations in four transects. The two king blue-grass population observed outside of the targeted survey transects totalled 52 – 105 tussocks.

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

Transect number	King blue-grass population size range								Population per transect
12	5-20								5-20
19	20-50								20-50
22	5-20			5-20			5-20		15-60
25	2-5	2-5	2-5	2-5	2-5	5-20	20-50	20-50	55-145
Total survey area population (range)	**95-275**								
Number of populations (#/km)	**13 (3.8/km)**								

Records of bluegrass were confirmed from one (8%) of the 12 threatened grass survey transects (transect 07), with six incidentally recorded populations (Table 10, Figure 10 and Figure 11).

Four populations of bluegrass were recorded along transect 7, where two populations were confirmed in 2018. The four populations along transect 7 comprised a total population size of 150 – 220 tussocks. The six bluegrass populations observed outside of the targeted survey transects totalled 59 – 140 tussocks.

Previous surveys in 2018 confirmed the presence of a previously undescribed species of *Dichanthium* with the interim name *Dichanthium sp. affine. serecium*. Given the subtleties in difference between the undescribed species and *Dichanthium setosum*, mostly relating to morphological differences in flower morphology, the observed populations could not easily be delineated so were instead assumed to be *Dichanthium setosum*. Investigations into the morphological attributes of the two species is currently underway by the Queensland Herbarium. Once formally described, delineation of the two species will be more readily possible during the flowering season.

Table 10: Bluegrass populations and their estimated size from transects at the MDS Project site.

Transect number	Bluegrass population size range				Population per transect
7	15-20	100+	20-50	20-50	150-220
Total survey area population (range)	**150-220**				
Number of populations (#/km)	**4 (1.2/km)**				

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

01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

Sojitz Blue Pty Ltd - MDS Project

Figure 10
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

Additional observations
Dichanthium queenslandicum
Dichanthium setosum

0 0.25 0.5 0.75 1
Kilometres

N

CO2 Australia

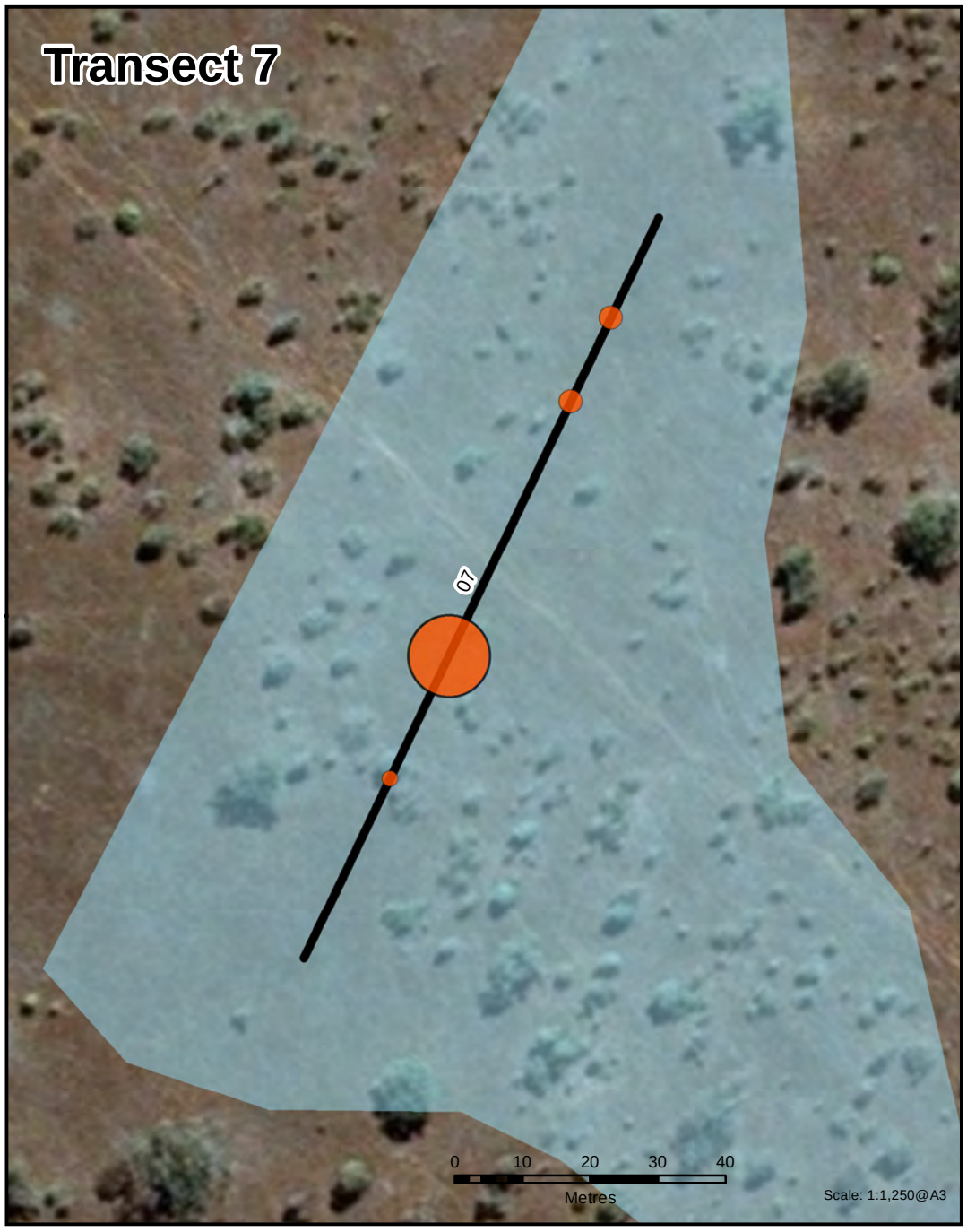
Location diagram

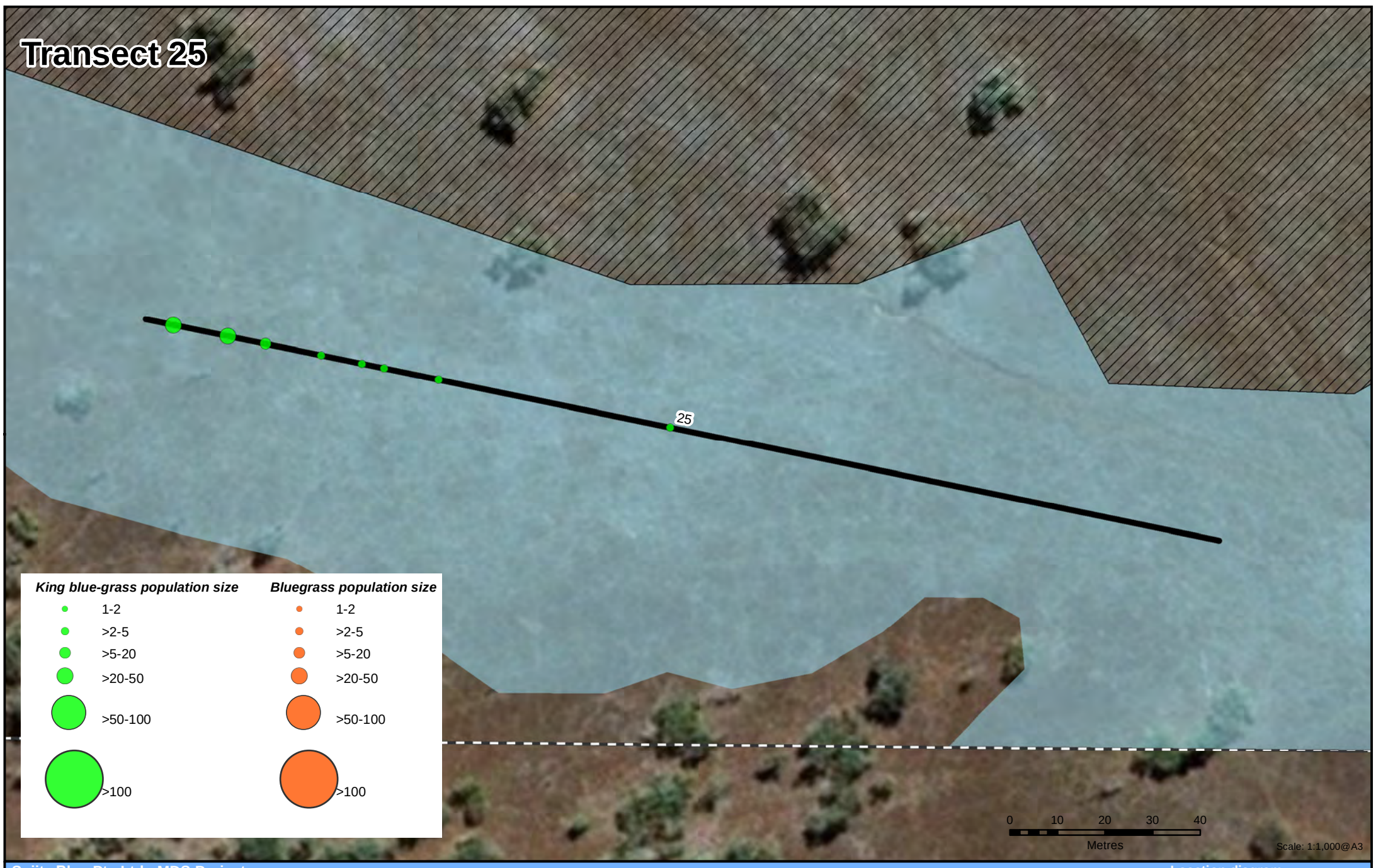
Brisbane

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

Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:27,500@A3

Path: P:\GIS\Data\Projects\Sojitz\918_20200627_Lex_MDS_post wet_monitoring_report\200710 - Figure 10 - MDS KBG BG survey overview.mxd





Sojitz Blue Pty Ltd - MDS Project

Figure 11
MDS Project
Threatened grass survey results - transect 7, 19, 25

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

Additional observations

Dichanthium queenslandicum
Dichanthium setosum

Location diagram

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

Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994

N

CO2 Australia

Path: P:\GIS\Data\Projects\Sojitz\918_20200627_Lex_MDS_post wet_monitoring_report\200710 - Figure 11 - MDS KBG BG survey 1_transects_7_19_25.mxd

Transect 12

12

0 10 20 30 40
Metres

Scale: 1:1,250@A3

Transect 22

22

0 10 20 30 40
Metres

Scale: 1:1,000@A3

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

Sojitz Blue Pty Ltd - MDS Project

Figure 12
MDS Project
Threatened grass survey results - transect 12, 22

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

Additional observations

Dichanthium queenslandicum
Dichanthium setosum

Location diagram

Brisbane

N

CO2 Australia

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

Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994

Path: P:\GISData\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 - Figure 12 - MDS KBG BG survey 2_transects_12_22.mxd

3.1.2 Squatter pigeon

Incidental searches for the squatter pigeon were conducted opportunistically from over 200 km of driving during the five days of field surveys on the project site, however, no squatter pigeons were recorded.

3.1.3 Australian painted snipe

Surveying was undertaken around Naroo Dam for Australian painted snipe across three mornings (19, 22 and 23 June 2020), for up to three hours each morning from sunrise (~6.30am). Access was granted to Naroo Dam via the Glencore Rolleston Mine, which allowed for the complete circumnavigation of the dam and its fringing habitat. Surveys involved a combination of binocular scanning of fringing mudflats and shallow water habitat, as well as traversing surrounding fringing vegetation, including *Melaleuca* thickets and rank grasses (e.g. *Megathyrsus maximus*). While surveying for Australian painted snipe was outside of the wet season (defined as between 1 November in one year to 31 May in the following year), and not following any significant inundation event, there was still an appreciable amount of water within the dam and the low-lying channels feeding into it to support habitat for Australian painted snipe (Figure 13 and Figure 14).

While a total of 43 species of birds were encountered utilising or occupying the dam and immediate surrounds, no Australian painted snipe were confirmed during the targeted surveying.

At the time of surveying, Naroo Dam supported a moderate number of shallow-water and open-water dependent waterbird species including small numbers of brolga (*Grus rubicunda*), black swan (*Cygnus atratus*), hardhead (*Aythya australis*), pacific black duck (*Anas superciliosa*), grey teal (*Anas gracilis*) and Australasian grebe (*Tachybaptus novaehollandiae*). Fringing vegetation was sparse, although where present, supported species such as plum-headed finch (*Neochmia modesta*), double-barred finch (*Taeniopygia bichenovii*), zebra finch (*Taeniopygia guttata*), chestnut-breasted mannikin (*Lonchura castaneothorax*) and Australian reed-warbler (*Acrocephalus australis*), with fringing grasslands supporting numerous family groups of brown quail (*Coturnix ypsilophora*). Notably, four species of raptor were hunting around the dam at the time of surveying, including white-bellied sea-eagle (*Haliaeetus leucogaster*), whistling kite (*Haliastur sphenurus*), black kite (*Milvus migrans*) and brown falcon (*Falco berigora*).

In addition to birds, a number of pig wallows were found along the shoreline of Naroo Dam, with a family of three pigs flushed from vegetation fringing the base of the dam wall during surveying.

Figure 13: Naroo Dam looking west from the dam wall showing open water areas grading to shallow fringing habitat.

148°22'E

148°22'30"E

24°25'S

24°25'30"S

H09

Sojitz Blue Pty Ltd - MDS Project

Location diagram

Figure 14
MDS Project
Australian painted snipe habitat

Disturbance areas
Mining Lease
Fences
Access tracks
Habitat for Australian painted snipe
Habitat monitoring transect

Australian painted snipe habitat
Shallow water foraging habitat
Muddy substrate foraging habitat
Shelter habitat

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

0 50 100 150 200
Metres

N

CO2 Australia

Brisbane

Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:5,000@A3

Path: P:\GISData\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 - Figure 14 - Australian painted snipe habitat.mxd

3.2 PHOTO MONITORING

Photo monitoring of the MDS Project site showed a variety of levels of cover ranging from dense grassy understorey (Site 06: refer to Photo D-56 in Appendix D) through to relatively open areas with evidence of grazing (Site 13: Photo D-112 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 WEED MONITORING

A total of 24 weed species were identified from the weed monitoring plots. No additional species of weeds were observed on the MDS Project site outside of those identified within the weed monitoring plots. Across the 20 weed monitoring plots, the average number of weed species observed per plot was 5.2 species, ranging between one species (Site 14) and 13 species (Site 09). Weed cover across the 20 weed monitoring plots averaged 13.3%; ranging between 1.1% (Site 03) and 57.6% (Site 17)(Table 11 and Figure 15).

The most commonly encountered weed was *Parthenium hysterophorus*, recorded from 14 of the 20 sites, followed by buffel grass (*Cenchrus ciliaris*) at 11 of the 20 sites (Table 11), with eight of the 24 weed species only encountered at single sites. While encountered at a large number of sites, the average cover of *Parthenium hysterophorus* and *Cenchrus ciliaris* across those encountered sites averaged 5.3% and 4.5%, respectively. For those weeds found from at least two sites, Angleton grass (*Dichanthium aristatum*) was the weed species with the highest average cover, averaging 10.9% cover across the three sites it was recorded from (Table 11). Although only encountered from a single site, Lippia (*Phyla canescens*) was the weed with the highest cover at any single site, represented by 42.8% cover at Site 09; located immediately adjacent Naroo Dam.

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

Scientific name	Common name	Family name	Percentage cover of weed species from given site																				# sites	Avg cover (%)[a]
			01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20		
Alternanthera pungens	Khaki Weed	Amaranthaceae			0.3				0.3				0.2				0.2						4	0.3
Bidens bipinnata	Bipinnate Beggar's Ticks	Asteraceae			0.4		0.2	0.3	1.1	0.8	1.8	1.2											7	0.8
Lactuca serriola	Prickly Lettuce	Asteraceae						0.4		0.3	0.1							0.2		0.6			5	0.3
Parthenium hysterophorus	Parthenium Weed	Asteraceae				1.0	2.1	0.2	0.3	0.2	3.2	0.1	0.1		20.9		0.5	0.9	35.4	2.1		7.1	14	5.3
Xanthium pungens	Noogoora Burr	Asteraceae									0.4												1	0.4
Xanthium spinosum	Bathurst Burr	Asteraceae													0.2								1	0.2
Crotalaria juncea	Sunhemp	Fabaceae			0.3	0.1	0.4				0.1						0.2	0.1	0.1		0.1		8	0.2
Stylosanthes viscosa	Sticky Stylo	Fabaceae							0.2												0.3		2	0.3
Vachellia farnesiana	Mimosa Bush	Fabaceae	0.1						0.2								0.2		0.2	2.5	0.1		6	0.6
Sida cordifolia	Flannel weed	Malvaceae										0.1	0.1										2	0.1
Sida spinosa	Sida	Malvaceae				0.3	0.3		0.3		0.6			0.1			0.1		0.3	0.5	0.1		9	0.3
Waltheria indica	Sleepy Morning	Malvaceae									0.5				1.3							0.1	3	0.6
Bothrichloa pertusa	Indian Bluegrass	Poaceae											2.5								3.0		2	2.8
Cenchrus ciliaris	Buffel Grass	Poaceae	15.4	9.7			0.1	0.5	2.9		0.2	3.1	2.5	5.8					1.2			8.1	11	4.5
Dichanthium aristatum	Angleton Grass	Poaceae							1.0		19.9								11.9				3	10.9
Megathyrsus maximus	Guinea Grass	Poaceae							0.5														1	0.5
Sorghum halepense	Johnson Grass	Poaceae															0.1		0.1		0.1		3	0.1
Urochloa decumbens	Signal Grass	Poaceae													0.5								1	0.5
Rumex crispus	Curled Dock	Polygonaceae									0.1												1	0.1
Portulaca oleracea	Pigweed	Portulacaceae							0.1														1	0.1
Datura ferox	Fierce Thornapple	Solanaceae																	0.1				1	0.1
Physalis lanceifolia	Goosberry	Solanaceae						1.2			6.5	0.1							8.4			18.2	5	6.9
Phyla canescens	Lippia	Verbenaceae									42.8												1	42.8
Verbena officinalis	Common Verbena	Verbenaceae		0.1	0.1	0.5	0.8			0.1	0.2	0.5		0.1		2.1	0.5	0.1		1.0			12	0.5
		# species	**2**	**2**	**4**	**4**	**6**	**5**	**10**	**4**	**13**	**6**	**5**	**3**	**4**	**1**	**7**	**4**	**9**	**5**	**6**	**4**		
		Weed cover (%)[b]	**15.5**	**9.8**	**1.1**	**1.9**	**3.9**	**2.6**	**6.9**	**1.4**	**76.2**	**5.1**	**5.4**	**6.0**	**22.9**	**2.1**	**1.8**	**1.3**	**57.6**	**6.7**	**3.7**	**33.5**		

[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°22'E

148°24'E

24°22'S

24°24'S

24°26'S

5 Number of weed species within weed monitoring plot

Weed monitoring plot symbolising % weed cover

09 Weed monitoring plot number

Sojitz Blue Pty Ltd - MDS Project

Location diagram

Figure 7
MDS Project
Weed monitoring results

- Disturbance areas
- Mining Lease
- Fences
- Access tracks
- Watercourse
- Brigalow TEC
- Natural Grassland TEC
- Habitat for King blue-grass and bluegrass
- Habitat for squatter pigeon
- Habitat for Australian painted snipe
- Weed monitoring plots

Weed cover (%)

- < 5
- 6 - 10
- 11 - 15
- 16 - 25
- 26 - 50
- 51 - 100

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

0 0.25 0.5 0.75 1
Kilometres

N

CO2 Australia

Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:27,500@A3

Path: P:\GISData\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 - Figure 15 - MDS weed monitoring plots.mxd

3.4 PEST ANIMAL MONITORING

3.4.1 Rabbits

Results of rabbit monitoring confirmed the presence of rabbit/hare scats from six of the ten rabbit monitoring plots (R02, R05, R07, R08, R09, R10; Figure 17). Across these plots, pellet abundance ranged from isolated pellets and small clumps more than 10 m apart, to scattered pellets and clumps less than 10 m apart. European rabbits (*Oryctolagus cuniculus*) were also visually confirmed (Figure 16) at one fauna camera station (Site C10), while brown hares (*Lepus europaeus*) were considerably more commonly encountered; being confirmed from seven of the 15 fauna camera stations (C03, C04, C05, C08, C11, C12, C13)(Figure 20).

Figure 16: European rabbit (*Oryctolagus cuniculus*) captured at fauna camera station C10 at the MDS Project site.

Table 12 shows the results of the assessment of overall rabbit impact. The results indicate that over half of the sites displayed evidence of rabbit abundance. The assessment of overall rabbit impact was denoted as 'Monitor closely' or 'Acceptable' for the majority of sites, with site R02 denoted as 'Unacceptable' due to higher rabbit abundance.

Table 12: Assessment of overall rabbit impact at the MDS Project site.

Site	Rabbit abundance score (0 – 5)	Seedling abundance score (0 – 5)	Rabbit damage score (0 – 5)	Corrected regeneration score (0 – 5)	Overall rabbit impact
R01	0	1	0	1.0	Acceptable
R02	2	0	0	0.2	Unacceptable
R03	0	3	0	3.0	Acceptable
R04	0	0	0	0.0	Acceptable
R05	1	3	0	3.0	Acceptable
R06	0	0	0	0.0	Acceptable
R07	1	3	0	3.0	Acceptable
R08	2	2	0	2.0	Monitor closely
R09	1	1	0	1.0	Monitor closely
R10	2	2	0	2.0	Monitor closely

148°22'E

148°24'E

24°22'S

24°24'S

24°26'S

R01

R02

R03

R04

R05

R06

R07

R08

R09

R10

Sojitz Blue Pty Ltd - MDS Project

Location diagram

Figure 17
MDS Project
Evidence of rabbits/hares

- Disturbance areas
- Mining Lease
- Fences
- Tracks
- Watercourse
- Brigalow TEC
- Natural Grassland TEC
- Habitat for King blue-grass and bluegrass
- Habitat for squatter pigeon
- Habitat for Australian painted snipe
- Observed rabbit

Rabbit monitoring plots (R01 - R10)

- No evidence for rabbits/hares
- Evidence of rabbits/hares

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

0 0.25 0.5 0.75 1
Kilometres

N

CO2 Australia

Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:27,500@A3

Path: P:\GISData\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 - Figure 17 - MDS evidence of rabbits.mxd

3.4.2 Feral pigs

Across all eight pig monitoring plots, represented by a total of 12 km of transects, there was confirmed evidence for the presence of feral pigs in seven plots (Figure 18). However, the only visual evidence for feral pigs through direct observation was from the base of the Naroo Dam wall, with a family of three pigs flushed from low vegetation. Evidence of feral pig presence within plots ranged from 0% (Site P02) to 17% (Site P01 and P08) and, on average, was observed across 10% of the transect sections surveyed within each plot (Table 13). Opportunistic surveying through ephemeral watercourses, including observation efforts during weed and rabbit monitoring, as well as around Naroo Dam revealed additional evidence of feral pigs.

Table 13: Assessment of overall feral pig presence and activity at the MDS Project site, denoted as either rooting (R), footprints (F), travel pads (P), or dung (D).

	Monitoring plot survey section (50 m)												
Plot	**Transect**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Transect**	**Plot % (record/30)**
P01	1	-	-	-	-	-	-	-	R	-	R	20%	17%
	2	-	-	-	-	-	-	-	-	-	R	10%	
	3	-	R	-	-	-	-	-	R	-	-	20%	
P02	1	-	-	-	-	-	-	-	-	-	-	0%	0%
	2	-	-	-	-	-	-	-	-	-	-	0%	
	3	-	-	-	-	-	-	-	-	-	-	0%	
P03	1	-	-	-	-	-	-	-	-	-	-	0%	7%
	2	-	-	-	F	F	-	-	-	-	-	20%	
	3	-	-	-	-	-	-	-	-	-	-	0%	
P04	1	-	-	R	-	-	-	-	-	-	-	10%	13.33%
	2	R	-	-	-	-	-	-	-	-	-	10%	
	3	-	-	-	-	R	-	-	-	-	R	20%	
P05	1	-	-	-	-	-	-	-	-	-	-	0%	7%
	2	R F	-	-	-	-	-	P	-	-	-	20%	
	3	-	-	-	-	-	-	-	-	-	-	0%	
P06	1	-	-	P	-	-	-	-	-	-	-	10%	7%
	2	-	P	-	-	-	-	-	-	-	-	10%	
	3	-	-	-	-	-	-	-	-	-	-	0%	
P07	1	-	-	-	-	-	-	-	-	-	-	10%	13.33%
	2	-	-	-	-	-	-	-	-	-	-	10%	
	3	-	-	-	-	-	-	-	-	-	-	20%	
P08	1	-	-	-	-	-	-	-	-	P F	P F	20%	17%
	2	-	-	-	-	-	-	-	P F	-	-	10%	
	3	-	-	D	-	-	-	P F	-	-	-	20%	
												Total	**10.0%**

148°22'E

148°24'E

24°22'S

24°24'S

24°26'S

P08

P07

P06

P05

P04

P03

P02

P01

Sojitz Blue Pty Ltd - MDS Project

Location diagram

Figure 10
MDS Project
Evidence of feral pigs

- Disturbance areas
- Mining Lease
- Fences
- Tracks
- Watercourse
- Brigalow TEC
- Natural Grassland TEC
- Habitat for King blue-grass and bluegrass
- Habitat for squatter pigeon
- Habitat for Australian painted snipe
- Observed feral pigs

Pig monitoring plots (P01 - P08)

- No evidence of feral pigs
- Evidence of feral pigs

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

0 0.25 0.5 0.75 1
Kilometres

N

CO2 Australia

Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:27,500@A3

Path: P:\GISData\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 - Figure 18 - MDS evidence of feral pigs.mxd

3.4.3 Fauna camera stations

Of the 15 fauna camera stations, all 15 were considered operable stations across at least four consecutive nights, resulting in a total of 68 operable station nights for the purposes of calculating Catling Index values for pest animal species. As indicated in Table 14, the fauna cameras confirmed the presence of three pest animal species, namely brown hare (*Lepus capensis*), European rabbit (*Oryctolagus cuniculus*) and feral dog (*Canis familiaris/lupus*). The highest Catling Index score was 22.1, which was calculated for feral dog, with the lowest Catling Index recorded for European rabbit (2.9). Non-pest animals were also detected from the fauna camera stations, including eastern grey kangaroo (*Macropus giganteus*), rufous bettong (*Aepyprymnus rufescens*), willie wagtail (*Rhipidura leucophrys*), Australian magpie (*Cracticus tibicen*) and crested pigeon (*Ocyphaps lophotes*).

Overall, there were 27 individual pest animal detections, recorded from 13 of the 15 fauna camera stations (Figure 20). Four of the 15 cameras detected two pest animal species, which the remaining nine cameras detecting pest animals detected only a single species.

No additional pest animals (e.g. cats or feral pigs) were confirmed via direct observation or through indirect evidence (e.g. scats).

Table 14: Pest animal results for the MDS Project site.

Pest animal species	Confirmed incidence of pest animal species from given site															
	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	C11	C12	C13	C14	C15	Catling Index
Nights camera operable*	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	
Dog																
18/06/20					✓											**22.1**
19/06/20		✓														
20/06/20		✓		✓			✓	✓						✓	✓	
21/06/20								✓			✓			✓	✓	
22/06/20						✓	✓									
23/06/20		✓														
European rabbit																
18/06/20																**2.9**
19/06/20																
20/06/20										✓						
21/06/20										✓						
22/06/20																
23/06/20																
Brown hare																
18/06/20												✓				**14.7**
19/06/20			✓									✓	✓			
20/06/20				✓												
21/06/20											✓	✓	✓			
22/06/20					✓			✓								
23/06/20																

* 68 camera nights for the purposes of calculating Catling Index.

Figure 19: Pest animals captured from the fauna camera including wild dog (top, Camera 08) and brown hare (bottom, Camera 12).

148°22'E

148°24'E

24°22'S

24°24'S

24°26'S

C01
C02
C03
C04
C05
C06
C07
C08
C09
C10
C11
C12
C13
C14
C15

Sojitz Blue Pty Ltd - MDS Project

Figure 20
MDS Project
Pest animal results

- Disturbance areas
- Mining Lease
- Fences
- Tracks
- Pest animal survey tracks
- Brigalow TEC
- Natural Grassland TEC
- Habitat for King blue-grass and bluegrass
- Habitat for squatter pigeon
- Habitat for Australian painted snipe

Dogs (# days confirmed)
- 1 day
- 2 days
- 3 days

Rabbits (# days confirmed)
- 1 day
- 2 days

Hares (# days confirmed)
- 1 day
- 2 days
- 3 days

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: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:27,500@A3

Path: P:\GISData\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 - Figure 20 - MDS pest animal results.mxd

3.5 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 15). 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).

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 (≥3,850 kg/ha, averaging 4,743 kg/ha), with Site 07 (RE 11.4.3) supporting the lowest biomass (2,230 kg/ha) (Table 26). Areas of RE 11.8.5 supported ≥2,500 kg/ha, averaging 2,638 kg/ha, while the one RE 11.3.3a photo monitoring site supported 3,405 kg/ha biomass.

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	Eucalypt woodlands	Blue grass, wire grass	Alluvial	Downs country	Biomass kg/ha
01	11.8.5	✓				3,050
02	11.8.11				✓	5,040
03	11.8.5	✓				2,500
04	11.8.11				✓	3,850
05	11.8.5	✓				2,500
06	11.8.11				✓	5,040
07	11.4.3		✓			2,230
08	11.8.11				✓	5,040
09	11.3.3a			✓		3,405
10	11.8.5	✓				2,500

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

3.6 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, with the majority of *Melaleuca bracteata* in these areas showing signs of dieback (Figure 21). However, it was noted that much of this vegetation community was showing 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. Notwithstanding, 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).

Figure 21: Evidence of dieback of *Melaleuca bracteata* in areas of RE 11.8.11a.

Site assessments revealed that areas that were identified as being subject to overgrazing during the dry-season surveys in December 2019 had shown considerable recovery. 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. Aside from the dieback of *Melaleuca bracteata* woodland, likely associated with a drought response of this vegetation community (see above), results of targeted king blue-grass and bluegrass surveys would indicate an increase in populations of those species within 500 m of the project footprint since the baseline survey in March 2018.

4 RESULTS: MDS RAIL LOOP SITE

4.1 HABITAT MONITORING

Results of habitat condition assessments identified an average site condition score of 6.71 out of 10 across all four habitat monitoring sites, with scores ranging between 4.83 (Site MDSRL03) and 8.50 (Site MDSRL01 and MDSRL02). Site context scores varied from 8.85 out of 10 (MDSRL02, MDSRL03 and MDSRL04) up to 10 out of 10 (MDSRL01). Appendix B outline details of the site condition assessments, summarised below in Table 16.

Table 16: 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	8.50	10.00
MDSRL02	11.8.11	646410	7303007	8.50	8.85
MDSRL03	11.8.11	646666	7303114	4.83	8.85
MDSRL04	11.8.11	646834	7303291	5.00	8.85
			Average score	**6.71**	**9.13**

MNES habitat condition assessments

Based on the results of the site condition and assessments, habitat condition scores for the two MNES averaged 7.83 out of 10 for Natural grasslands TEC and 6.27 out of 10 for king blue-grass (Table 17). King blue-grass had the lower score of the two MNES (6.13) 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 17: 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	9.20	7.36
MDSRL 02	11.8.11	8.66	6.93
MDSRL 03	11.8.11	6.70	5.36
MDSRL 04	11.8.11	6.79	5.43
Average score		**7.83**	**6.27**

Natural Grasslands habitat

Natural Grasslands TEC habitat condition scores for the four habitat monitoring sites ranged between 6.70 and 9.20 (Table 17). The four assessment sites supported between four and five TEC indicator grass species (Table 18). While additional species are likely to have been present, 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	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**	**4**	**5**	**4**

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. The results of this assessment (Table 19) indicated that two of the condition sites (MDSRL01 and MDSRL02) were in 'best' condition, with the remaining two sites (MDSRL03 and MDSRL04) being only in 'good' condition, largely attributed to the high weed cover in these plots, particularly *Setaria incrassata* and *Physalis lanceifolia*.

Table 19: 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	4	5	4
Number of native grass tussocks	>200	>200	>200	>200
Woody shrub canopy cover (%)	<5	<5	<5	<5
Perennial non-native plant cover (%)	4.5	4.8	13.4	21.6
Condition class	**Best**	**Best**	**Good**	**Good**

King blue-grass habitat

King blue-grass habitat condition scores for the four habitat monitoring sites ranged between 5.36 and 7.36 (Table 17). 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 a relative consistent levels of biomass, characterised by a moderate grass cover. Whereas many areas of comparable areas of 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 WEED MONITORING

A total of 10 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 5.2 species, ranging between four species (Site MDSRL03 and MDSRL05) and seven species (Site MDSRL01), with four weed species only encountered at single sites. Weed cover across the five weed monitoring plots averaged 15.43%; ranging between 7.7% (Site MDSRL05) and 31.4% (Site MDSRL02)(Table 20 and Figure 22).

The most commonly encountered weeds were *Setaria incrassata* and *Verbena officinalis*, each recorded from all five sites (Table 20). However, while encountered at a large number of sites, the average cover of *Verbena officinalis* across those five encountered sites averaged only 0.3%, whereas *Setaria incrassata* had the highest average cover of 9.0%. *Cenchrus ciliaris* was encountered at three of the five sites, but had the second highest average cover, averaging 5.4% cover across the three sites it was recorded from (Table 20).

Table 20: 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	0.8			0.8		2	0.8
Parthenium hysterophorus	Parthenium weed	Asteraceae	0.9		0.5	1.3		3	0.9
Opuntia tomentosa	Velvety tree pear	Cactaceae	0.1					1	0.1
Cucumis myriocarpus	Paddy melon	Cucurbitaceae		0.1				1	0.1
Leucaeana leucocephala	Leucaena	Fabaceae		0.6				1	0.6
Cenchrus ciliaris	Buffel grass	Poaceae	0.3	15.6			0.4	3	5.4
Melinis repens	Red natal grass	Poaceae		1.2				1	1.2
Setaria incrassata	Purple pigeon grass	Poaceae	3.9	13.7	16.2	6.4	4.7	5	9.0
Physalis lanceifolia	Gooseberry	Solanaceae	2.4		1.7	2.3	1.7	4	2.0
Verbena officinalis	Common verbena	Verbenaceae	0.1	0.2	0.4	0.1	0.9	5	0.3
		# species	**7**	**6**	**4**	**5**	**4**		
		Weed cover (%)[b]	**8.5**	**31.4**	**18.8**	**10.9**	**7.7**		

[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

MDSRL01 7

MDSRL02 4

MDSRL03 4

MDSRL04 6

MDSRL05 5

5 Number of weed species within weed monitoring plot

Weed monitoring plot symbolising % weed cover

09 Weed monitoring plot number

Sojitz Blue Pty Ltd - MDS Rail Loop

Figure 22
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

Location diagram

Brisbane

Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:9,000@A3

Path: P:\GIS\Data\Projects\Sojitz\918_20200627_Lex_MDS_post wet_monitoring_report\200710 - Figure 22 - MDS RAIL LOOP weed monitoring plots.mxd

4.4 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 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 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 2,140 kg/ha and 3,015 kg/ha.

Table 21: 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	✓	3,015
MDSRL02	11.8.11	✓	2,578
MDSRL03	11.8.11	✓	2,140
MDSRL04	11.8.11	✓	3,015

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

4.5 GENERAL SITE INSPECTION

At the time of the monitoring, the rail loop was under construction, with extensive heavy machinery and earthworks. 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 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); indicative of a relatively good wet season. The results of the photo monitoring in the Lexington offset site is presented in Appendix F.

5.2 WEED MONITORING

A total of 30 weed species were identified from the 20 weed monitoring plots. No additional species of weeds were observed on the site outside of those identified within the weed monitoring plots. Across the 20 weed monitoring plots, the average number of weed species observed per plot was 9.3 species, ranging between four species (Site 13) and 15 species (Site 09), with six weed species only encountered at single sites. Weed cover across the 20 weed monitoring plots averaged 31.3%; ranging between 2.7% (Site 13) and 69.3% (Site 09; Table 22; Figure 23).

The most commonly encountered weed was *Cenchrus ciliaris* and *Parthenium hysterophorus*, both recorded from 17 of the 20 sites (Table 22). While recorded from only two weed monitoring plots, *Megathyrsus maximus* had the highest average cover from the two sites of 13.1%.

Table 22: Results of weed monitoring assessments at the Lexington offset site.

Scientific name	Common name	Family name	Percentage cover of weed species from given site																			# sites	Avg cover (%)[a]
			01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20		
Alternanthera pungens	Khaki weed	Amaranthaceae														1.0							1	1.0
Cryptostegia grandiflora	Rubber vine	Apocynaceae									1.1												1	1.1
Gomphocarpus physocarpus	Ballon cotton-bush	Apocynaceae									0.1												1	0.1
Bidens bipinnata	Bipinnate beggar's ticks	Asteraceae		0.5	0.2					0.2	13.2	1.8				0.6	2.0	0.5					8	2.4
Lactuca serriola	Prickly lettuce	Asteraceae				0.2										0.3							2	0.3
Parthenium hysterophorus	Parthenium weed	Asteraceae	11.8	0.2	2.0	1.0		11.9	1.8	3.6	0.2	12.3	5.6	3.9	1.6	2.7	11.7	10.7	12.4			7.0	17	5.9
Sonchus oleracea	Sow thistle	Asteraceae			0.2	0.1		0.2			0.1	0.3		0.1	0.2	0.5		0.1	0.7			0.5	11	0.3
Tridax procumbens	Tridax daisy	Asteraceae														0.1							1	0.1
Verbesina encelioides	Goldweed	Asteraceae	0.6			0.5					0.7	0.4				0.1	0.6		0.1				7	0.4
Xanthium pungens	Noogoora burr	Asteraceae									0.1							0.5	0.5				3	0.4
Opuntia tomentosa	Velvety tree pear	Cactaceae								0.1		0.5					0.1						3	0.2
Cucumis myriocarpus	Paddy melon	Cucurbitaceae	0.2		0.1			0.1		0.1			0.1	1.3	0.7	12.6	0.5		0.2			0.1	11	1.5
Clitoria ternatea	Butterfly pea	Fabaceae								11.5	6.5	4.3							0.1				4	5.6
Crotalaria juncea	Sunhemp	Fabaceae	0.2	0.2		0.8	0.1													0.1			5	0.3
Macroptilium atropurpureum	Siratro	Fabaceae									0.1												1	0.1
Stylosanthes viscosa	Sticky stylo	Fabaceae		0.1		1.8	1.7		3.8									0.1		0.5	0.9		7	1.3
Vachellia farnesiana	Mimosa bush	Fabaceae	3.1			0.1		0.3		5.9		0.4	0.5			0.3	3.1	3.8	10.1	0.7			11	2.6
Sida cordifolia	Flannel weed	Malvaceae	0.5	0.4		0.2			2.8		0.8	2.3					0.2	0.1	0.1		0.1		10	0.8
Sida spinosa	Sida	Malvaceae	0.7						0.4				0.1	0.1			0.2		0.7				6	0.4
Waltheria indica	Sleepy morning	Malvaceae								0.5													1	0.5
Bothrichloa pertusa	Indian bluegrass	Poaceae	2.5	2.6		1.0											0.5						4	1.7
Cenchrus ciliaris	Buffel grass	Poaceae	2.0	0.6	1.3	44.9	14.4		26.6	17.9	0.5	21.1	13.3	3.0		0.6	8.7	28.7	6.2	8.1	1.5		17	11.7
Dichanthium aristatum	Angleton grass	Poaceae									4.2	4.4											2	4.3
Megathyrsus maximus	Guinea grass	Poaceae									37.5	18.2											2	27.9
Melinis repens	Red natal grass	Poaceae	2.6	1.2		2.2	2.0	0.1	0.6				0.1	0.1	0.2				0.1	2.7	0.9		12	1.1
Sorghum halepense	Johnson grass	Poaceae			0.3			0.1		1.1	1.5	0.2				0.1		0.1					7	0.5
Rumex crispus	Curled dock	Polygonaceae	0.5		0.1			1.0						2.0								2.1	5	1.1
Capsicum sp.	Chilli	Solanaceae						0.1			2.8												2	1.5
Physalis lanceifolia	Gooseberry	Solanaceae	5.5		16.3	0.2		9.5	0.1	13.4		0.6	0.2			5.3	17.2	13.4	26.9		0.2	0.4	14	7.8
Verbena officinalis	Common verbena	Verbenaceae	2.0	0.2	0.1	1.2								0.2		0.6	0.8	0.1		0.7		0.2	10	0.6
		# species	**13**	**9**	**9**	**13**	**4**	**9**	**7**	**10**	**15**	**13**	**7**	**8**	**4**	**13**	**12**	**11**	**12**	**6**	**5**	**6**		
		Weed cover (%)[b]	**32.1**	**6.0**	**20.6**	**54.2**	**18.1**	**23.3**	**36.0**	**54.1**	**69.3**	**66.6**	**19.9**	**10.6**	**2.7**	**24.7**	**45.5**	**58.1**	**58.0**	**12.8**	**3.6**	**10.3**		

[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°1'0"E 148°2'0"E 148°3'0"E 148°4'0"E 148°5'0"E

23°54'0"S 23°55'0"S 23°56'0"S 23°57'0"S 23°58'0"S 23°59'0"S

ML 70376

ML 70145

ML 70376

01 13 13 14

02 9 12 15

03 9

04 13

05 4

06 9

07 7

08 10

09 15

10 13

11 7

12 8 6 20

13 4

16 11

17 12

18 6

19 5

Number of weed species within weed monitoring plot

Weed monitoring plot symbolising % weed cover

09 Weed monitoring plot number

Sojitz Blue Pty Ltd - Lexington offset

Location diagram

Figure 23
Lexington offset
Weed monitoring results

- Minerva lots (lot 10 & 11 DN40126)
- Existing offset area (Category A area)
- Mining leases (ML70376 and ML70145)
- Offset area
- Weed monitoring plots

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

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

0 0.5 1 1.5 2
Kilometres

N

CO2 Australia

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

Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:30,000@A3

Path: P:\GIS\Data\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 - Figure 23 - Lexington weed monitoring plots.mxd

5.3 PEST ANIMAL MONITORING

5.3.1 Rabbits

Results of rabbit monitoring confirmed the presence of rabbit/hare scats from nine of the 10 rabbit monitoring plots (R01 – R09)(Figure 27). Across these plots, pellet abundance ranged from isolated pellets and small clumps more than 10 m apart, to abundant pellets, often in large clumps and buck-heaps. Brown hares (*Lepus europaeus*) and European rabbits (*Oryctolagus cuniculus*) (Figure 24) were also visually confirmed at six separate fauna camera stations (Site C01, C02, C04, C10, C13, C15), which were spread across the whole Lexington offset site (Table 25). Brown hares and European rabbits were found evenly across the Lexington offset site, with five captures of each species recorded from three fauna camera sites; however both species were never captured from the same fauna camera site.

Figure 24: Brown hare (*Lepus europaeus*) captured at fauna camera station C13 on the Lexington offset site.

Table 23 shows the results of the assessment of overall rabbit impact. The results indicate that all of the sites displayed evidence of rabbit abundance with the exception of R10. The assessment of overall rabbit impact was denoted as 'unacceptable' for three sites, due to moderate levels of rabbit abundance (identified through the presence of scats; Figure 25), with rabbit damage only encountered at one site in the form of 45° seedling damage (Figure 26). Remaining sites were either denoted as 'monitor closely', with two sites (R05 and R10) denoted as 'acceptable'.

Table 23: Assessment of overall rabbit impact at the Lexington offset site.

Site	Rabbit abundance score (0 – 5)	Seedling abundance score (0 – 5)	Rabbit damage score (0 – 5)	Corrected regeneration score (0 – 5)	Overall rabbit impact
R01	1	1	0	1.0	Monitor closely
R02	2	3	0	3.0	Monitor closely
R03	2	2	0	2.0	Unacceptable
R04	2	3	0	3.0	Monitor closely
R05	1	3	0	3.0	Acceptable
R06	2	3	1	1.5	Unacceptable
R07	1	2	0	2.0	Monitor closely
R08	3	3	0	3.0	Monitor closely
R09	3	2	0	2.0	Unacceptable
R10	0	0	0	0.2	Acceptable

Figure 25: Rabbit scats and diggings seen at the Lexington offset.

Figure 26: Evidence of rabbit damage in the form of 45-degree angled clipping of young stems, found at the Lexington offset.

148°1'0"E
148°2'0"E
148°3'0"E
148°4'0"E
148°5'0"E
23°54'0"S
23°55'0"S
23°56'0"S
23°57'0"S
23°58'0"S
23°59'0"S

ML 70145
ML 70376
R01
R02
R03
R04
R05
R06
R07
R08
R09
R10

Sojitz Blue Pty Ltd - Lexington offset

Figure 27
Lexington offset - Rabbit/hare monitoring results

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

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

Rabbit monitoring plots (R01 - R10)
- No evidence for rabbits/hares
- Evidence of rabbits/hares

Location diagram

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

Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:30,000@A3

0 0.5 1 1.5 2
Kilometres

N

CO2 Australia

Path: P:\GISData\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 - Figure 27 - Lexington evidence of rabbits.mxd

5.3.2 Feral pigs

Across the eight pig monitoring plots, there was confirmed evidence for the presence of feral pigs in five plots. There was evidence of feral pigs through direct observation (P07), observed as a single young piglet, although no pigs were confirmed via and of the 15 fauna cameras. Evidence of feral pig presence within plots ranged from 0% (Sites P03 and P05) to 37% (Site P01) and, on average, was observed across 13.33% of the available transect sections within each plot (Table 24). Indicators of pig presence were often observed within the direct vicinity of areas mapped as RE 11.8.11a (Figure 28). These areas are represented by *Melaleuca bracteata* woodland along ephemeral watercourse and as such, are likely to be favoured by feral pigs given they afford greater cover compared to the surrounding woodland and grassland habitat.

Table 24: Assessment of overall feral pig presence and activity at the Lexington offset site, denoted as either rooting (R), footprints (F), travel pads (P) or physical presence (+).

		Monitoring plot survey section (50 m)											
Plot	**Transect**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Transect**	**Plot % (record/30)**
P01	1	-	R F	-	-	-	-	-	-	R	-	20%	37%
	2	-	P	-	-	R	-	-	R	P	P R	50%	
	3	-	-	R	R	R	F	-	-	-	-	40%	
P02	1	-	-	-	-	-	-	-	-	-	-	0%	3%
	2	D	-	-	-	-	-	-	-	-	-	10%	
	3	-	-	-	-	-	-	-	-	-	-	0%	
P03	1	-	-	-	-	-	-	-	-	-	-	0%	0%
	2	-	-	-	-	-	-	-	-	-	-	0%	
	3	-	-	-	-	-	-	-	-	-	-	0%	
P04	1	-	-	P	-	R	-	-	-	-	-	20%	13.33%
	2	-	-	-	-	-	R	-	-	-	-	10%	
	3	-	-	-	-	-	-	P	-	-	-	10%	
P05	1	-	-	-	-	-	-	-	-	-	-	0%	0%
	2	-	-	-	-	-	-	-	-	-	-	0%	
	3	-	-	-	-	-	-	-	-	-	-	0%	
P06	1	-	-	-	-	-	-	R	P R	-	P F R	30%	20%
	2	-	-	-	D R	-	-	-	P	-	P	30%	
	3	-	-	-	-	-	-	-	-	-	-	0%	
P07	1	-	-	-	R	-	F R	R	R	-	-	40%	16.67%
	2	-	-	-	-	-	-	-	-	-	-	0%	
	3	-	+ R	-	-	-	-	-	-	-	-	10%	
P08	1	-	-	-	-	-	-	-	-	-	-	0%	16.67%
	2	-	R	P	R	R	-	-	-	-	-	40%	
	3	-	-	-	-	F P	-	-	-	-	-	10%	
												Total	**13.33%**

148°1'0"E 148°2'0"E 148°3'0"E 148°4'0"E 148°5'0"E

23°54'0"S 23°55'0"S 23°56'0"S 23°57'0"S 23°58'0"S 23°59'0"S

ML 70145

ML 70376

P01 P02 P03 P04 P05 P06 P07 P08

Sojitz Blue Pty Ltd - Lexington offset

Figure 28
Lexington offset
Evidence of feral pigs

- Minerva lots (lot 10 & 11 DN40126)
- Incidental observations of feral pigs
- Existing offset area (Category A area)
- Mining leases (ML70376 and ML70145)
- Offset area

Regional ecosystem

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

Pig monitoring plots (P01 - P08)

- No evidence of feral pigs
- Evidence of feral pigs

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

Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:30,000@A3

0 0.5 1 1.5 2
Kilometres

N

CO2 Australia

Location diagram

Brisban

Path: P:\GISData\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 - Figure 28 - Lexington evidence of feral pigs.mxd

5.3.3 Fauna camera station

Of the 15 fauna camera stations, 14 were operable across each of the three consecutive nights, resulting in a total of 42 operable station nights for the purposes of calculating Catling Index values for pest animal species. The fauna camera at site C05 did not display any captures due to a camera error and was deemed inoperable. The fauna cameras confirmed the presence of four pest animal species, namely feral cat (*Felis catus*; Figure 29), brown hare (*Lepus capensis*), European rabbit (*Oryctolagus cuniculus*) and wild dog (*Canis familiaris*; Figure 30). The highest Catling Index score was 21.4 for the feral cat, followed by European rabbit and brown hare (11.9) and wild dog (7.1). Non-pest animals were also detected from the fauna camera stations, including eastern grey kangaroo (*Macropus giganteus*), rufous bettong (*Aepyprymnus rufescens*), Australian magpie (*Cracticus tibicen*), Australian raven (*Corvus coronoides*), galah (*Eolophus roseicapilla*), emu (*Dromaius novaehollandiae*) and horse (*Equus caballus*).

Overall, there were 22 individual pest animal detections, recorded from 9 (64%) of the 14 fauna camera stations (Table 25). These detections were made throughout the site (Figure 31), although there was a notable lack of pest animal detections along Prickle Farm Road that traverses the centre of Lexington (Figure 31).

Table 25: Pest animal results from the Lexington offset site.

Pest animal species	Confirmed incidence of pest animal species from given site															
	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	C11	C12	C13	C14	C15	Catling Index
Nights camera operable*	3	3	3	3	0	3	3	3	3	3	3	3	3	3	3	
Wild dog																
25/06/20													✓			**7.1**
26/06/20																
27/06/20						✓							✓			
Feral cat																
25/06/20			✓										✓			**21.4**
26/06/20																
27/06/20	✓	✓	✓			✓				✓	✓		✓			
European rabbit																
25/06/20										✓						**11.9**
26/06/20		✓		✓												
27/06/20		✓								✓						
Brown hare																
25/06/20																**11.9**
26/06/20													✓		✓	
27/06/20	✓												✓		✓	

* 42 camera nights for the purposes of calculating Catling Index.

Figure 29: Feral cat (*Felis catus*) captured at fauna camera station C11 on the Lexington offset site.

Figure 30: Wild dog (*Canis familiaris*) captured at fauna camera station C13 on the Lexington offset site.

148°1'0"E 148°2'0"E 148°3'0"E 148°4'0"E 148°5'0"E

23°54'0"S 23°55'0"S 23°56'0"S 23°57'0"S 23°58'0"S 23°59'0"S

ML 70145

ML 70376

CO1 CO2 CO3 CO4 CO5 CO6 CO7 CO8 CO9 C10 C11 C12 C13 C14 C15

Dogs (# days confirmed)
- 1 day
- 2 days

Cats (# days confirmed)
- 1 day
- 2 days

Rabbits (# days confirmed)
- 1 day
- 2 days

Hares (# days confirmed)
- 1 day
- 2 days
- Access tracks

Sojitz Blue Pty Ltd - Lexington offset

Figure 31
Lexington offset
Pest animal results

- Minerva lots (lot 10 & 11 DN40126)
- Existing offset area (Category A area)
- Mining leases (ML70376 and ML70145)
- Offset area
- Access tracks
- Pest animal survey tracks

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

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

Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:30,000@A3

0 0.5 1 1.5 2
Kilometres

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CO2 Australia

Location diagram

Path: P:\GISData\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 - Figure 31 - Lexington pest animal results.mxd

5.4 BIOMASS MONITORING

5.4.1 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 26).

Photo monitoring showed some variability in biomass of ground cover. Sites in RE 11.8.11 and 11.8.11a were all at least 2,578 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 1,750 kg/ha in rockier upslope areas (Site 02) and 5,000 kg/ha in more open grassy woodland areas (Site 11; Table 26).

Table 26: 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		✓	3,850
02	11.8.4	✓		1,750
03	11.8.11		✓	3,015
04	11.8.5	✓		2,000
05	11.8.4	✓		3,625
06	11.8.11		✓	3,015
07	11.8.4	✓		1,750
08	11.8.11a		✓	3,015
09	11.8.11a		✓	3,850
10	11.8.11a		✓	4,445
11	11.8.5	✓		5,000
12	11.8.11		✓	4,445
13	11.8.11		✓	3,850
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).

5.4.2 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.

5.5 SIGNIFICANT SPECIES

While targeted survey 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, numerous populations of both species were confirmed throughout the offset area (Figure 32) during monitoring within weed plots, as well as across rabbit and pig monitoring plots.

Of particular significance was the presence of at least 38 populations of *D. setosum*[2] which were restricted to areas of RE 11.8.5 and RE 11.8.4 in the west of the offset area. A particularly large population was seen in the vicinity of the weed monitoring plot at site 02, with other populations confirmed from near sites 07 and 19.

Three populations of *Dichanthium queenslandicum* were confirmed from the Lexington offset site, including a large population of over 200 tussocks in the east of the Lexington offset area immediately to the south of site 13 (Figure 32). Another population was confirmed in the east of the offset area to the north-west of site 12, although since surveying in 2018, the eastern-most parts of Lexington have always supported appreciable populations of *D. queenslandicum*. Significantly, a population of *D. queenslandicum* was confirmed in the western expanse of RE 11.8.11 to the north-west of site 14 (Figure 32). While populations of *D. queenslandicum* are known from areas of RE 11.8.11 in North Promenade paddock to the north of the Lexington offset area, it is understood to be the first confirmed record of *D. queenslandicum* in this part of the Lexington offset area.

5.6 GENERAL SITE INSPECTION

Following the dry season monitoring in December 2019, many upgrades and installations of fencing has occurred throughout the Lexington offset site, with additional access tracks also installed. Where observed, updated fencing and access tracks are presented in the Lexington monitoring site figures (Figure 5 and Figure 6). Some of the fencing was being constructed at the time of surveying in June 2020. The additional fencing extent and access tracks outside of the extent of traversed areas in June 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, cattle were observed in the natural grassland areas in the west of the Lexington offset area during the post-west season monitoring. There was also evidence of previous cattle grazing in some of these offset areas.

Outside of the weed monitoring plots assessed as part of the post-wet season surveys, there were a number of areas away from surveyed plots where weed infestation was considered serious. Most noticeably was the

[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* speices. 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*.

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*.

148°1'0"E
148°2'0"E
148°3'0"E
148°4'0"E
148°5'0"E
23°54'0"S
23°55'0"S
23°56'0"S
23°57'0"S
23°58'0"S
23°59'0"S

ML 70145
ML 70376

01
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19
20

Sojitz Blue Pty Ltd - Lexington offset

Figure 32
Lexington offset
Significant species

Access tracks
Minerva lots (lot 10 & 11 DN40126)
Existing offset area (Category A area)
Mining leases (ML70376 and ML70145)
Offset area
Weed monitoring plots

Regional ecosystem
RE 11.8.11
RE 11.8.11a
RE 11.8.4
RE 11.8.5

Significant species
Dichanthium queenslandicum
Dichanhtium setosum

0 0.5 1 1.5 2
Kilometres

N

CO2 Australia

Location diagram

Brisban

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

Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:30,000@A3

Path: P:\GIS\Data\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 - Figure 32 - Lexington significant species.mxd

6 RESULTS: LEXINGTON RAIL LOOP OFFSET SITE

6.1 HABITAT MONITORING

Results of habitat condition assessments identified an average site condition score of 7.57 out of 10 across all seven habitat monitoring sites, with scores ranging between 5.67 (Site LEXRL03) and 8.67 (Site LEXRL05). Site context scores varied from 6.54 out of 10 (LEXRL03) up to 10 out of 10 (LEXRL01 and LEXRL02). Appendix C outlines details of the site condition assessments, summarised below in Table 16.

Table 27: Lexington Rail Loop offset site habitat monitoring sites: site condition and site context scores calculated in accordance with the *Guide to determining terrestrial habitat quality* (DEHP 2017).

Offset paddock	Site	RE	Easting	Northing	Site condition score (/10)	Site context score (/10)
North Promenade	LEXRL01	11.8.11	604390	7355247	6.33	10.00
	LEXRL02	11.8.11	604758	7354797	8.00	10.00
Harry's	LEXRL03	11.8.11	608595	7355228	5.67	6.54
	LEXRL04	11.8.11	609262	7355036	8.00	7.31
Contours	LEXRL05	11.8.11	612011	7354575	8.67	7.31
	LEXRL06	11.8.11	611834	7354280	7.83	7.31
	LEXRL07	11.8.11	611215	7353711	8.50	7.31
				Average score	**7.57**	**7.97**

MNES habitat condition assessments

Based on the results of the site condition and assessments, habitat condition scores for the two MNES averaged 7.76 out of 10 for Natural grasslands TEC and 6.92 out of 10 for king blue-grass (Table 17). King blue-grass had the lower score of the two MNES (6.92) on account of the absence of confirmed king-blue grass tussocks from four of the seven surveyed plots. (refer to Appendix C for site condition raw data contributing to site condition score).

Table 28: Lexington Rail Loop offset site monitoring sites showing their habitat condition scores contributing to MNES.

Offset paddock	Site	RE	Natural Grasslands TEC	King blue-grass
North Promenade	LEXRL01	11.8.11	8.04	6.43
	LEXRL02	11.8.11	8.93	7.14
Harry's	LEXRL03	11.8.11	6.07	6.52
	LEXRL04	11.8.11	7.68	8.14
Contours	LEXRL05	11.8.11	8.04	7.76
	LEXRL06	11.8.11	7.59	6.07
	LEXRL07	11.8.11	7.95	6.36
		Average score	**7.76**	**6.92**

Natural Grasslands habitat

Natural Grasslands TEC habitat condition scores for the seven habitat monitoring sites ranged between 6.07 and 8.93 (Table 17). The seven assessment sites supported between three and four TEC indicator grass species (Table 18). While additional species are likely to have been present, some individuals could not be identified to species level due to the dry conditions and as a consequence, lack of fertile material. Notably, *Dichanthium queenslandicum* was confirmed at three of the seven sites, including both the Harry's paddock monitoring sites and one of the three Contours paddock monitoring sites.

Table 29: Natural Grasslands TEC indicator species at the Lexington Rail Loop offset site.

Scientific name	Common name	North Promenade		Harry's		Contours		
		LEXRL01	LEXRL02	LEXRL03	LEXRL04	LEXRL05	LEXRL06	LEXRL07
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	**4**	**4**	**3**	**3**	**4**	**3**	**4**

Natural Grassland quality assessments were conducted at each of the seven 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. The results of this assessment (Table 19) indicated that four of the condition sites (LEXRL01, LEXRL02, LEXRL05 and LEXRL07) were in 'best' condition, with the remaining three sites (LEXRL03, LEXRL04 and LEXRL06) being only in 'good' condition, largely attributed to the presence of only three perennial indicator grass species, with both of the Harry's paddock sites being in only 'good' condition despite the presence of *Dichanthium queenslandicum*.

Table 30: Condition classes for the Natural Grasslands TEC at the Lexington Rail Loop offset site.

TEC quality criteria	North Promenade		Harry's		Contours		
	LEXRL01	LEXRL02	LEXRL03	LEXRL04	LEXRL05	LEXRL06	LEXRL07
Perennial indicator grass species	4	4	3	3	4	3	4
Number of native grass tussocks	>200	>200	>200	>200	>200	>200	>200
Woody shrub canopy cover (%)	<5	<5	<5	<5	<5	<5	<5
Perennial non-native plant cover (%)	9.1	1.15	9.8	2.25	0	0.5	3.4
Condition class	**Best**	**Best**	**Good**	**Good**	**Best**	**Good**	**Best**

King blue-grass habitat

King blue-grass habitat condition scores for the seven habitat monitoring sites ranged between 6.07 and 8.93 (Table 17). King-blue grass was positively identified from three of the seven habitat condition assessment plots at the time of surveying, present as single tussocks (Site LEXRL06) up to a population at LEXRL04 of 20-50 tussocks (Figure 34). Outside of the habitat condition assessment plots, the only confirmed population of king blue-grass was within the LEXRL12 weed monitoring plot, where a population of over 100 tussocks was confirmed (Figure 33).

Figure 33: Population of >100 king blue-grass (*Dichanthium queenslandicum*) tussocks in the foreground, with the taller, more upright *Dichanhtium sericeum* in the background.

LEXRL03

Harry's

LEXRL04

Contours

LEXRL05

LEXRL12

King blue-grass population size

1-2

>2-5

>5-20

>20-50

>50-100

>100

Sojitz Blue Pty Ltd - Lexington Rail Loop offset

Location diagram

Figure 34
Lexington Rail Loop offset
King blue-grass populations

Lexington existing fences

Access tracks

Lexington Rail Loop offset

Harry's paddock

Contours paddock

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 25 50 75 100
Metres

N

CO2 Australia

Brisbane

Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:3,000@A3

Path: P:\GISData\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 - Figure 34 - LEXINGTON RAIL LOOP KBG populations.mxd

6.2 PHOTO MONITORING

Photo monitoring of the Lexington Rail Loop offset sites showed consistent levels of high grass cover across the Harry's and Contours paddocks (Site LEXRL05: refer to Photo G-43 in Appendix G), with slightly reduced grass cover in the North Promenade paddock (Site LEXRL09: refer to Photo G-80 in Appendix G). Variability in the ground cover within the North Promenade and Harry's paddocks is likely a consequence of cattle grazing and horse grazing (respectively) in the two paddocks. Ongoing management and concurrent photo monitoring should detect improvements in these paddocks over time, as the grassland continues to mature and recover from these disturbances. The results of the photo monitoring in the MDS Rail Loop site is presented in Appendix G.

6.3 WEED MONITORING

A total of 15 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 4.8 species, ranging between one species (Site LEXRL05, LEXRL07 and LEXRL11) and 10 species (Site LEXRL02 and LEXRL09), with three weed species only encountered at single sites. Weed cover across the 12 weed monitoring plots averaged 11.5%; ranging between 0.1% (Site LEXRL07) and 39.1% (Site LEXRL09)(Table 31 and Figure 35).

The number of weed species differed by offset paddock, with the North Promenade paddock having a higher weed species richness and average cover (8.75 species and 24.2% cover) than Harry's (5 species and 10.0% cover), with Contours having the lowest weed species richness and average cover of all three paddocks (1.6 species and 2.3% cover).

The most commonly encountered weed was *Parthenium hysterophorus* which was recorded from eight of the 12 sites (Table 31). *Parthenium hysterophorus* also had the highest average cover of 8.2%, followed by *Cucumis myriocarpus* which from the four sites it was encountered at, had an average cover of 7.5%. Nine of the 15 weed species (60%) had average covers <0.5%.

Table 31: 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		
Bidens bipinnata	Bipinnate Beggar's Ticks	Asteraceae		0.2						0.1					2	0.2
Lactuca serriola	Prickly Lettuce	Asteraceae		0.1						0.1	0.2				3	0.1
Parthenium hysterophorus	Parthenium Weed	Asteraceae	19.2	2.8	0.8	6.4				8.0	15.1	4.3	8.8		8	8.2
Sonchus oleracea	Sow Thistle	Asteraceae		0.2						0.1	0.1				3	0.1
Verbesina encelioides	Goldweed	Asteraceae	0.1												1	0.1
Cucumis myriocarpus	Paddy Melon	Cucurbitaceae	5.2	0.6						3.6	20.9				4	7.5
Vachellia farnesiana	Mimosa Bush	Fabaceae	1.9	4.5				0.5		5.5	0.1				5	2.5
Sida spinosa	Sida	Malvaceae		0.1											1	0.1
Cenchrus ciliaris	Buffel Grass	Poaceae	0.6	0.5						1.0	0.5			1.1	5	0.7
Dichanthium aristatum	Angleton Grass	Poaceae				8.0	0.5					5.1			3	4.5
Melinis repens	Red Natal Grass	Poaceae			0.1	0.3						0.7		0.4	4	0.4
Sorghum halepense	Johnson Grass	Poaceae	0.1		0.3	0.1					0.1	0.1			5	0.1
Rumex crispus	Curled Dock	Polygonaceae									0.1				1	0.1
Physalis lanceifolia	Goosberry	Solanaceae	1.2	0.9	2.9						2.0				4	1.7
Verbena officinalis	Common Verbena	Verbenaceae		0.4	0.4	0.1		0.1	0.1	1.0	0.1	0.3		0.1	9	0.3
		# species	**7**	**10**	**5**	**5**	**1**	**2**	**1**	**8**	**10**	**5**	**1**	**3**		
		Weed cover (%)[b]	**28.2**	**10.2**	**4.5**	**14.9**	**0.5**	**0.6**	**0.1**	**19.3**	**39.1**	**10.5**	**8.8**	**1.6**		

[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

7

10

8

10

ML 70145

Sojitz Blue Pty Ltd - Lexington Rail Loop offset

Location diagram

Brisbane

Figure 35
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: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:6,000@A3

Path: P:\GIS\Data\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 - Figure 35 - 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

5 LEXRL03

5 LEXRL04

5 LEXRL10

Harry's

ML 70145

ML 70376

1 LEXRL05

3 LEXRL12

2 LEXRL06

Contours

1 LEXRL11

1 LEXRL07

Path: P:\GIS\Data\Projects\Sojitz\918_20200627_Lex_MDS_post_wet_monitoring_report\200710 - Figure 36 - LEXINGTON RAIL LOOP weed monitoring plots east.mxd

Sojitz Blue Pty Ltd - Lexington Rail Loop offset

Location diagram

Brisbane

Figure 36
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

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: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:17,500@A3

6.4 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 32). 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 3,015 kg/ha and 5,040 kg/ha. The average biomass varied considerably between the offset paddocks, with the average biomass at Contours (4,921 kg/ha) greater than at Harry's (4,365 kg/ha) and greater again than at North Promenade (3,681 kg/ha).

Table 32: 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	✓	4,445
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	✓	4,445
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).

6.5 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. Likewise, cattle were 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.

Figure 37: Horses in Harry's paddock.

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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?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Pest animal monitoring		
								Rabbit plot	Feral pig plot	Fauna camera
01	H01_0m	641462	7304249	✓	Squatter pigeon	✓				
	H01_50m	641462	7304301	✓		✓				
	W01_01	641462	7304249	✓		✓	✓			
	W01_02	641462	7304301				✓			
	W01_03	641462	7304348				✓			
	R01	641462	7304249	✓				✓		
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				✓			
	R02	640199	7303572	✓				✓		
03	H03_0m	638418	7303259	✓	Squatter pigeon	✓				
	H03_50m	638425	7303308	✓		✓				
	W03_01	638418	7303259	✓		✓	✓			
	W03_02	638425	7303308				✓			

Site	Start point name[a]	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Pest animal monitoring		
								Rabbit plot	Feral pig plot	Fauna camera
	W03_03	638430	7303358				✓			
	R03	638418	7303259	✓				✓		
04	H04_0m	637945	7300236	✓	Natural Grasslands TEC, King blue-grass, bluegrass	✓				
	H04_50m	637951	7300287	✓		✓				
	W04_01	637945	7300236	✓		✓	✓			
	W04_02	637951	7300287				✓			
	W04_03	637950	7300338				✓			
	R04	637945	7300236	✓				✓		
05	H05_0m	638426	7299836	✓		✓				
	H05_50m	638420	7299885	✓	Squatter pigeon	✓				
	W05_01	638426	7299836	✓		✓	✓			
	W05_02	638420	7299885				✓			
	W05_03	638416	7299937				✓			
	R05	638426	7299836	✓				✓		
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							
	R06	637445	7299566	✓				✓		

Site	Start point name[a]	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Pest animal monitoring		
								Rabbit plot	Feral pig plot	Fauna camera
07	H07_0m	638426	7298876	✓	Brigalow TEC	✓				
	H07_50m	638419	7298926	✓		✓				
	W07_01	638426	7298876	✓		✓	✓			
	W07_02	638419	7298926				✓			
	W07_03	638423	7298974				✓			
	R07	638426	7298876	✓				✓		
08	H08_0m	637032	7298735	✓	Natural Grasslands TEC, King blue-grass, bluegrass	✓				
	H08_50m	637034	7298785	✓		✓				
	W08_01	637032	7298735	✓		✓	✓			
	W08_02	637034	7298785				✓			
	W08_03	637039	7298835				✓			
	R08	637032	7298735	✓				✓		
09	H09_0m	638387	7298599	✓	Australian painted snipe	✓				
	H09_50m	638380	7298648	✓		✓				
	W09_01	638387	7298599	✓		✓	✓			
	W09_02	638380	7298648				✓			
	W09_03	638372	7298699				✓			
	R09	638387	7298599	✓				✓		
10	H10_0m	636412	7297523	✓	Squatter pigeon	✓				
	H10_50m	636415	7297571	✓		✓				

Site	Start point name[a]	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Pest animal monitoring		
								Rabbit plot	Feral pig plot	Fauna camera
	W10_01	636412	7297523	✓		✓	✓			
	W10_02	636415	7297571				✓			
	W10_03	636413	7297617				✓			
	R10	636412	7297523	✓				✓		
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				✓			
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	✓		✓	✓			

Site	Start point name[a]	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Pest animal monitoring		
								Rabbit plot	Feral pig plot	Fauna camera
	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				✓			
	W19_03	638290	7301821				✓			
20	W20_01	636740	7298674	✓		✓	✓			
	W20_02	636746	7298723				✓			
	W20_03	636752	7298771				✓			
21	P01_01	636412	7297523						✓	
	P01_02	636412	7297423						✓	
	P01_03	636412	7297323						✓	
22	P02_01	636397	7298627						✓	
	P02_02	636397	7298527						✓	
	P02_03	636397	7298427						✓	

Site	Start point name[a]	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Pest animal monitoring		
								Rabbit plot	Feral pig plot	Fauna camera
23	P03_01	637232	7298835						✓	
	P03_02	637232	7298735						✓	
	P03_03	637232	7298635						✓	
24	P04_01	638126	7299076						✓	
	P04_02	638126	7298976						✓	
	P04_03	638126	7298876						✓	
25	P05_01	638126	7299836						✓	
	P05_02	638126	7299736						✓	
	P05_03	638126	7299637						✓	
26	P06_01	638156	7300985						✓	
	P06_02	638156	7300885						✓	
	P06_03	638156	7300785						✓	
27	P07_01	638992	7303366						✓	
	P07_02	638992	7303266						✓	
	P07_03	638992	7303166						✓	
28	P08_01	641150	7303945						✓	
	P08_02	641150	7303845						✓	
	P08_03	641150	7303745						✓	
29	C01	642069	7303364							✓
30	C02	641096	7303802							✓

Site	Start point name[a]	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Pest animal monitoring		
								Rabbit plot	Feral pig plot	Fauna camera
31	C03	639777	7303065							✓
32	C04	638324	7301905							✓
33	C05	638692	7301073							✓
34	C06	638685	7300013							✓
35	C07	638679	7299497							✓
36	C08	638419	7298830							✓
37	C09	637498	7300708							✓
38	C10	637519	7300049							✓
39	C11	637050	7299119							✓
40	C12	636843	7298531							✓
41	C13	636494	7297829							✓
42	C14	636293	7297414							✓
43	C15	636936	7297300							✓

[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), R = start point (south-west) of 2 ha rabbit monitoring plot, P = start point (west) of each site's pig monitoring plot transects (PXX_01, PXX_02 and PXX_03 corresponds to transect 1, 2 and 3), C = fauna camera station. Start points for habitat assessment, weed monitoring and rabbit monitoring plots are the same for sites 01 – 10, with sites 11 – 20 only corresponding to weed monitoring plots.

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?	Photo monitoring	Weed monitoring	Pest animal monitoring		
							Rabbit plot	Feral pig plot	Fauna camera
01	W01_01	604331	7354000	✓	✓	✓			
	W01_02	604331	7353950			✓			
	W01_03	604331	7353900			✓			
	R01	604331	7353900	✓			✓		
02	W02_01	603925	7353100	✓	✓	✓			
	W02_02	603908	7353053			✓			
	W02_03	603892	7353005			✓			
	R02	603892	7353005	✓			✓		
03	W03_01	604380	7352577	✓	✓	✓			
	W03_02	604380	7352527			✓			
	W03_03	604380	7352477			✓			
	R03	604380	7352477	✓			✓		
04	W04_01	603904	7351791	✓	✓	✓			
	W04_02	603904	7351741			✓			
	W04_03	603904	7351691			✓			
	R04	603904	7351691	✓			✓		
05	W05_01	603360	7351127	✓	✓	✓			
	W05_02	603345	7351079			✓			
	W05_03	603330	7351031			✓			

Site	Start point name[a]	Easting	Northing	Star picket?	Photo monitoring	Weed monitoring	Pest animal monitoring		
							Rabbit plot	Feral pig plot	Fauna camera
	R05	603426	7351001	✓			✓		
06	W06_01	604790	7351295	✓	✓	✓			
	W06_02	604790	7351245			✓			
	W06_03	604790	7351195			✓			
07	W07_01	604649	7350850	✓	✓	✓			
	W07_02	604649	7350800			✓			
	W07_03	604649	7350750			✓			
	R06	604649	7350750	✓			✓		
08	W08_01	606488	7350461	✓	✓	✓			
	W08_02	606488	7350411			✓			
	W08_03	606488	7350361			✓			
	R07	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			✓			
	R08	607175	7351571	✓			✓		
11	W11_01	609631	7353204	✓	✓	✓			
	W11_02	609631	7353154			✓			

Site	Start point name[a]	Easting	Northing	Star picket?	Photo monitoring	Weed monitoring	Pest animal monitoring		
							Rabbit plot	Feral pig plot	Fauna camera
	W11_03	609631	7353104			✓			
	R09	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			✓			
	R10	610237	7352515	✓			✓		
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			✓			

Site	Start point name[a]	Easting	Northing	Star picket?	Photo monitoring	Weed monitoring	Pest animal monitoring		
							Rabbit plot	Feral pig plot	Fauna camera
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			✓			
21	P01_01	604442	7353084					✓	
	P01_02	604442	7352984					✓	
	P01_03	604442	7352884					✓	
22	P02_01	603879	7351891					✓	
	P02_02	603879	7351791					✓	
	P02_03	603879	7351691					✓	
23	P03_01	604513	7354397					✓	
	P03_02	604513	7354297					✓	
	P03_03	604513	7354197					✓	
24	P04_01	604624	7350950					✓	
	P04_02	604624	7350850					✓	
	P04_03	604624	7350750					✓	

Site	Start point name[a]	Easting	Northing	Star picket?	Photo monitoring	Weed monitoring	Pest animal monitoring		
							Rabbit plot	Feral pig plot	Fauna camera
25	P05_01	606463	7350561					✓	
	P05_02	606463	7350461					✓	
	P05_03	606463	7350361					✓	
26	P06_01	607101	7351233					✓	
	P06_02	607101	7351133					✓	
	P06_03	607101	7351033					✓	
27	P07_01	607092	7351771					✓	
	P07_02	607092	7351671					✓	
	P07_03	607092	7351571					✓	
28	P08_01	609840	7353261					✓	
	P08_02	609840	7353161					✓	
	P08_03	609840	7353061					✓	
29	C01	604003	7354128						✓
30	C02	604006	7353171						✓
31	C03	603871	7352215						✓
32	C04	603885	7351500						✓
33	C05	605051	7354267						✓
34	C06	604978	7353531						✓
35	C07	604885	7352747						✓
36	C08	604776	7352174						✓
37	C09	604705	7351408						✓

Site	Start point name[a]	Easting	Northing	Star picket?	Photo monitoring	Weed monitoring	Pest animal monitoring		
							Rabbit plot	Feral pig plot	Fauna camera
38	C10	604402	7350811						✓
39	C11	604107	7350032						✓
40	C12	605496	7350889						✓
41	C13	606580	7350889						✓
42	C14	610156	7352282						✓
43	C15	610612	7353100						✓

[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), R = start point (south-west) of 2 ha European rabbit monitoring plot, P = start point (west) of each site's feral pig monitoring plot transects (PXX_01, PXX_02 and PXX_03 corresponds to transect 1, 2 and 3), C = fauna camera station. Start points for weed monitoring and European rabbit monitoring plots are the same for sites 01 – 10, with sites 11 – 20 only corresponding to weed monitoring plots.

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	Weed monitoring	Biomass monitoring
MDSRL01	H01_0m	645575	7303101	✓	Natural Grasslands TEC, King blue-grass	✓		
	H01_50m	645575	7303151	✓		✓		✓
	W01_01	645575	7303101	✓		✓	✓	
	W01_02	645575	7303151				✓	
	W01_03	645575	7303201				✓	
MDSRL02	H02_0m	646410	7303007	✓	Natural Grasslands TEC, King blue-grass	✓		
	H02_50m	646410	7303057	✓		✓		✓
	W02_01	646410	7303007	✓		✓	✓	
	W02_02	646410	7303057				✓	
	W02_03	646410	7303107				✓	
MDSRL03	H03_0m	646666	7303114	✓	Natural Grasslands TEC, King blue-grass	✓		
	H03_50m	646666	7303164	✓		✓		✓
	W03_01	646666	7303114	✓		✓	✓	
	W03_02	646666	7303164				✓	
	W03_03	646666	7303214				✓	
MDSRL04	H04_0m	646834	7303291	✓	Natural Grasslands TEC, King blue-grass	✓		
	H04_50m	646834	7303341	✓		✓		✓
	W04_01	646834	7303291	✓		✓	✓	

Site	Start point name[a]	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Biomass monitoring
	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 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?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Biomass monitoring
LEXRL01	H01_0m	604390	7355247	✓	Natural Grasslands TEC, King blue-grass	✓		
	H01_50m	604390	7355297	✓		✓		
	W01_01	604390	7355247	✓		✓	✓	
	W01_02	604390	7355297				✓	
	W01_03	604390	7355347				✓	
LEXRL02	H02_0m	604758	7354797	✓	Natural Grasslands TEC, King blue-grass	✓		
	H02_50m	604758	7354847	✓		✓		
	W02_01	604758	7354797	✓		✓	✓	
	W02_02	604758	7354847				✓	
	W02_03	604758	7354897				✓	
LEXRL03	H03_0m	608595	7355228	✓	Natural Grasslands TEC, King blue-grass	✓		
	H03_50m	608595	7355278	✓		✓		
	W03_01	608595	7355228	✓		✓	✓	
	W03_02	608595	7355278				✓	
	W03_03	608595	7355328				✓	
LEXRL04	H04_0m	609262	7355036	✓	Natural Grasslands TEC, King blue-grass	✓		
	H04_50m	609262	7355086	✓		✓		
	W04_01	609262	7355036	✓		✓	✓	

Site	Start point name[a]	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Biomass monitoring
	W04_02	609262	7355086				✓	
	W04_03	609262	7355136				✓	
LEXRL05	H05_0m	612011	7354575	✓	Natural Grasslands TEC, King blue-grass	✓		
	H05_50m	612011	7354625	✓		✓		
	W05_01	612011	7354575	✓		✓	✓	
	W05_02	612011	7354625				✓	
	W05_03	612011	7354675				✓	
LEXRL06	H06_0m	611834	7354280	✓	Natural Grasslands TEC, King blue-grass	✓		
	H06_50m	611834	7354330	✓		✓		
	W06_01	611834	7354280	✓		✓	✓	
	W06_02	611834	7354330				✓	
	W06_03	611834	7354380				✓	
LEXRL07	H07_0m	611215	7353711	✓	Natural Grasslands TEC, King blue-grass	✓		
	H07_50m	611215	7353761	✓		✓		
	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				✓	

Site	Start point name[a]	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Biomass monitoring
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 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 1 HABITAT CONDITION ASSESSMENT

The following tables provide details of the habitat condition assessments undertaken during the Year 1 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 June 2020. 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	7	11	3	6	11	3	8	11	3	8	11	3
Native plant species richness - forbs	4	17	2.5	3	17	2.5	4	17	2.5	5	17	3
Tree canopy height	-	-	-	-	-	-	-	-	-	-	-	-
Tree sub canopy height	-	-	-	-	-	-	-	-	-	-	-	-
Tree canopy cover	-	-	-	-	-	-	-	-	-	-	-	-
Tree sub canopy cover	-	-	-	-	-	-	-	-	-	-	-	-
Shrub canopy cover	-	-	-	-	-	-	-	-	-	-	-	-
Native perennial grass cover	67	43	5	44	43	5	21	43	1	21	43	1
Organic litter	23	13	5	22	13	5	38.6	13	3	28	13	3
Large eucalypt trees	-	-	-	-	-	-	-	-	-	-	-	-
Large non-eucalypt trees	-	-	-	-	-		-	-	-	-	-	
Coarse woody debris	-	-	-	-	-	-	-	-	-	-	-	-
Non-native plant cover	4.45	0	10	4.75	0	10	13.4	0	5	21.6	0	5
Total			25.5			25.5			14.5			15
/10			**8.50**			**8.50**			**4.83**			**5.00**

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	2.5	2.5	2.5	3
Tree canopy height	-	-	-	-
Tree canopy cover	-	-	-	-
Shrub canopy cover	-	-	-	-
Native perennial grass cover	5	5	1	1
Organic litter	5	5	3	3
Large trees	-	-	-	-
Coarse woody debris	-	-	-	-
Non-native plant cover	10	10	5	5
Total of BioCondition attributes	25.5	25.5	14.5	15
MAX ecological condition score	30	30	30	30
Score /10	**8.50**	**8.50**	**4.83**	**5.00**
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	9.20	8.66	6.70	6.79	**7.83**
King blue-grass – calculated based on combination of: – habitat quality (site condition + site context) – 80% – species stocking rate (score out of 3) – 20%	7.36	6.93	5.36	5.43	**6.27**

APPENDIX C LEXINGTON RAIL LOOP OFFSET SITE – YEAR 1 HABITAT CONDITION ASSESSMENT

The following tables provide details of the habitat condition assessments undertaken during the Year 1 monitoring period at the Lexington Rail Loop 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 June 2020. 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 Rail Loop offset sites, as presented in the Lexington Rail Loop ecological assessment (SLR 2019b).

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

Ecological condition indicators	Site LEXRL01 RE 11.8.11			Site LEXRL02 RE 11.8.11			Site LEXRL03 RE 11.8.11			Site LEXRL04 RE 11.8.11			Site LEXRL05 RE 11.8.11			Site LEXRL06 RE 11.8.11			Site LEXRL07 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	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	9	11	3	9	11	3	5	11	3	4	11	3	5	11	3	3	11	3	5	11	3
Native plant species richness - forbs	5	17	3	6	17	3	7	17	3	5	17	3	5	17	3	3	17	2.5	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	50	43	5	54	43	5	23	43	3	47	43	5	73	43	5	37	43	5	75.6	43	5
Organic litter	35	13	3	28	13	3	43	13	3	41	13	3	21.8	13	5	30.6	13	3	18.4	13	5
Large eucalypt trees	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Large non-eucalypt trees	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coarse woody debris	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-native plant cover	9.1	0	5	1.15	0	10	9.5	0	5	2.25	0	10	0	0	10	0.5	0	10	3.4	0	10
Total			19			24			17			24			26			23.5			25.5
/10			**6.33**			**8.00**			**5.67**			**8.00**			**8.67**			**7.83**			**8.50**

Table C-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 LEXRL01 RE 11.8.11 Natural Grasslands TEC, King blue-grass	Site LEXRL02 RE 11.8.11 Natural Grasslands TEC, King blue-grass	Site LEXRL03 RE 11.8.11 Natural Grasslands TEC, King blue-grass	Site LEXRL04 RE 11.8.11 Natural Grasslands TEC, King blue-grass	Site LEXRL05 RE 11.8.11 Natural Grasslands TEC, King blue-grass	Site LEXRL06 RE 11.8.11 Natural Grasslands TEC, King blue-grass	Site LEXRL07 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	3	3	3
Native plant species richness - forbs	3	3	3	3	3	2.5	2.5
Tree canopy height	-	-	-	-	-	-	-
Tree canopy cover	-	-	-	-	-	-	-
Shrub canopy cover	-	-	-	-	-	-	-
Native perennial grass cover	5	5	3	5	5	5	5
Organic litter	3	3	3	3	5	3	5
Large trees	-	-	-	-	-	-	-
Coarse woody debris	-	-	-	-	-	-	-
Non-native plant cover	5	10	5	10	10	10	10
Total of BioCondition attributes	19	24	17	24	26	23.5	25.5
MAX ecological condition score	30	30	30	30	30	30	30
Score /10	**6.33**	**8.00**	**5.67**	**8.00**	**8.67**	**7.83**	**8.50**
Site context							
Size of patch (fragmented bioregions)	10	10	10	10	10	10	10
Connectivity (fragmented bioregions)	5	5	5	5	5	5	5
Context (fragmented bioregions)	5	5	2	4	4	4	4
Distance to permanent watering point (intact bioregions)	-	-	-	-	-	-	-
Ecological corridors	6	6	0	0	0	0	0
Total of site context attributes	26	26	17	19	19	19	19
MAX site condition score	26	26	26	26	26	26	26
Score /10	**10.00**	**10.00**	**6.54**	**7.31**	**7.31**	**7.31**	**7.31**

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

Species stocking rate /3[a]	Site LEXRL01 RE 11.8.11	Site LEXRL02 RE 11.8.11	Site LEXRL03 RE 11.8.11	Site LEXRL04 RE 11.8.11	Site LEXRL05 RE 11.8.11	Site LEXRL06 RE 11.8.11	Site LEXRL07 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	2.5	3	2	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-4: Summary of the MNES habitat condition score for each RE assessment unit

Assessment unit habitat condition score /10	Site LEXRL01 RE 11.8.11	Site LEXRL02 RE 11.8.11	Site LEXRL03 RE 11.8.11	Site LEXRL04 RE 11.8.11	Site LEXRL05 RE 11.8.11	Site LEXRL06 RE 11.8.11	Site LEXRL07 RE 11.8.11	FINAL MNES habitat quality score
Natural Grasslands TEC – calculated based on site condition (/80) + site context (/26) converted to score out of 10	8.04	8.93	6.07	7.68	8.04	7.59	7.95	**7.76**
King blue-grass – calculated based on combination of: – habitat quality (site condition + site context) – 80% – species stocking rate (score out of 3) – 20%	6.43	7.14	6.52	8.14	7.76	6.07	6.36	**6.92**

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

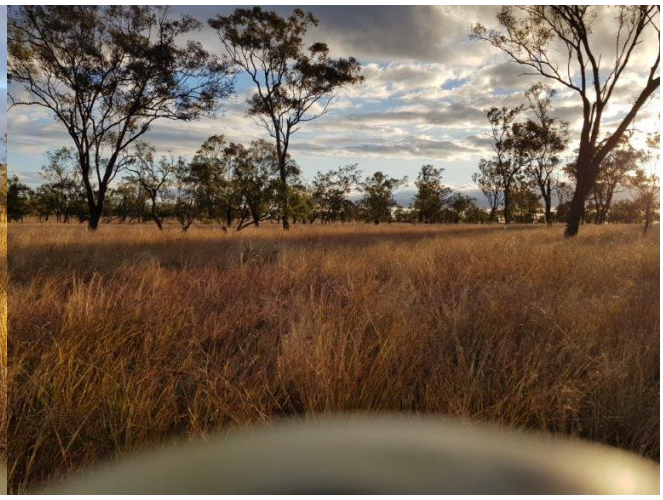

Photo D-9 West

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_0M

No photos available.

SITE 14 – W14_0

Photo F-126 North

Photo F-127 East

Photo F-128 South

Photo F-129 West

Photo F-130 Ground

SITE 15 – W15_0

Photo F-131 North

Photo F-132 East

Photo F-133 South

Photo F-134 West

Photo F-135 Ground

SITE 16 – W16_0

Photo F-136 North

Photo F-137 East

Photo F-138 South

Photo F-139 West

Photo F-140 Ground

SITE 17 – W17_0

Photo F-141 North

Photo F-142 East

Photo F-143 South

Photo F-144 West

Photo F-145 Ground

SITE 18 – W18_0

Photo F-146 North

Photo F-147 East

Photo F-148 South

Photo F-149 West

Photo F-150 Ground

SITE 19 – W19_0

Photo F-151 North

Photo F-152 East

Photo F-153 South

Photo F-154 West

Photo F-155 Ground

SITE 20 – W20_0

Photo F-156 North

Photo F-157 East

Photo F-158 South

Photo F-159 West

Photo F-160 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