

PRELIMINARY DOCUMENTATION REPORT

REFERRAL #2019-8482

Meteor Downs South Rail Loop Project

Prepared for:

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- Appendix A – Title Searches
- Appendix B – Updated Lexington OMP
- Appendix C – Queensland Department of Transport and Main Roads Approval

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Appendix G – Rail Loop MNESMP
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Appendix K – Meteor Downs South Rehabilitation Management Plan
Appendix L – Environmental Policies
Appendix M – Hydrological Technical Memorandum

1 Introduction

1.1 Description of the project

Sojitz MDS Mining Pty Ltd (**Sojitz**) operates the Meteor Downs South project (**MDS**) in central Queensland on behalf of its joint venture partner U & D Mining Industry (Australia) Pty Ltd (**U&D**).

MDS was referred under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (**EPBC Act**) (referral # 2013/6799) and determined to be a controlled action which was approved on 25 November 2014 subject to a number of conditions including the requirement to:

- a) have an approved Matters of National Environmental Significance Management Plan (**MNESMP**);
- b) have an approved Offset Management Plan (**OMP**);
- c) secure environmental offsets.

Sojitz has secured the offsets required for MDS and collocated these with its existing offset land required by its Minerva mine (referral # 2005/2039). The offset land is located at a property called Lexington (Lots 10 and 11 on plan DN40126 and Lots 13 and 14 on plan DN40170) which is fully owned by Sojitz (see Appendix A for a copy of the title searches). A significant amount of land suitable for offsets remains at Lexington and the intention is that future offsets for the rail loop project are also located at Lexington. This document includes details of how additional offsets will be delivered at the Lexington property for the proposed action and a the updated OMP is included as Appendix B.

MDS currently hauls product 85 km north to the Minerva rail load out facility under approvals from the Queensland Department of Transport and Main Roads (**DTMR**) and the Central Highlands Regional Council (**Council**) (included as Appendix C and Appendix D to this document). The conditions of the DTMR approval require Sojitz to prioritise development of an alternate rail network connection in order to reduce the number of truck movements on the State controlled road. Both the DTMR and Council approvals restrict haulage to times outside of school drop-off hours as the current haul route passes through local school zones and there are a number of community safety concerns. The DTMR and Council approvals expire in Q1 2020 and if not extended MDS will be placed in care and maintenance until an alternate haulage option is approved.

Over the past three years Sojitz and U&D have been investigating alternate haulage options including engaging directly with nearby mine operators to secure access to their rail facilities. While all efforts were made to reach a commercial agreement with an existing facility, they were unwilling to share access to their private facility which has necessitated a standalone option being pursued. The current location and design is the culmination of that work and has been determined to be the most suitable location to enable connection to the existing Bauhinia rail network. Aurizon has also committed to a rail line expansion by creating a passing loop at the existing Starlee siding, about 5 km from the proposed Sojitz rail loop.

Sojitz has already secured the necessary State and Local Government approvals for its project and the Federal approval remains the key outstanding approval required to commence activities on site. The key approvals are:

- a) Development approval issued by Council – see Attachment D;

- b) Environmental authority issued by the Queensland Department of Environment and Science – see Appendix E;
- c) SARA approval issued by the Department of State Development, Infrastructure and Planning – see Appendix F;
- d) Confirmation that the proposed activities are consistent with the native title status for the property.

In addition, Sojitz has entered into an option agreement with the landholder that provides a right to carry out the development.

On 11 July 2019 Sojitz referred the project to the Department of the Environment and Energy (DEE) for a decision on whether it was a controlled action (Ref # 2019/8482). On 6 August 2019 representatives from Sojitz, U&D and SLR met with DEE in Canberra to discuss the referral, level of assessment and the material required as part of the preliminary documentation.

On 24 September 2019 DEE confirmed the project was a controlled action on the basis of the potential impact on listed threatened species and communities, and that the impact could be assessed based on the preliminary documentation. On 30 September 2019 DEE provided a request for further information (RFI).

This report has been prepared in response to the controlled action decision and to enable the commencement of the action. This report specifically addresses the content of the RFI.

A new MNESMP has been prepared to avoid, mitigate, manage and monitor potential impacts to MNES associated with the proposed action and is included with this document (Appendix G). The MDS Rail Loop MNESMP is modelled on the approved MNESMP for the MDS Mine and includes adaptive management strategies to ensure impacts are effectively managed over the life of the project.

The approved Lexington OMP has been updated to include delivery, monitoring and management of additional proposed offsets for significant residual impacts associated with the MDS Rail Loop project. The updated OMP is included as Appendix B with this document. The Ecological Assessment Report detailing condition assessments and providing justification of the suitability of the proposed offset areas for delivering a conservation outcome is included as an attachment to the OMP.

1.2 Request for Additional Information for Assessment by Preliminary Documentation

1.2.1 Overview

This report has been prepared in response to the DEE decision for assessment on preliminary documentation and request for additional information. This report includes:

RFI Reference	Information Required	Document reference
2	A description of the controlled action	Section 2
3	A description of the environment and matters of national environmental significance	Section 3

RFI Reference	Information Required	Document reference
4	A description of the relevant impacts	Section 4
5	The proposed avoidance and mitigation measures	Section 5
6	The residual impacts/proposed offsets	Section 6
7	Other approvals and conditions for the project	Section 7
8	Social and economic considerations	Section 8
9	Consideration of the ecologically sustainable development (ESD) principles	Section 9
10	The environmental record of person proposing to take the action	Section 10

The RFI has been tabulated in this report so each line item corresponds with the issue raised by the DEE. The document is split into tables for each individual heading in the RFI. The table references each section of the preliminary documentation that contains further information and/or clarification.

1.2 Description of the Action

Table 1: RFI - Section 2, Description of the Action

RFI Reference	Information Required	Location in Preliminary Documentation
2 (a)	The location, boundaries and size (in hectares) of the disturbance footprint and of any adjoining areas which may be indirectly impacted by the proposal, including nearby vegetation, as well as areas for stockpiles, vehicle access and associated activities.	Section 2.3
2 (b)	A description of all components of the action, including the anticipated timing and duration (including start and completion dates) of each component of the project.	Section 2.2
2 (c)	A description of the operational requirements of the action including any anticipated maintenance works.	Section 2.4
2 (d)	A description of surrounding land uses.	Section 2.5
2 (e)	Mapping and coordinates of the layout options of the proposed action.	Section 2.6

1.3 Description of the Environment and Matters of National Environmental Significance

Table 2: RFI - Section 3, Description of the Environment and Matters of National Environmental Significance

RFI Reference	Information Required	Location in Preliminary Documentation
The preliminary documentation must provide a general description of the environment affected by and surrounding the proposed action area, in both the short and long term. Specific matters this section must address include, but are not limited to:		
3 (a)	A description of any potential MNES that occur, or have the potential to occur, in the project area and adjacent area, including but not limited to: <ul style="list-style-type: none"> i. Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin – Endangered; ii. King Blue-grass (<i>Dichanthium queenslandicum</i>)– Endangered 	Section 3.1
3 (b)	Results from targeted surveys undertaken in accordance with the Department's survey guidelines used to identify the potential presence of the protected matters listed in Section 3(a).	Section 3.2 and 3.3
3 (c)	Information about other resources used to identify and assess the environmental values on site, including survey data and historical records.	Section 3.1 Desktop assessment. Section 3.1.1 Previous surveys; section 3.1.2 Database searches

1.4 Relevant Impacts

Table 3: RFI - Section 4, Relevant Impacts

RFI Reference	Information Required	Location in Preliminary Documentation
The preliminary documentation must include an assessment of potential impacts (including direct, indirect, facilitated and cumulative impacts) that may occur as a result of all elements and project phases of the proposed action (e.g. construction and post-construction) on the MNES addressed at Section 3. Consideration of impacts must not be confined to the immediate area of the proposed action but must also consider the potential of the proposed action to impact on adjacent areas that are likely to contain populations of or habitat for MNES. For listed threatened species and communities this must include, but not be limited to:		
4 (a)	An assessment of the direct and indirect loss and/or disturbance of threatened species populations and habitat as a result of the proposed action, including: i. The quality of the habitat impacted, a quantification of the total individuals/populations and habitat area in hectares and analysis of the indirect impacts such as fragmentation of the habitat in the proposed action area and surrounding areas. ii. The impacts of changes to surface hydrology to habitat in the proposed action area and surrounding areas. iii. The impacts of dust resulting from the construction and operation of the project to habitat in the proposed action area and surrounding areas.	Section 4.1
4 (b)	An assessment of the likely duration of impacts to MNES as a result of the proposed action.	Section 4.3
4 (c)	An assessment of whether impacts are likely to be repeated, for example as part of maintenance.	Section 4.3
4 (d)	Discussion of the risk of introduction and spread of weeds and pathogens during construction on MNES.	Section 4.4
4 (e)	Details on whether any impacts are likely to be unknown, unpredictable or irreversible.	Section 4.5
4 (f)	Full justification of all discussions and conclusions based on the best available information, including relevant conservation advices, recovery plans, threat abatement plans and guidance documents, should be included if applicable. Departmental documents regarding listed threatened species can be found at: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl .	Section 4.6

1.5 Proposed Avoidance and Mitigation Measures

Table 4: RFI - Section 5, Proposed Avoidance and Mitigation Measures

RFI Reference	Information Required	Location in Preliminary Documentation
The preliminary documentation must include detailed descriptions of measures proposed to be undertaken by the proponent to avoid, minimise and manage relevant impacts of the project on the above listed threatened species. The proposed measures should be based on best available practices, appropriate standards and supported by scientific evidence. Please provide:		
5 (a)	proposed measures to be undertaken to avoid and mitigate the relevant impacts of the project on the above listed threatened species;	section 5.1
5 (b)	assessment of the expected or predicted effectiveness of the proposed mitigation measures;	Section 5.2
5 (c)	any statutory or policy basis for the proposed mitigation measures, including reference to approved conservation advices relevant to the listed threatened species, and discussion on how the proposed mitigation measures are not inconsistent with recovery plans and threat abatement plans relevant to the listed threatened species and communities;	Section 5.3
5 (d)	any mitigation measures proposed to be undertaken by State and local governments;	Section 5.4
5 (e)	details of ongoing management, including monitoring programs to support an adaptive management approach and determine the effectiveness of the measures proposed; and	Section 5.5
5 (f)	the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program.	Section 5.6

1.6 Residual Impacts/Proposed Offsets

Table 5: RFI - Section 6, Residual Impacts/Proposed Offsets

RFI Reference	Information Required	Location in Preliminary Documentation
<p>Describe the residual impacts on MNES that are likely to occur as a result of the proposed action in its entirety, after proposed avoidance and/or mitigation measures are taken into account. If applicable, this should include the reasons why avoidance or mitigation of impacts cannot be reasonably achieved.</p> <p>If residual impacts are likely to be significant please provide an offset package to compensate for residual impacts to MNES. This should consist of an offset proposal (Offset Strategy) and key commitments and management actions for delivering and implementing a proposed offset (i.e. an Offset Management Plan).</p> <p>Offsets must directly contribute to the ongoing viability of the species and ecological communities and deliver an overall conservation outcome that improves or maintains the viability of the protected matter, as compared to what is likely to have occurred if neither the action nor the offset had taken place. The offset proposal should demonstrate how the conservation outcome will be delivered for the protected matter.</p> <p>The proposed offset must meet the requirements of the Department’s <i>EPBC Act Environmental Offsets Policy</i> (October 2012) available at: www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy.</p> <p>The Department’s <i>Offset Assessment Guide</i> may be used as a guide to estimate the area of offset required to adequately compensate for the residual impacts of the project, it is available at: www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy.</p> <p>A project officer within the Department will assess the offset based on the information provided in the offsets proposal using the offsets assessment guide. Please note that proposals with unacceptable impacts will not necessarily be approved because offsets are provided.</p> <p>The package must include, but not be limited to, the following:</p>		
Offset Management Plan (a)	A description of the offset site(s) including location, size, condition and environmental values.	Section 6.1
Offset Management Plan (b)	Details of the surveys undertaken in accordance with the survey guidelines used to confirm the presence of the protected matter at the offset site.	Section 6.2
Offset Management Plan (c)	Details of the quality of the offset site including vegetation condition assessment (VQA) and habitat characteristics for the protected matter.	Section 6.3
Offset Management Plan (d)	Details of on-going threats to the protected matter at the offset site.	Section 6.4
Offset Management Plan (e)	A comparison of the environmental values as compared to the impact site.	Section 6.5
Offset Management Plan (f)	Justification of how the offset package meets the <i>EPBC Act Environmental Offsets Policy</i> .	Section 6.6
Offset Management Plan (g)	The specific environmental outcomes to be achieved.	Section 6.7
Offset Management Plan (h)	Details on how the offset will be secured, managed and monitored to meet these environmental outcomes, including <ul style="list-style-type: none">i. Management actions, performance targets, monitoring methodology and review criteria.ii. Responsibility and timing for implementation of actions.	Section 6.8
<p>Please note, in all cases, targets and criteria should be specific and measurable.</p> <p>Offsets required by the State can contribute to offset obligations under the EPBC Act if those offsets also meet the requirements of the <i>EPBC Act Environmental Offsets Policy</i>.</p> <p>If relevant, please provide demonstrated engagement with any third parties engaged to deliver the proposed offset (including the proposed landowner of the offset site and any entity providing a security mechanism for the offset), and confirmation that those third parties are able to deliver the aspects of the proposed offset for which they are responsible, as described in the offset management plan.</p>		

1.7 Other Approvals and Conditions

Table 6: RFI - Section 7, Other Approvals and Conditions

RFI Reference	Information Required	Location in Preliminary Documentation
The preliminary documentation must include information on any other requirements for approval or conditions that apply, or that you reasonably believe are likely to apply, to the proposed action. This must include:		
7 (a)	A description of any approval obtained or required to be obtained from a State or Commonwealth agency or authority (other than an approval under the EPBC Act), including any conditions that apply to the proposed action.	Section 7.1
7 (b)	A description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.	<p>A decision on the submitted Development Application has not yet been received. Monitoring conditions may be included as part of these approvals and are likely as part of the Environmental Authority, when issued.</p> <p>As part of the Development Application (included in the appendices), potential impacts to environmental values (air, noise, land, water waste) and mitigation strategies were assessed using a risk assessment process which is consistent with <i>AS/NZS ISO 31000:2009</i>. The risk assessment considers the scenario of the operation being undertaken with no mitigation planning, initial risk and, also with proposed mitigation planning in place, residual risk.</p> <p>All risks were reduced through the application of proposed mitigation measures. All residual risk was assessed as low accept one aspect (clearing) which was rated as medium.</p> <p>Key mitigation measures will include, planned and permitted clearing, topsoil and subsoil recovery in accordance with detailed criteria, Commonwealth and State offsets will be provided for RE 11.8.11 clearing, Waste Management Plan and Erosion and Sediment Control Plan and rehabilitation of the site to pre disturbance land use potential, appropriate chemical and hydrocarbon storage, spill clean-up, weed management and prevention and, employee education.</p> <p>Further information is provided in Section 4 of the Development Assessment Application provided in the appendices.</p>

1.8 Social and Economic

Table 7: RFI - Section 8, Social and Economic

RFI Reference	Information Required	Location in Preliminary Documentation
The proponent must provide a discussion and analysis of the social and economic impacts of the project, both positive and negative, in the preliminary documentation. Economic and social impacts should be considered at the local, regional and national levels. Matters of interest may include:		
8 (a)	details of any public consultation activities undertaken, and their outcomes;	Section 8.1
8 (b)	details of any consultation with Indigenous stakeholders;	Section 8.2
8 (c)	projected economic costs and benefits of the project (in dollars), including the basis for their estimation through cost/benefit analysis or similar studies; and	Section 8.3

RFI Reference	Information Required	Location in Preliminary Documentation
8 (d)	employment opportunities expected to be generated by the project (including construction and operational phases).	Section 8.4

1.9 Ecologically Sustainable Development (ESD)

Table 8: RFI - Section 9, Ecologically Sustainable Development (ESD)

RFI Reference	Information Required	Location in Preliminary Documentation
9 (a)	Please include a discussion of how the project will conform to the principles of ESD. To assist you, the <i>National Strategy for Ecologically Sustainable Development</i> (1992) is available at: www.environment.gov.au/about-us/esd/publications/national-esd-strategy .	Section 9

1.10 Environmental Record of Person Proposing to take the Action

Table 9: RFI - Section 10, Environmental Record of Person Proposing to take the Action

RFI Reference	Information Required	Location in Preliminary Documentation
Please provide the following information <u>if updated</u> from that provided with the referral document, details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:		
10 (a)	The person proposing to take the action.	The information provided as part of the EPBC referral has not been updated and is reproduced in Section 10.
10 (b)	For an action for which a person has applied for a permit, the person making the application.	
10 (c)	If the person proposing to take the action is a corporation, details of the corporation's environmental policy and planning framework must also be included.	

1.11 Conclusion

Table 10: RFI - Section 11, Conclusion

RFI Reference	Information Required	Location in Preliminary Documentation
11 (a)	The preliminary documentation must provide an overall conclusion as to the environmental acceptability of the proposal, including discussion on compliance with the principles of Ecologically Sustainable Development (ESD) and the objects and requirements of the EPBC Act. To assist you, the <i>National Strategy for Ecologically Sustainable Development</i> (1992) is available on the following web site: https://www.environment.gov.au/about-us/esd/publications/national-esd-strategy .	Section 11

RFI Reference	Information Required	Location in Preliminary Documentation
11 (b)	You may wish to include a statement as to whether or not the controlled action should be approved and may recommend conditions pertaining to an approval. This should include justification for undertaking the proposed action in the manner proposed. The measures proposed or required by way of offset for any unavoidable impacts on MNES and the relative degree of compensation, should be restated here.	Section 11

2 Description of the Action

2.1 Location

The Project site is in Central Queensland approximately 240 km southwest of Rockhampton and 21 km west northwest of the Rolleston township (**Figure 1**). The Project site is within the Central Highlands Regional Council (CHRC) Local Government Area. Emerald is the nearest major centre, approximately 100 km north of the Project site. Land use in the area of the Project is dominated by agricultural and coal mining activities. The proposed load out facility is located immediately to the north of the Dawson Highway crossing of the Blackwater Rail system approximately 8.5 km to the north northeast of the MDS Mine Industrial Area (located on ML70452) (**Figure 2**).

The property on which the project will be located is freehold title (Lot 56 on DSN808) and is currently utilised as a grazing property. The project is considered an impact assessable development. A Development Application was lodged with the CHRC and approved (Appendix D) with regard to the following applications:

- Material Change of Use (MCU);
- Reconfiguration of a Lot (RoL);
- Environmentally Relevant Activity (ERA) 50 (1)(a) and (b)-Bulk material handling; and
- Operational Works.

2.2 Components of proposed action

Meteor Downs South Mine (MDS) is an open-cut coal mine situated on Mining Lease (ML) 70452, approximately 25 km west of Rolleston in central Queensland. Operated as a joint venture between Sojitz Coal Mining Pty Ltd and Endocoal Limited, the mine is authorised to produce 2 million tonnes per annum of coal.

Coal from MDS is currently transported along public roads approximately 80 km, through the Springsure township, to the Minerva Mine where it is loaded onto trains and transported to Gladstone for export. The new rail loop is located approximately 3 km from the MDS access road intersection with the Dawson Highway and will significantly reduce road train movements on Dawson Highway from MDS to Minerva (**Figure 3**).

Construction of the Project will commence in late 2019 following the receipt of the necessary approvals and is scheduled to take six to nine months. The life of the operating phase is estimated at ten years which may be extended if an alternate use of the facility exists once mining at MDS is completed. If there is no alternate use of the facility, it will be decommissioned and rehabilitated.

The main construction features (**Figure 4**) are:

- A rail loop constructed off the existing Blackwater rail system. The loop will accommodate trains with approximately 100 wagons and a nominal length of 1.7 km. Approximately four (4) trains per week will be loaded at the facility. Based on an approximate loading rate of 1,600 t per hour, loading will take in the order of five hours;
- A stockpile pad of approximately 3.5 ha with a storage capacity of 110,000 m³ and train loading facilities;
- Buildings including an office, crib room, control room and ablutions block (temporary demountable style structures);

- General cut to fill and borrow areas totalling approximately 102,000 m³.

Other key construction features are; a purpose-built dual carriage access road off the Dawson Highway; a workshop; sediment dam; industrial area for power generators (diesel), water storage tanks, fire suppression equipment and a car park.

2.3 Disturbance footprint

The area of disturbance from the development within the project boundary will be approximately 74.3 ha (**Table 11** and **Figure 5**). Disturbance within the material borrow area is not likely to disturb the entire area but has been included in the total calculation in case unsuitable borrow material is encountered.

Minor disturbance within the road and rail corridors outside the project boundary will also be required to construct the Dawson Highway access road intersection and the rail offtake for the balloon loop. Approximately 2.7 ha of disturbance will occur outside the project boundary.

Table 11: Project Disturbance

Disturbance type	Area (ha)
Within Project Boundary	
Project infrastructure	31.5
Material Borrow area	42.8
Sub- Total	74.3
Outside Project Boundary	
Intersection with Dawson Highway	1.3
Rail Spur	1.4
Sub- Total	2.7
Total	77.0

King Bluegrass and natural grasslands occur adjacent to the rail loop. Indirect impacts to these matters include invasive species (weeds and pest animals), dust and fire. Monitoring activities to avoid, minimise and manage these potential risks include:

- General site inspections
- Habitat quality assessments and photographic monitoring
- Targeted surveys for King Bluegrass
- Weed monitoring
- Biomass monitoring
- Dust deposition monitoring
- Rehabilitation monitoring

Further details on avoiding, minimising and managing these potential impacts can be found in the Rail Loop MNESMP.

2.4 Operational requirements of proposed action

2.4.1 Site access

Access to site will be via a purpose built intersection off the Dawson Highway. The intersection and associated road will be constructed using conventional civil engineering construction methods and will be surfaced with road base pavement material. The access road will be dual carriageway to ensure the safe passing for trucks entering and exiting the site. A “Rumble Grid” will be included within the exit lane of the access road to aid in removal of any fugitive dust from trucks before returning to the mine site.

Construction of the access road will involve clearing of vegetation and topsoil stripping (and subsoil where available) and adjacent stockpiling for re-use in rehabilitation. The surface grade will be achieved using surface grading, cut and fill and placement of general fill from the borrow area as required. Pavement sub-base will be placed and compacted and finally road base material will be placed and compacted to form the running surface. Drainage from the road will be allowed to dissipate in the adjacent pasture or captured in adjacent grassed table drains and directed via culverts to either local streams or the Sediment Dam.

A farm gate installation will be included at the entrance adjacent to the Dawson Highway to restrict access to the site. The operational areas of the new lot on which the site is located will be fenced to exclude cattle using existing fencing on the southern and eastern boundaries where applicable and new four strand wire and star picket configuration fencing will be installed on the northern and western sections of the site.

The access road and general site speed limit will be generally 40 km per hour throughout construction and operations subject to conditions.

2.4.2 Rail loop

The rail loop will be constructed off the existing Blackwater rail system. The loop is designed for coal trains locomotives with around 100 wagons and a nominal length of 1.7 km to be accommodated within the loop to ensure through rail traffic is not impeded. Trains will have a nominal capacity of 8,250 t and approximately four (4) trains per week will be loaded at the facility. Based on an approximate loading rate of 1,600 t per hour, loading will take in the order of five hours. An inspection access track is proposed on the inside of the balloon and the northern side of the line between the balloon loop and the Blackwater line.

Construction of the rail loop will involve clearing of vegetation, topsoil and subsoil stripping and adjacent stockpiling for re-use in rehabilitation. The surface grade will be achieved using surface grading, cut and fill and placement of general fill from the borrow pits to ensure appropriate track grade is maintained. Geotextile will be placed where necessary and fill will be placed and compacted and ballast material imported from a quarry will be placed and consolidated prior to installation of concrete sleepers and rail track. Construction of the rail line will conform with the requirements of the Aurizon earthworks specifications.

2.4.3 Product coal stockpile and train loading facilities

The coal stockpile pad will be approximately 3.5 hectares having a storage capacity of 110,000 m³ of coal. Pad construction will involve clearing of vegetation, topsoil and subsoil stripping (and parent material if necessary) and adjacent stockpiling for re-use in rehabilitation. The surface grade will be achieved using surface grading, cut and fill and placement of general fill from the borrow pits. Pavement materials will be placed and compacted (including increased thickness at the train loading area). Approximately 500 mm of coal will be maintained beneath the active stockpile to ensure the pad base remains uncompromised. Runoff from the coal stockpile area will be directed to a sediment dam for containment onsite. The coal delivered to the stockpile will typically have an inherent moisture content of 5 to 10 % (subject to climatic conditions). The stockpile area will be watered for dust suppression as required which will generally be during delivery and dispatch (train loading) activities.

Product coal will be loaded to the trains using up to three wheel loaders (nominally Caterpillar 992 or equivalent). The loading facilities will include a weighbridge installed within the rail loop to reconcile the quantity of coal loaded to each wagon. Consistent with industry best practice a coal veneering (chemical sealing) unit will be included at the loading facilities and loaded wagons will be veneered prior to exit to aid in dust control along the route to the port facilities.

Runoff from the coal stockpile and train loading facility area (including the weighbridge and veneering pad) will be directed to the Sediment Dam (see **Figure 4**).

2.4.4 Buildings

Buildings on site will include:

- Office;
- Workshop and stores;
- Control Room;
- Ablutions Block; and
- Crib Room.

The Office, Crib Room, Control Room and Ablutions Block will be demountable style structures. The Workshop will be an igloo style structure supported by sea containers on either side similar to field workshop installations throughout the area. The buildings will primarily be located in the industrial area with the exception of the rail loading control room which will be located adjacent to the coal Veneering Plant.

2.4.5 Water Supply and Distribution

Raw water will be supplied to the site via one or both of the following solutions:

- Piped from the MDS Mine, which is authorised under the existing approvals; and/ or
- Sourced from landholder water supply bores under an authorised allocation.

Raw water will be stored in two 250,000 L raw water tanks which will be constructed on site. An annual site demand in the order of 20 to 30 mega litres (ML) is expected.

Water from the raw water tanks will be reticulated to building water supply, ablution facilities, Workshop, water truck fill point, miscellaneous taps throughout the operational area and the veneering system.

Potable water will be trucked to the site and stored in tanks located in the industrial area from where it will be reticulated to the offices, crib rooms, workshop and ablution facilities.

2.4.6 Industrial Area

The IA will be located to the south of the coal stockpile area and will be constructed as a hard stand using similar methods as beneath the coal stockpile (excluding the 500 mm coal layer) further described in **section 2.4.3**. The IA will contain key site infrastructure as described in the sections below.

2.4.6.1 Power supply generator and switchboard

The main power supply will be via by a 250 KW (nominal) diesel powered generator located in the IA. A switch board will be located adjacent to the generator to distribute power to the buildings and Workshop and pump out septic tank. A second generator (nominally 63 KW) and switchboard will be located in the rail load out area to supply rail loading infrastructure. Distribution of power will be via conventional pole and wire systems.

2.4.6.2 Potable water tanks

A potable water tank discussed in **section 2.4.5** will be located within the IA. The tank will be pre-formed fit for purpose commercially available poly tank and will be ground mounted.

2.4.6.3 Raw water tanks

The two 250,000 L raw water tanks discussed in **section 2.4.5** will be located within the IA. The tanks will be commercially available build on site panel tanks and will be ground mounted.

2.4.6.4 Fire suppression system

Fire suppression infrastructure includes distribution pumps and pipework. Pumps will be located adjacent to the raw water tanks.

2.4.6.5 Car parks

The main site car park will cater for employees and visitors and this will be located outside the secured operation area to the southwest of the office and crib huts (which are located within the secured operational area). A second car park is to be located immediately to the west of the office and crib huts within the secured operational area. The car parks design will comply with AO4.2 of the CHRC Industrial Uses Code.

2.4.6.6 Truck manoeuvring and parking areas

Manoeuvring and standing areas are to be provided outside the secured area to enable deliveries and truck turn around. Within the secured operational area open spaces within the IA provide for the required manoeuvring, parking and inspection.

2.4.6.7 Sewage

The ablution facilities to be provided on site will direct untreated sewage to a septic tank for appropriate containment. The untreated sewage will be removed as required by a licenced waste contractor and disposed of at one of the municipal Sewage Treatment Plants in consultation with the CHRC.

2.4.6.8 Workshop, tyre change and stores

See **section 2.4.4**. The workshop will cater for service and repair of the loader and trucks. Tyre changing capabilities will also be incorporated into the workshop. Stores of consumables for the workshop and broader site will be retained in the workshop area.

The workshop will have a concrete floor and aprons and drainage from within the workshop will be directed to a central drain which will discharge to a coarse sediment pit. Workshop water will be recovered from the sediment pit and processed by the oily water separator located adjacent to it. Waste from the oil water separator will be recovered to an adjacent staging tank for collection and licenced transport offsite for disposal by a licenced contractor.

2.4.6.9 Sediment Dam

The IA will be graded to the north to ensure runoff reports to the Sediment Dam. The Sediment Dam will also receive runoff from the Coal Stockpile and Loading Pad, the Sediment Dam will have sufficient storage capacity to contain a 1% Annual Exceedance Probability (AEP) event.

2.4.6.10 Hydrocarbon and chemical storage tanks

Hydrocarbons and chemicals will be limited to diesel for truck and loader refuelling, hydraulic and engine oils for trucks and loader, waste oil and the coal veneering product. **Table 12** shows the materials, quantities and storage methods. The diesel tank will be a commercially available self-bunded (Transtank or similar) and will be compliant with *AS1940:2017: The storage and handling of flammable and combustible liquids* (AS1940). Oils will be stored in minor quantities (as defined in AS1940) and will managed in accordance with Section 2 of AS1940. The coal veneering product is non-solvent, biodegradable, non-hazardous and not flammable or combustible and will be stored adjacent to the veneering plant in as supplied bulk containers.

Table 12: Hydrocarbons and chemicals to be stored onsite

Material	Nominated Quantity (L)	Storage Method
Diesel	55,000	Self bunded tank
Hydraulic oil and Engine oil	≤ 1,000	Original commercial packaging
Waste Oil	≤ 3,000 (assumed)	Intermediate Bulk containers (IBCs)
Coal Veneer (APPLIED A3152C)	≤ 3,000	IBCs

The refuelling bay will be a concrete pad located adjacent to the workshop and will drain to the coarse sediment pit for treatment by the oil water separator (see **section 2.4.6.8**).

2.4.7 General cut and fill material and borrow areas

Material cut and fill will be required to achieve the grade for location and drainage of infrastructure. Cut and fill quantities have been estimated to total approximately 102,000 m³.

A borrow area is planned for excavation of foundation materials required for the Project facilities. This borrow area was identified through a material sampling and geotechnical analysis program and is located within the disturbance footprint, **Figure 4**. Approximately, 35,000 m³ of material is expected to be required additional to the material won from cuttings.

Material will be excavated as required for use as general fill in foundations of the infrastructure including, the rail loop, access road, stockpile, industrial area and building footings. Unsuitable material excavated from the infrastructure footprint will be temporarily stockpiled for backfilling to the borrow pits as excavation from them is completed.

Materials to be excavated will be free dug and no blasting will be undertaken during construction.

2.4.8 Other materials for construction

In addition to the general fill materials sourced from the on-site borrow pits, pavement sub-base, pavement base, rock rip rap and gabion material for drainage features will be required. These materials will be sourced from an off-site quarry and crushed and screened to the required sizing specifications for the intended uses for trucking to site.

Ballast for the rail loop will be imported from an offsite quarry and is expected to be transported by ballast train to site. Approximately 8,500m³ of ballast is expected to be required.

2.5 Land use

The property on which the project will be located is freehold title (**Figure 6**) and is currently utilised as a grazing property. The area surrounding the project site is zoned as Rural under the CHRC Planning Scheme. The aesthetic value of the area is subsequently characterised by clear open spaces and agricultural activities intersected by watercourses (Aldebaran Creek and Meteor Creek) and isolated areas of remnant vegetation typically associated with watercourses throughout the landscape.

The project site and lands surrounding have been extensively grazed since 1850. Much of the area experienced extensive clearing in the 1960s and in recent decades has been used for grazing on native vegetation, with some dryland cropping and minor forestry. Current land uses are pastoral, open cut coal mining and a number of conservation tenures (Albina National Park, Conservation Park and Resources Reserve; Mount Hope, Mount Pleasant and Cairdbeign State Forests; Carnarvon National Park).

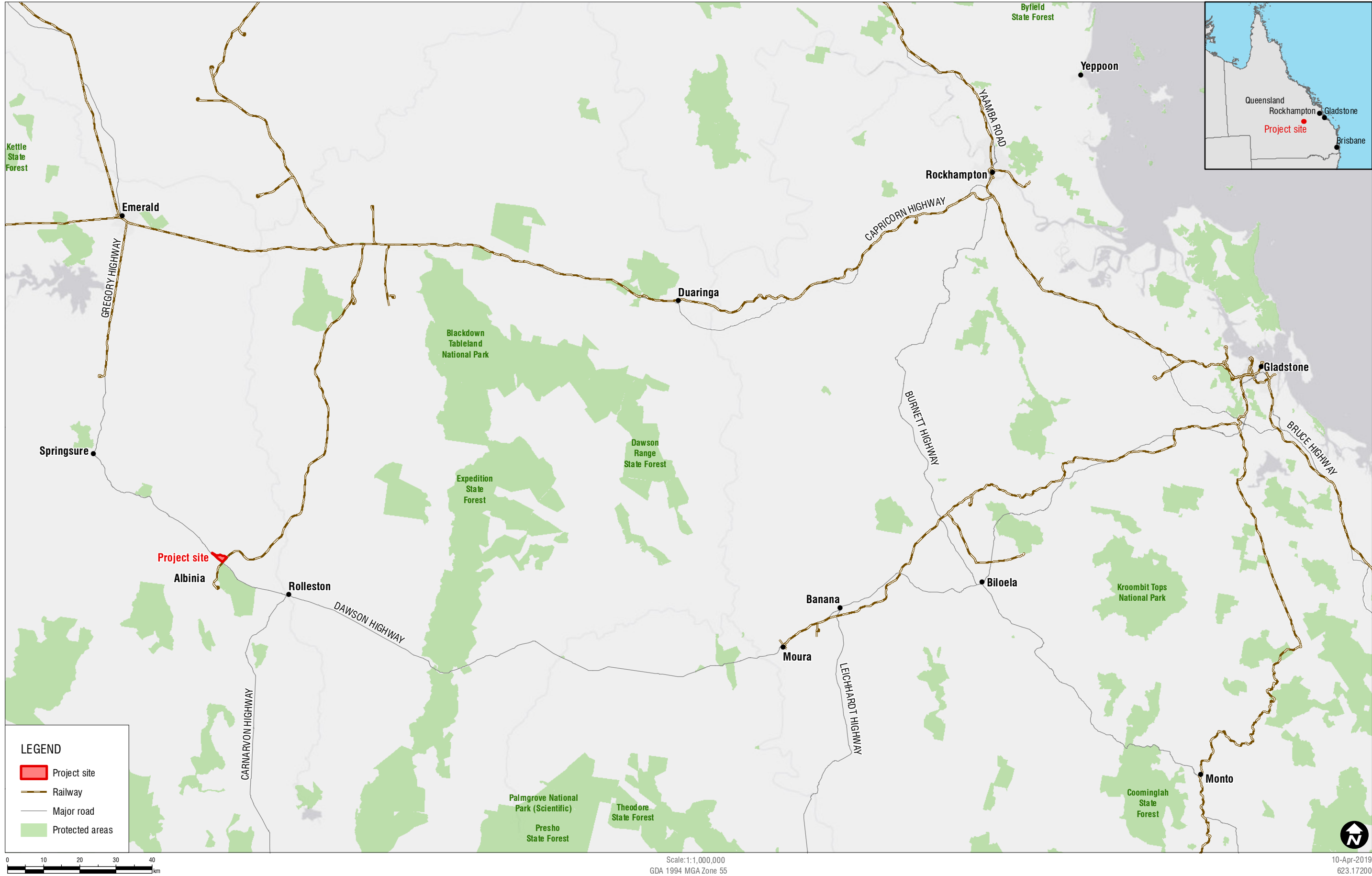
The northern portion of the study area has been planted with the fodder crop *Leucaena leucocephala* (Leucaena). Aerial Raster imagery accessed via QImagery identified that this area was initially cultivated prior to January 1962 (57 years before present), with evidence of Leucaena cultivation on site as early as June 1969 and development of swales prior to July 1983. Aerial imagery indicates ongoing management of the Leucaena planting area until April 1993; no further evidence of cultivation in the last 26 years was obtained.

2.6 Mapping of project site and layout

The following figures of the project site and layout are presented in this section.

- **Figure 1:** Project Location
- **Figure 2:** Regional Location
- **Figure 3:** Project Overview

- **Figure 4:** Project Layout
- **Figure 5:** Disturbance Plan
- **Figure 6:** Tenure

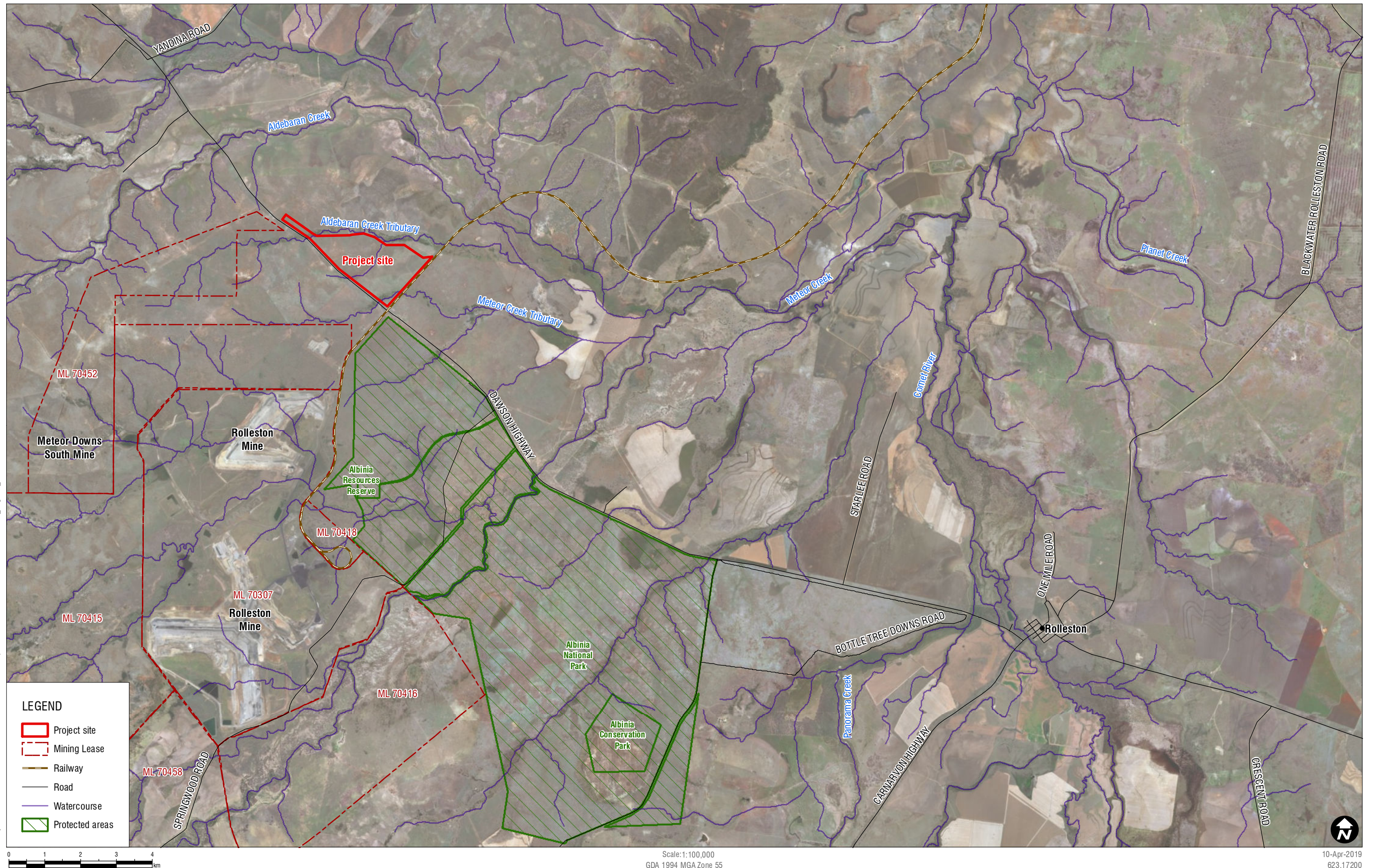


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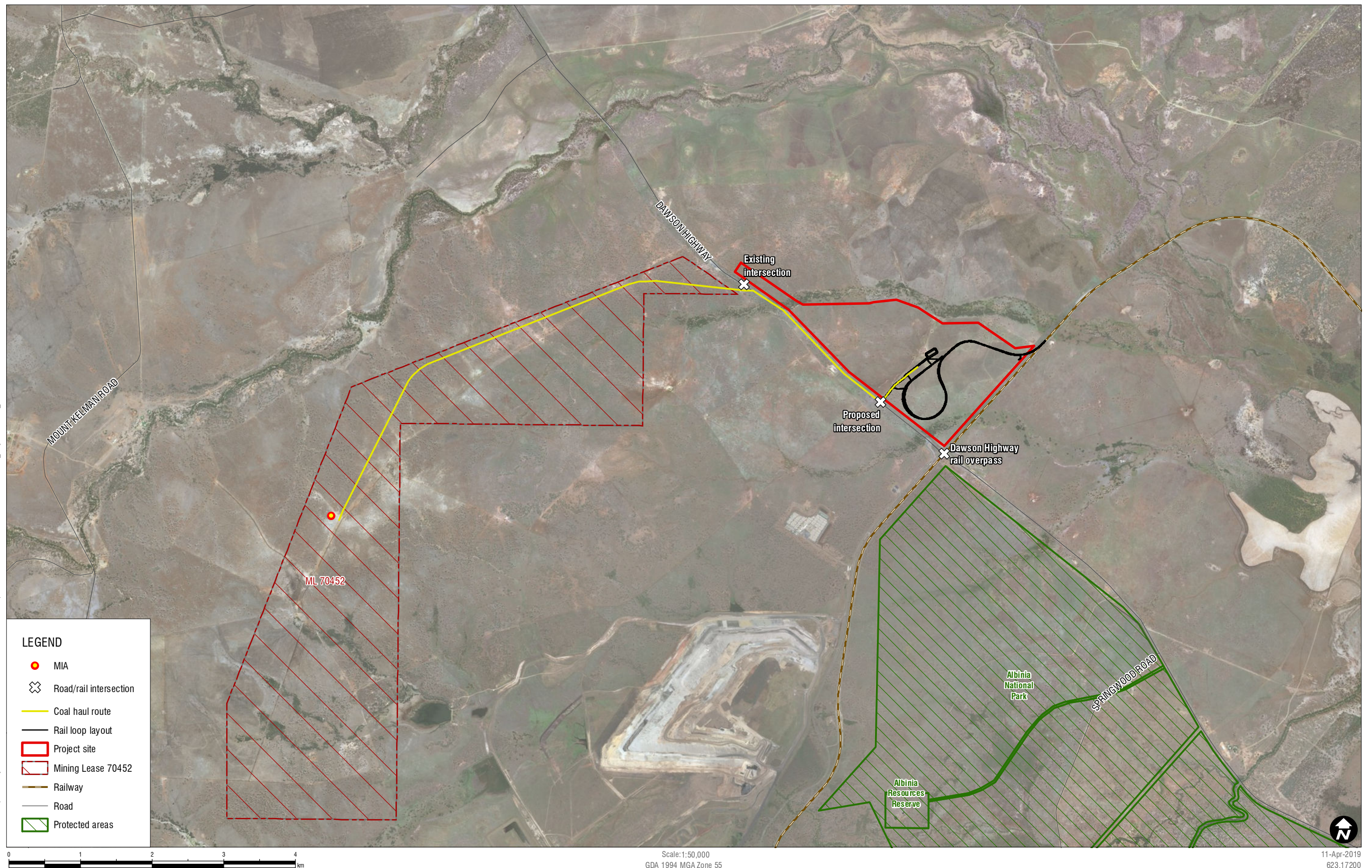
Project Location

FIGURE 1

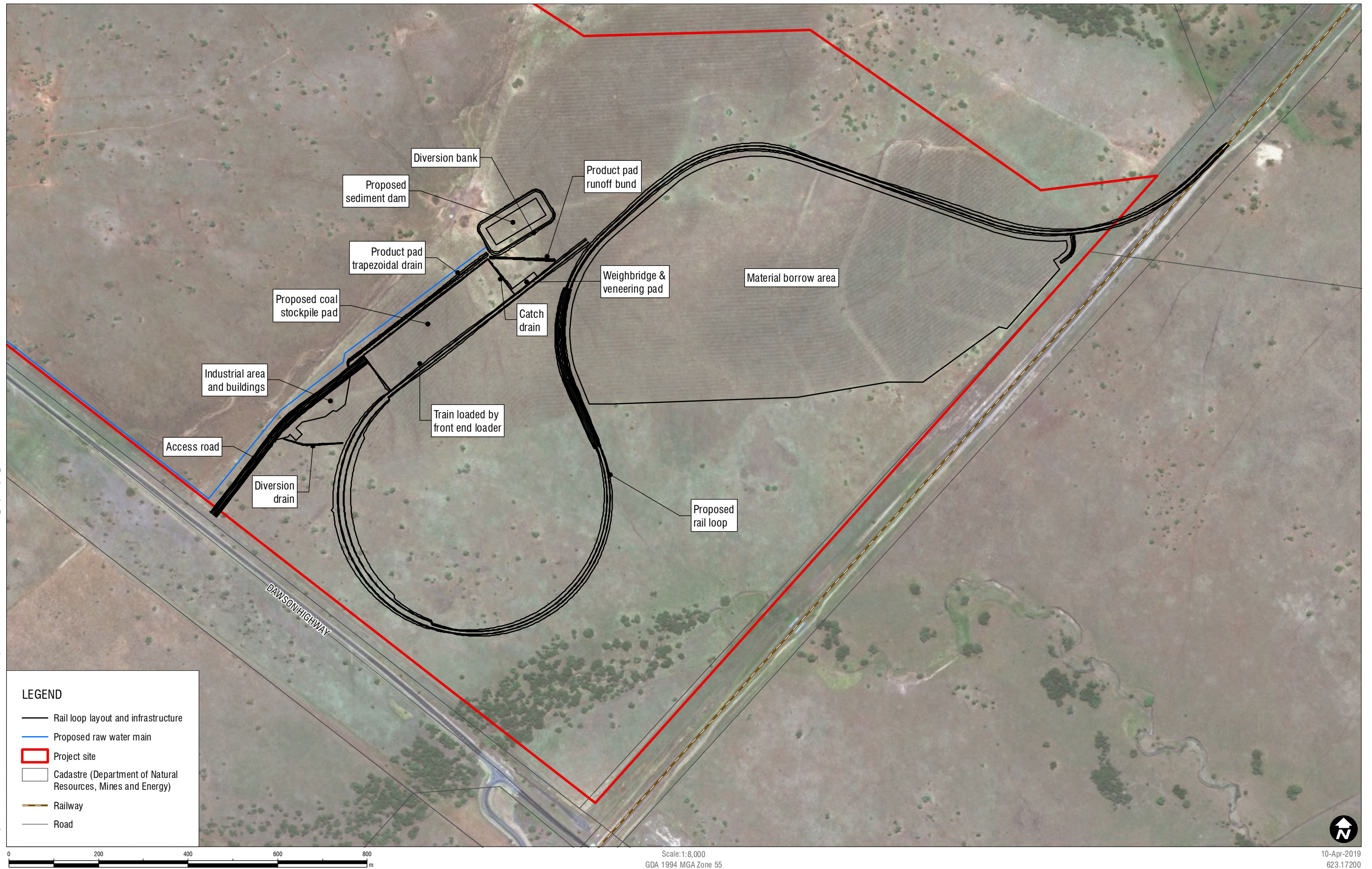
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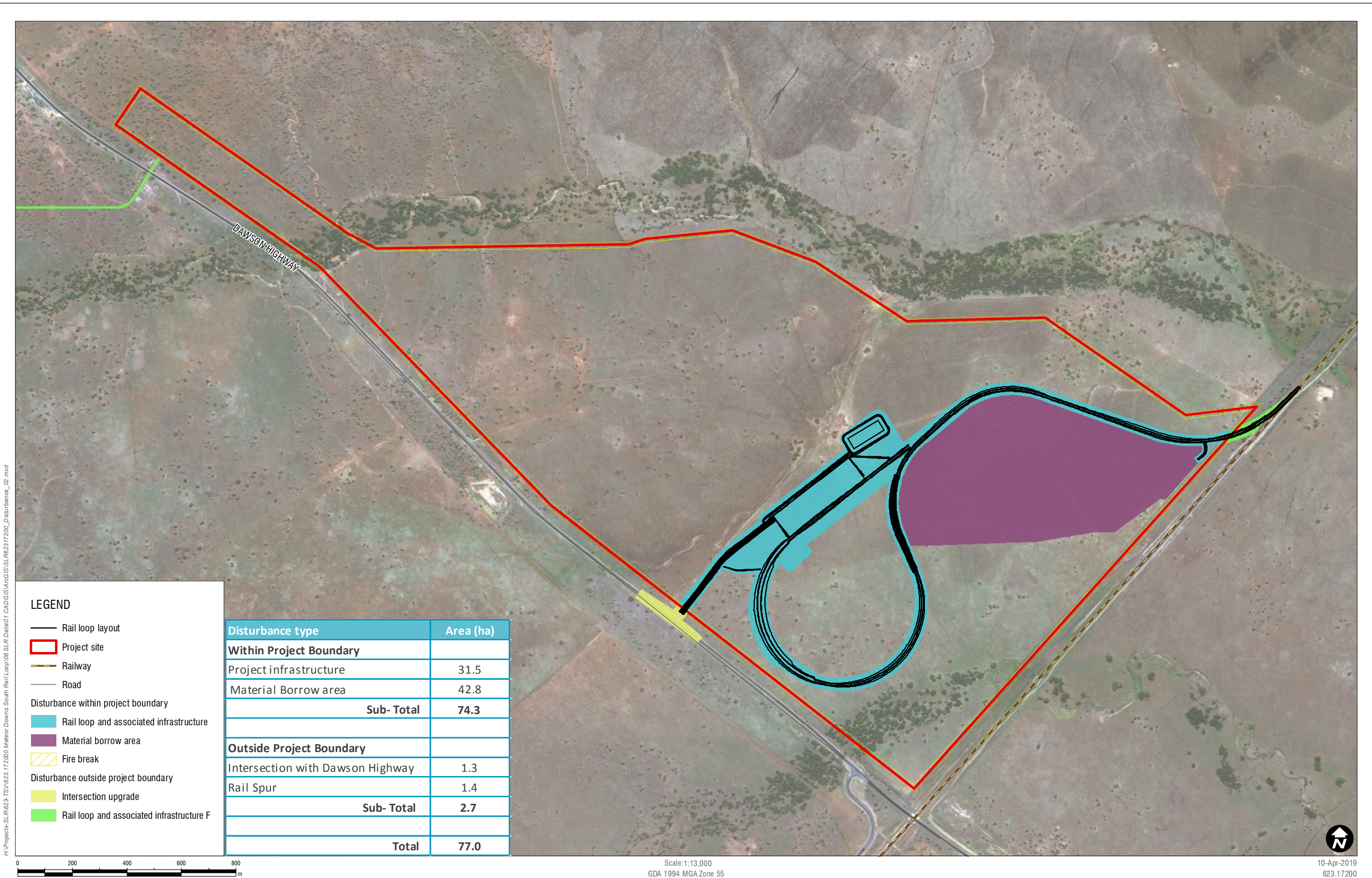


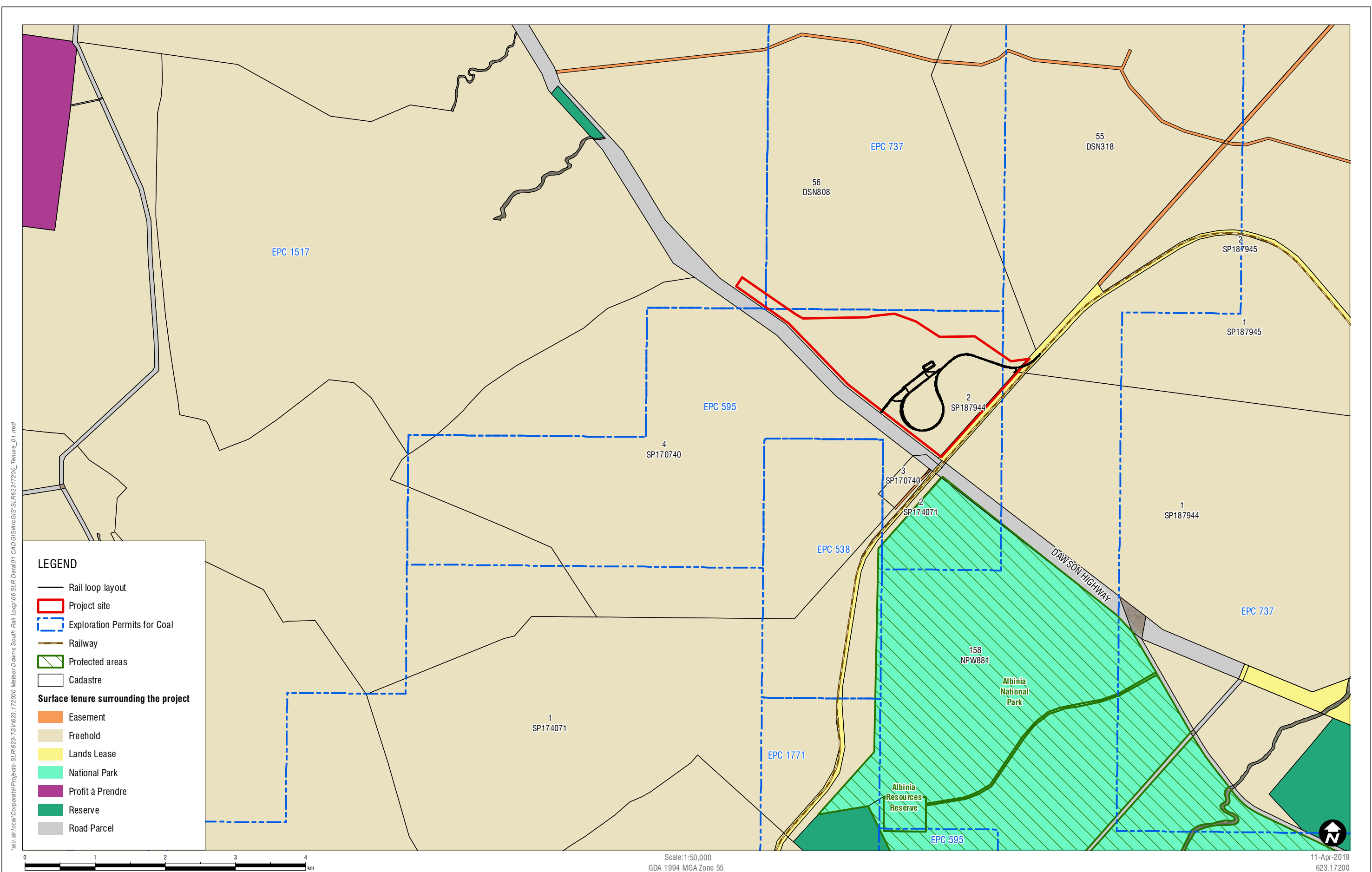
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3 Description of the Environment and Matters of National Environmental Significance

3.1 Desktop Assessment

3.1.1 Previous Surveys

Ecological assessments were undertaken at nearby Meteor Downs South Coal Project, located 2.6 km south west of the current survey area. An EPBC referral (EPBC 2013/6799) was submitted, and subsequently approved with conditions for disturbance to Threatened Ecological Communities (TECs) and species that are MNES listed in **Table 13** below.

Table 13: MNES Identified at Meteor Downs South Coal Project

MNES	Status at Meteor Downs
Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant) TEC	Represented by a patch of 2.21 ha or regrowth of RE 11.4.3 close to Naroo Dam. The area will not be disturbed.
Natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin (Natural Grasslands TEC)	Represented by an area of 424 ha of RE 11.8.11, occurring in multiple patches of varying size. The nearest mapped area is 2.11 km west of the rail loop study site. Assessments found patches were in good to best condition. The project will require clearing 98.9 ha.
King Blue-grass (<i>Dichanthium queenslandicum</i>)	A survey in December 2013 identified approximately 40 plants within a 25 m ² area, south of Naroo Dam, in association with RE 11.8.11. An additional survey in 2014 expanded that population to include 520 plants within an area of 1,303.6 m ² , and an additional group of 30 plants located 27 metres (m) further to the west. All individuals are associated with RE 11.8.11, and it was assumed that additional plants occur within the broader 424 ha of this community.
Bluegrass <i>Dichanthium setosum</i>	A survey in December 2013 identified five plants adjacent to Naroo Dam, in RE 11.8.11. Naroo Dam is located 7.23 km from the study area. Although no individuals have been found in subsequent surveys, it is assumed that additional plants occur within the broader 424 ha of RE 11.8.11 on site.
Squatter Pigeon (<i>Geophaps scripta scripta</i>)	Although habitat is present (RE 11.8.5 and RE 11.8.15), the Squatter Pigeon <i>Geophaps scripta scripta</i> has not been recorded from the Project site or surrounds, with the nearest record from 4 km to the south-east of the Project site. Potential suitable habitat is mapped to the margins of the Dawson Highway, to a point approximately 600 m from the study area. A pre-clearance survey for squatter pigeons was undertaken in 2017 in accordance with the survey guidelines for EPBC listed threatened bird species (DEWHA, 2010). No birds were detected (NRC, 2017).
Australian Painted Snipe (<i>Rostratula australis</i>)	Two Australian Painted Snipe <i>Rostratula australis</i> were located at Naroo Dam on November 2012 but have not been observed since. Naroo Dam is located 7.23 km from the study area. These ephemeral drainage lines were considered to provide potential seasonal habitat following periods of inundation.

Source CO2 Australia (2018a)

Meteor Downs South Coal Project subsequently prepared a 'Matters of National Environmental Significance Management Plan' (CO2 Australia, 2018a), which was approved by DEE on 18 January 2018. In addition, an offset site was established on the nearby on the Lexington property to provide 324 ha of Squatter Pigeon *Geophaps scripta scripta* habitat and 249 ha of Natural Grasslands TEC, 280ha of habitat for King Blue-grass *Dichanthium queenslandicum* and 241ha of Bluegrass *D. setosum* habitat (CO2 Australia, 2017).

Studies conducted on the nearby Rolleston Coal Mine have previously been undertaken prior to lodgement of EPBC referral 2011/5965 and subsequent variation by Glencore Coal Queensland Pty Ltd. This includes areas to the immediate west and south of the Meteor Downs South Coal project area. The referral was assessed as being a controlled action for impacts to the Natural Grasslands TEC and small areas of Brigalow TEC. Following the lodgement of the EPBC referral, an EIS was undertaken on site which identified a loss of 118 ha of the Natural Grasslands TEC and 8.6 ha of Brigalow TEC (Coordinator General 2003).

The 7,360 ha Albinia National Park (Albinia NP) is located to the immediately south of the proposed rail siding. The park is described as having the largest and most intact representation of natural grassland TEC (RE 11.8.11) in the Brigalow Belt on QPWS estate (Department of National Parks, Recreation, Sport and Racing, 2013). Albinia NP is also described as containing the following threatened and near-threatened flora and fauna species:

- *Dichanthium queenslandicum* (listed as 'Vulnerable' under the NC Act and EPBC Act).
- *Dichanthium setosum* (listed as 'Vulnerable' under the EPBC Act).
- *Digitaria porrecta* (listed as 'Near-threatened' under the NC Act and 'Endangered' under the EPBC Act).
- *Marsdenia brevifolia* (listed as 'Vulnerable' under both the NC Act and EPBC Act).
- Squatter Pigeon *Geophaps scripta scripta* (listed as 'Vulnerable' NC Act, EPBC Act).
- Koala *Phascolarctos cinereus* (listed as 'Vulnerable' under the NC Act, EPBC Act).
- Australian Painted Snipe *Rostratula australis* (listed as 'Vulnerable' under the NC Act, and as 'Endangered' under the EPBC Act).

Ten bird species listed as 'Migratory' under the EPBC Act are listed for Albinia NP (DNPRSR, 2013).

3.1.2 Database Searches

The EPBC Act Protected Matters Report (DEE, 2018) and Wildlife Online (WO) database extract (DES, 2019c) incorporating a 30 km buffer around the study area are included in Appendix H and Appendix I. The WO database extract and Protected Matters Report identified five threatened flora species, 18 threatened fauna species and nine migratory fauna species as potentially occurring within the study area. The Vegetation Management Supporting Map (DNRME, 2018) identified two REs including one TEC as occurring within the site boundaries.

3.1.3 Threatened Species

3.1.3.1 Flora

Five EVNT flora species were identified in the database searches as potentially occurring within 30 km of the site. This included five species predicted by the EPBC Act Protected Matters Report (DEE, 2018) and the Queensland Government WO database extract (DES, 2019c). The results of these searches have been combined in **Table 14** to show all EVNT flora species recorded from the database searches and their status under State and Commonwealth legislation.

Table 14: Threatened Flora Identified from Database Searches

NC Act Status	EPBC Act Status	Species Name	Common Name
Vulnerable	Vulnerable	<i>Marsdenia brevifolia</i>	Shrubby Bush Pear
Vulnerable	Vulnerable	<i>Aristida annua</i>	-
Vulnerable	Endangered	<i>Dichanthium queenslandicum</i>	King Blue-grass
Least Concern	Vulnerable	<i>Dichanthium setosum</i>	Bluegrass
Vulnerable	Vulnerable	<i>Cadellia pentastylis</i>	Ooline

3.1.3.2 Fauna

A total of 18 threatened fauna species were returned from the database searches of a 30 km radius surrounding the study area. The results of these searches have been combined in **Table 15**.

Table 15: Threatened Fauna Identified from Database Searches

NC Act Status	EPBC Act Status	Scientific Name	Common Name
Endangered	Vulnerable	<i>Erythrotriorchis radiatus</i>	Red Goshawk
Vulnerable	Vulnerable	<i>Geophaps scripta scripta</i>	Squatter Pigeon (Southern)
Endangered	Endangered	<i>Neochmia ruficauda ruficauda</i>	Star Finch (Southern)
Endangered	Endangered	<i>Poephila cincta cincta</i>	Southern Black-throated Finch
Vulnerable	Vulnerable	<i>Grantiella picta</i>	Painted Honeyeater
Vulnerable	Endangered	<i>Rostratula australis</i>	Australian Painted Snipe
Endangered	Critically Endangered and Migratory	<i>Calidris ferruginea</i>	Curlew Sandpiper
Least Concern	Endangered	<i>Dasyurus hallucatus</i>	Northern Quoll
Endangered	Vulnerable	<i>Macroderma gigas</i>	Ghost Bat
Vulnerable	Vulnerable	<i>Phascogale cinerea</i>	Koala
Vulnerable	Vulnerable	<i>Petauroides volans volans</i>	Southern Greater Glider
Vulnerable	Vulnerable	<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat
Vulnerable	Vulnerable	<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat
Endangered	Critically Endangered	<i>Elseya albagula</i>	Southern Snapping Turtle
Vulnerable	Vulnerable	<i>Rheodytes leukops</i>	Fitzroy River Turtle
Vulnerable	Vulnerable	<i>Denisonia maculata</i>	Ornamental Snake
Vulnerable	Vulnerable	<i>Delma torquata</i>	Collared Delma
Vulnerable	Vulnerable	<i>Egernia rugosa</i>	Yakka Skink

3.1.4 Migratory Species

The EPBC Protected Matters Search Report (DEE, 2018) identified nine migratory species as potentially occurring within 30 km of the study area. The results of this search are included in **Table 16**.

Table 16: Migratory Species from the Protected Matters Report

NC Act Status	EPBC Act Status	Scientific Name	Common Name
Special Least Concern	Migratory	<i>Apus pacificus</i>	Fork-tailed Swift
Special Least Concern	Migratory	<i>Cuculus optatus</i>	Oriental Cuckoo
Special Least Concern	Migratory	<i>Myiagra cyanoleuca</i>	Satin Flycatcher
Special Least Concern	Migratory	<i>Motacilla flava</i>	Yellow Wagtail
Special Least Concern	Migratory	<i>Actitis hypoleucos</i>	Common Sandpiper
Special Least Concern	Migratory	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper
Endangered	Critically Endangered and Migratory	<i>Calidris ferruginea</i>	Curlew Sandpiper
Special Least Concern	Migratory	<i>Calidris melanotos</i>	Pectoral Sandpiper
Special Least Concern	Migratory	<i>Gallinago hardwickii</i>	Latham's Snipe

3.1.5 Threatened Ecological Communities

One of the REs identified (RE 11.8.11) in database searches equates to the EPBC-listed Natural Grasslands TEC. In total, three TECs were identified in the Protected Matters Report (DEE, 2018) as potentially occurring within the study area or within a 30 km radius. Identified TECs include:

- Natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin Threatened Ecological Community
- Brigalow (*Acacia harpophylla* dominant and co-dominant) Threatened Ecological Community
- Weeping Myall Woodlands Threatened Ecological Community

3.2 Flora and Fauna Surveys

The fauna surveys incorporated survey timing and effort recommendations outlined in the *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (Eyre *et al.*, 2018). The study area for the flora and fauna surveys is approximately 470ha and consisted of the proposed impact area of the rail loop and a large buffer zone surrounding it. The western side of the study area is bounded by the Dawson Hwy, the eastern side by the existing Blackwater System railway line and the northern side by an un-named tributary of Aldebaran Creek.

3.2.1 Timing and Survey Effort

3.2.1.1 Timing and Climate

Baseline habitat assessments for MNES were undertaken at the proposed rail loop on 14 - 19 May 2018 and 5 - 10 November 2018 which coincided respectively with the autumn and spring / early summer survey periods as recommended in the *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (Eyre *et al.*, 2018) for the Brigalow Belt bioregion. An additional survey on 25 February - 2 March 2019 aimed to obtain greater detail of threatened communities and grassland species within the proposed development area. However, conditions were too dry for effective surveys of the grassland vegetation, so additional surveys were undertaken in 4 - 7 June and 3 - 4 July 2019 when suitable conditions prevailed.

Optimal timing for surveys of the grassland TEC and threatened grass species are after the wet season when grasses are fully developed and seeding for positive identification. It is noted that in poor seasons, such as hot summers or drought, only desiccated and heavily cropped tussocks lacking fertile material may remain that are difficult to identify. Surveys should be conducted during a good season approximately two months after the cessation of disturbance and within two months of effective rainfall (TSSC, 2009). SLR conducted targeted field surveys for the native grassland TEC and *Dichanthium queenslandicum* between 4 - 7 June and 3 - 4 July 2019.

The nearest weather records were obtained from Rolleston airport (weather station 035129), located 20.5km southwest of the study area. Albinia Downs (weather station 035209), located 5.84km southwest of the study area ceased rainfall records in 2012. Rolleston experienced 153.8mm of rainfall for the 2018/2019 wet season (Nov-March) which is below the historical average of 386.7mm (Figure 1; BOM, 2019). Rainfall in November and December 2018 were below average. In contrast to average of 173.5mm for February- February, January and February 2019 received no rain at all. March 2019 recorded 118.4mm, which was significantly higher than the March average rainfall of 80.18mm (Figure 1; BOM, 2019). This high rainfall, and subsequent rainfall in April-June allowed for positive identification of grasses well into the dry season.

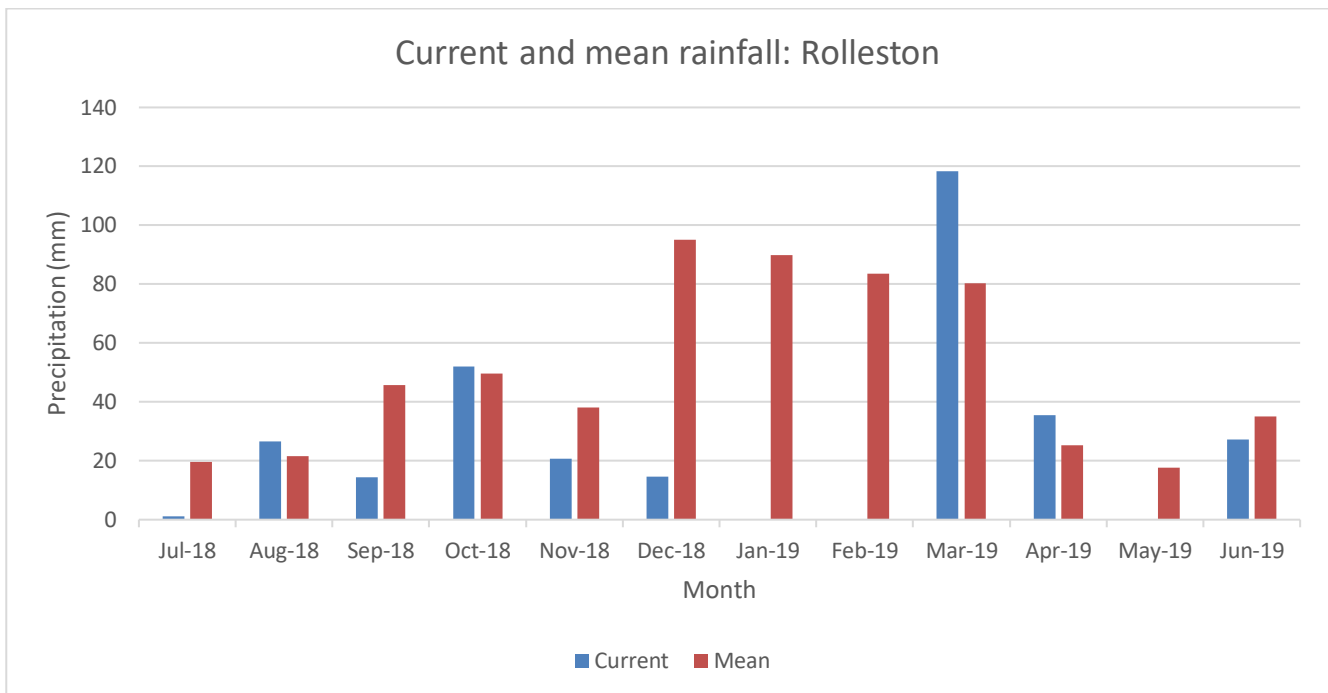


Figure 7: Current rainfall compared to historic average (BOM, 2019)

3.2.1.2 Survey Effort

The baseline and targeted field-based surveys described above were necessary to determine the size and nature of any impact to the threatened (grassland) ecological community protected under the EPBC Act. The habitat suitability and population extent of threatened flora species and any species still containing a moderate or high likelihood of occurring within the disturbance area were also assessed.

Initial baseline surveys assessed a larger area of 350 ha, with a frontage along the Dawson Highway of approximately 3.82km. Subsequent targeted surveys was focused mainly on the proposed impact area of the rail loop. The study area includes a small polygon on the south western side bordering the Dawson Highway proposed as a slip lane for vehicle movement into site. The centre of the rail loop design occurs in an area mapped as non-remnant area and dominated by a plantation of *Leucaena**. Inside the western border of this polygon is a cattle trough with the immediate area surrounding it being highly disturbed due to cattle using this area as a drinking point. The remainder of the area is remnant grassland.

To address the potential occurrence of MNES within the study area, surveys were undertaken for species that could not be immediately dismissed through the desktop assessment. Species that were considered to have a moderate or high likelihood of occurrence based on distribution, presence of local records and suitable mapped vegetation communities were targeted during field surveys, in accordance with the appropriate survey guidelines, as described in Table 5 below.

These assessments included:

- Systematic baseline fauna surveys, including fauna trapping, bird surveys, active diurnal and nocturnal searches, acoustic bat detection and use of infra-red game cameras;

- Targeted surveys and habitat quality assessment for threatened fauna species including the Yakka Skink, Ornamental Snake, Squatter pigeon, Koala and Greater Glider;
- Verification of regional ecosystem mapping, including extent and remnant status;
- Surveys for threatened flora species including threatened grass species (especially *Dichanthium queenslandicum* and *D. setosum*);
- Compiling a comprehensive flora and fauna list for the site; and
- The remnant status of grasslands was determined using the criteria provided by Neldner *et al.* (2017), while determination of the grassland TEC was undertaken using key diagnostic criteria and condition thresholds for 'Natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin' as defined in the Listing Advice by the Threatened Species Scientific Committee (TSSC, 2009).

These assessments provided a substantial dataset for assessing the presence, likely occurrence and potential for impacts to threatened species and communities. At the time of the February-March survey, climatic conditions prevented comprehensive assessment of the listed *Natural Grasslands of the Queensland Central Highlands and Fitzroy Basin* and the potential occurrence of threatened grass species. Additional surveys were undertaken in 4 - 7 June and 3 - 4 July 2019 when suitable conditions prevailed.

3.2.2 Native Grassland TEC Surveys

In accordance with the Commonwealth Listing advice for the Natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin (TSSC 2009a), TEC assessment sites were based upon a quadrat size of 0.1ha (50m x 20m). Sites were measured with transect tapes and demarcated with flagged stakes in order to ensure that survey effort was restricted to the appropriate area. Within each assessment site, the condition class, 'Best quality' or 'Good quality', was determined according to diagnostic conditions specified within **Table 18** of the approved advice for natural grasslands (TSSC 2009a).

TEC assessment sites were selected on a desktop level and placed in intervals of approximately 200m apart, or at closer intervals when appropriate, within the proposed disturbance footprint. This systematic placement of assessment plots was implemented to determine the presence/absence of the TEC across the study site, the condition class of any occurring TEC, the spatial variability in TEC condition class and the overall TEC presence/absence throughout the proposed disturbance area.

TEC assessments were conducted during seasonally appropriate periods (within two months of effective rain) when grass condition was maximally conducive to identification, in accordance with the relevant approved advice. Appropriate timing was determined by a combination of weather monitoring, using Bureau of Meteorology (BoM) online data, and direct communication with personnel at the project sites.

3.2.2.1 Diagnostic characteristics

To determine the presence of this grassland TEC, the following condition thresholds provided by TSSC (2009a) need to be met:

- be situated in the Brigalow belt (north or south) bioregion
- contain a natural tree canopy layer of less than 10%
- perennial native grasses dominate the ground layer and consist of three or more of the following indicator species (**Table 17**)

Table 17: List of perennial grass species within the grassland TEC

Scientific Name	Common Name
<i>Aristida latifolia</i>	Feather-top Wiregrass
<i>Aristida leptopoda</i>	White Speargrass
<i>Astrelba elymoides</i>	Hoop Mitchell Grass
<i>Astrelba lappacea</i>	Curly Mitchell Grass
<i>Astrelba squarrosa</i>	Bull Mitchell Grass
<i>Bothriochloa erianthoides</i>	Satin-top Grass
<i>Dichanthium queenslandicum</i>	King Blue-grass
<i>Dichanthium sericeum</i>	Queensland Bluegrass
<i>Eriochloa crebra</i>	Cup Grass
<i>Panicum decompositum</i>	Native Millet
<i>Panicum queenslandicum</i>	Yabila Grass
<i>Paspalidium globoideum</i>	Shot Grass
<i>Thellungia advena</i>	Coolibah Grass

Condition threshold

To determine the presence of the grassland TEC the above diagnostic characteristics and condition thresholds in **Table 18** need to be met.

Table 18: Condition thresholds excerpt taken from the TSSC (2009)

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

3.2.2.2 Habitat Condition Assessment for Grassland TEC

Field methodology

Habitat condition assessments were conducted in line with the 'Guide to determining terrestrial habitat quality' (DEHP, 2014). A 100m transect line was laid parallel to the slope of the land, if applicable, and marked at 0m, 50m and 100m points. Basic site details, including date and time, site number, location, regional ecosystem (RE) and GPS coordinates, were recorded. Four landscape photographs (two parallel and two perpendicular to the transect) and a ground photograph were taken at the 0m, 50m and 100m points. The orientation of the site was recorded by marking the 0m, 50m and 100m points on a GPS device. All parameters specified were recorded in the field; however, only some were relevant to the development of habitat condition scores for RE 11.8.11 (reference BioCondition benchmark doc for Brigalow belt) and are displayed in bold below. There are no benchmark values for a number of parameters for RE 11.8.11 as this is a grassland ecosystem that doesn't support high numbers of trees or shrubs. Other parameters relevant to each site are provided to assist validating habitat suitability for threatened species.

Along the 100m transect line the following data, where applicable, were recorded:

- **Tree canopy cover.** This is the proportion of the 100m transect intersected by the foliage of a tree within the emergent, canopy and sub-canopy layer. In order to calculate cover, an observer walked along the transect line, looking up and noting at which point on the transect an overlap with the tree canopy occurred. The observer then walked along the transect until it no longer overlapped with the canopy and noted this point on the transect line. The difference in length between the two points is the length of canopy cover. This was repeated for the length of the transect, and the canopy cover lengths were added to give a percentage tree canopy cover.
- **Shrub canopy cover.** This is the proportion of the 100m transect intersected by the foliage of shrubs. Calculation of cover was as per 'tree canopy cover' above.

A 100m x 50m plot was marked out within individual REs using stakes placed 25m out from each of the 0m and 100m points. Within this area, the following data, where applicable, were recorded:

- **Tree height.** The median height of the emergent, canopy, and sub-canopy heights were recorded.
- **Number and DBH of large eucalypt and non-eucalypt trees.** A large tree is a tree with a diameter at breast height (DBH) greater than the size threshold specified in the relevant benchmark document for the RE, or if no benchmark document exists, a eucalypt of DBH >30cm or a non-Eucalypt of DBH >20cm is used. All trees meeting these requirements were counted within the plot then extrapolate to trees per hectare.
- **Native tree and shrub species richness.** The number of native tree and shrub species present, determined by walking through the plot and identifying each species.
- **Recruitment of woody perennial species.** This is the proportion of tree species represented by at least one recruit (an individual <5cm DBH).

A 50m x 20m plot was marked out using stakes placed 10m either side of the transect at the 25m and 75m points. Within this area the following data, if applicable, were recorded:

- **Coarse woody debris.** This is the cumulative length of all logs within the plot that are
 - > 10cm in diameter;
 - > 50cm total length;
 - > 80% in contact with the ground.

If a log was partly within the plot, only the part of the log within the plot was measured. If a log was in part greater than 10cm in diameter, only the section of appropriate diameter was measured.

A 50m x 10m plot was marked out using stakes placed 5m either side of the transect at the 25m and 75m points. Within this area the following data, if applicable, were recorded:

- **Native grass and forb species richness.** The number of non-woody species (grass and forbs) present within the ground layer, determined by walking through the plot and identifying each species.
- **Non-native plant cover.** An estimate of the total cover of all non-native species within the plot, determined by averaging the non-native plant cover within smaller sub-plots within this area.

Finally, five 1m x 1m quadrats were placed along the transect from the 25m point to the 65m point and assessed for:

- **Total native perennial grass cover** (the percentage of native perennial grasses);
- **Organic litter.**

Cover percentages for each of the above were averaged across the five quadrats to give a final value for each feature contributing to ground cover.

Site Context Scoring involves assessing the surrounding landscape and its attributes with the use of high-quality digital imagery, GIS mapping and spatial analysis. The following parameters, in bold, were calculated for the grassland TEC:

- **Size of patch:** Only scored for fragmented landscapes. Is the size of the patch being assessed and any directly connecting remnant vegetation.
- **Connectedness:** Used only for fragmented subregions listed in Appendix 11.6 of the Guide to determining terrestrial habitat quality (DEHP, 2014). This assessment involves measuring the proportion of the sties boundary which is connected to remnant vegetation.
- **Context:** Only scored for fragmented landscapes. Assessment involves measuring the percentage of remnant vegetation within a 1km buffer around the site.
- **Distance permanent watering point:** Only scored for intact landscapes. Permanent water points include dams, earth tanks, raised ring-tanks, troughs on pipelines and natural permanent water supplies (rivers and waterholes). This parameter is up to a 5km radius.
- **Ecological corridors:** Used for both fragmented and intact landscapes. This is determined by the proximity of the site to state, bioregional, regional or sub-regional corridors (terrestrial or riparian). The site can be either located within, shares a common boundary with or is not within a corridor.

Scoring and comparison to benchmarks

Benchmarks are quantitative values for each vegetation condition attribute assessed in BioCondition (Eyre et al., 2015) and are used as a reference for comparisons within and between regional ecosystems. Benchmarks are subject to regular review and updates based on additional data. BioCondition benchmarks are compiled for quantitative site data from reference sites, data from the Queensland Herbarium's CORVEG database as well as other relevant information and expert opinions and are specific to each regional ecosystem vegetation community.

Scores were compared to BioCondition benchmark values, current as of January 2019, for RE 11.8.11 using the BioCondition Benchmarks for Regional Ecosystem Condition Assessment (DES, 2019a) (**Table 19**). There are no benchmark values for a number of parameters for RE 11.8.11 as this is a grassland ecosystem that doesn't support high numbers of trees or shrubs. Field data was then assessed using the 'Guide to determining terrestrial habitat quality' (DEHP, 2014) to calculate a habitat condition score within the design footprint. Scores for all attributes used to calculate the habitat condition score and maximum score possible are presented in **Table 19**. Site context scores were calculated using high quality imagery and GIS mapping tools. A combination of field observations and desktop assessments were used for species habitat index scores.

Datasheets provided in the 'Guide to determining terrestrial habitat quality' (DEHP, 2014) were used to record field data to assess against published benchmark and other values.

Analysis

Field results for each site condition indicator parameter were compared against the relevant attribute score as per methodologies identified in Section 5.1.1 Table 2 of the 'Guide to Determining Terrestrial Habitat Quality' (DEHP, 2017). The sum of these attribute scores for each habitat condition site were used in determining the final habitat quality score for each site as per the methodology described below.

For the purpose of this, and all subsequent reports, the maximum score of values identified for each site in Table 12 will be used in determining the final habitat quality score as per the below equation.

$$\left(\frac{\text{Total score for measured values (site condition + site context)}}{\text{Maximum score for values (site condition + site context)}} \right) \times 10$$

Habitat quality scores from the current monitoring event established baseline condition of the Natural Grassland TEC habitat with potential to be impacted by the development.

Table 19: Benchmark values and maximum habitat condition scores relevant to RE 11.8.11

Site Based Attribute		Benchmark Value	Maximum Score
Native plant species richness:	Grasses	11	5
	Forbs and other	17	5
Native perennial grass cover (%)		43	5
Organic litter cover (%)		13	5
Non-native plant cover		0	10
Site Context Scoring			
Size of patch		-	10
Connectedness		-	5
Context		-	5
Ecological corridors		-	6
Total maximum score available			56

3.2.3 Threatened Flora Surveys

King Blue-grass

The Flora Survey Guideline – Protected Plants (DES, 2019b) identifies EVNT plot surveys (section 6.2.7 of the Guideline) as an acceptable method for detecting EVNT flora species. The Guideline specifies the following requirements for EVNT plot surveys:

“Plot surveys must follow the Queensland Herbariums methodology (Neldner et al., 2012), using a plot measuring 50m by 10m; or an alternative plot size provided it can be demonstrated that an alternative plot size is appropriate for the EVNT plant, or a possible EVNT plant. Within the plot, the following information must be recorded and described:

- *The GPS location of each plot;*
- *The number of individuals of the EVNT plant, as well as any other observations such as the age and structure (if possible), reproductive state and health;*
- *A description of the vegetation structure, including noting the Regional Ecosystem (where relevant);*
- *The identifies and locational data for all of the EVNT plants, and descriptions and locational data for all possible EVNT plants found in the plot;*
- *The landscape attributes including the landform type and soil type, geology, slope, aspect and altitude; and*
- *Any specific habitat or micro-habitat features associated with EVNT plants, or a possible EVNT plant.”*

Structured searches for *D. queenslandicum* were undertaken within the TEC assessment sites (50 x 20m plots). The TEC assessment plots recommended by TSSC (2009a) are twice the size of the 50 x 10m EVNT plot survey requirements in order to account for the difficulty of locating individual tussocks in dense grassland and the very sparse distribution of tussocks identified in some areas. *D. queenslandicum* individuals were readily detected utilising the TEC assessment site plots, and these plots were thus determined to be suitable for the detection of this species. The GPS location for three corners of each plot was marked.

Each site was traversed independently, in its entirety, by two ecologists. If *D. queenslandicum* was detected within a plot the location of tussocks was mapped using a handheld GPS. Due to the 5m accuracy limitations of undifferentiated handheld GPS, and as tussock density was often too high to allow for mapping of individuals, the following process was used to map individual tussocks. The operator would mark a point on the GPS and then record all *D. queenslandicum* tussocks within a 2.5m radius of that point. This process would be repeated each time a *D. queenslandicum* tussock was identified outside of a 5m diameter area that had not already been assessed for *D. queenslandicum* abundance. To ensure that only the presence and quantity of *D. queenslandicum* tussocks were accurately identified, only tussocks with identifiable fertile material were used. This approach was taken as some other grass species tussocks resembled those of *D. queenslandicum* when no fertile material was available during initial surveys in November (2018) and February (2019). Further surveys conducted in June and July readily located fertile material for *D. queenslandicum*.

As the proposed disturbance footprint was traversed by foot, incidental observations of *D. queenslandicum* were also recorded on a handheld GPS utilising the aforementioned methodology.

Bluegrass

Searches for Bluegrass used the same methodology as King Blue grass. Random Meander and plot surveys as per the Flora Survey Guidelines – Protected Plants (DES, 2019b) were conducted to increase the likelihood of detecting this species during baseline and subsequent surveys. A sample of each grass with reproductive parts, within TEC assessment areas and while searching for other EVNT grasses, were also taken and identified to help increase the likelihood of recording this species. Any grasses that could not be identified were sent to the Queensland Herbarium for positive identification.

3.2.4 Fauna Surveys

The survey effort employed for each of the fauna survey techniques is outlined in **Table 20**, showing the total survey effort employed for MNES predicted to occur from the desktop assessment, in accordance with the requirements of the relevant EPBC survey guidelines for that species. The majority of these species were assessed as unlikely to occur on the basis of unsuitable habitat present.

Table 20: Fauna survey effort during baseline surveys

Threatened species	Survey methodology	Total survey effort
Yakka Skink	Active searching for 20 mins per hectare of suitable habitat (DSEWPC, 2011a).	No suitable habitat occurs within the project footprint. Active searching for approx. 15 person hours (Five × systematic surveys sites plus five × one-person hour survey sites) in adjacent habitat
Ornamental Snake	Nocturnal searches from January to mid-March in and around suitable gilgai habitat 1–3 days after rainfall events when frog activity is at its peak (DSEWPC, 2011a).	No suitable gilgai habitat present. 36 trap nights with pitfall traps, 72 trap nights with funnel traps, active searching in potential habitat for approx. 15 person hours (Five × systematic surveys sites plus five × one-person hour survey sites), approx. 10km of nocturnal driving on internal tracks, habitat assessments
Squatter Pigeon	Target surveys during the dry season which is the optimal timeframe for this species to be the most active foraging (DEE, 2019). 15 hrs over 3 days area searches or transect surveys and flushing surveys through adjacent habitat (short, grassy understorey of eucalypt woodland near permanent water) (DEWHA, 2010a)	10 person hours dedicated bird surveys, 14 days of vehicle and foot traverse of grassland and open woodland habitats, habitat assessments. Visual monitoring at water troughs was not possible due to cattle, so a motion sensitive camera was installed for two days.
Black-throated Finch	10 hrs land based searches, watching waterholes for 6 hrs over 2 days during the dry season (DEWHA 2009). Area searches focussed on searching suitable BTF habitat occurring within 600m of water sources.	10 person hours dedicated bird surveys, particularly within 600m of artificial water sources. Area searches included 14 days of vehicle and foot traverse of grassland and open woodland habitats. Visual monitoring at water troughs was not possible due to cattle, so a motion sensitive camera was installed for two days. Assessment of habitat condition defined “Habitat Management Guidelines for the Black-Throated Finch (<i>Poephila cincta cincta</i>) in the Brigalow Belt North Bioregion”
Red Goshawk	80 hours area searches for red goshawks and nests - located in an exposed fork in the top of a living tree between 10 and 20 m above the ground, large platform of dead sticks lined with twigs and green leaves	10 person hours dedicated bird surveys, area searches within all treed areas for red goshawks and nests. Area searches included 14 days of vehicle and foot traverse of grassland and open woodland habitats.

Threatened species	Survey methodology	Total survey effort
Fork-tailed Swift	No formal survey guidelines exist, counts undertaken by an experienced person during the Austral summer (DoE 2015).	10 days of ongoing surveys for overflying birds undertaken between October and April when Swifts are known to be in Australia.
Koala	Daytime survey of Koala food trees within the alignment looking for scratches and faecal pellets, applying habitat assessment method, habitat assessments undertaken in accordance with the 'EPBC Act Referral Guidelines for the vulnerable Koala' (DoE 2014)	All potential food trees within the watercourse were surveyed along a length of approximately 2km, 17 person hours spotlighting, habitat assessments undertaken in accordance with DoE 2014.
Greater Glider	SEWPC (2011b) recommends spotlighting along least two 200 metre transects per 5-hectare site, repeated on two separate nights. Survey of tree hollows for scratches.	No suitable habitat occurs within the project footprint. 17 person hours spotlighting in potential adjacent watercourse vegetation, surveys for suitable habitat (large hollow-bearing trees along ~2km of watercourse vegetation) over several nights

Additional fauna survey methods included Elliot traps (388 trap nights), cage traps (60 trap nights), camera traps (22 trap nights) and unattended bat detectors (11 detector nights) to establish a baseline record of fauna species on site.

3.3 Results

3.3.1 Vegetation Communities

Vegetation within the study area was assessed to verify existing RE mapping and determine the potential presence of TECs. Of the three TECs identified in the desktop analyses, the Native Grassland TEC was confirmed to occur within the proposed rail loop; the remaining TECs were considered to have a low likelihood of occurring.

Grasslands throughout the survey area were determined to be remnant areas of RE 11.8.11 in accordance with the criteria provided by Neldner *et al.* (2017), and therefore is considered to represent the Natural Grassland TEC. Assessments undertaken within the Leucaena plantation found that the grassland within this area also meets the criteria for the TEC. Using the condition thresholds for the Natural Grassland TEC (Table 11), surveys identified 10 survey plots to be 'good quality', while the remaining 31 plots met the criteria for 'best quality', including numerous plots within the Leucaena plantation. Site condition scores ranged from 6.5-7, with an average of 7. Across the entire original 350 ha study area, the TEC was dominant with a large area in the west representing a woodland community 11.8.5 ('*Eucalyptus orgadophila* open woodland on Cainozoic igneous rocks'); or a mixed polygon of 11.8.5 and 11.8.11. A total of 155.06ha of the TEC was mapped within the proposed rail loop management area, including 79.70ha of the TEC within the proposed footprint. The Native Grassland TEC is discussed in further detail in the Impact Assessment and Management section of this report.

The north of the site was bordered by riparian vegetation consistent with RE 11.3.3a: '*Melaleuca bracteata* woodland on alluvial plains; riverine or fringing riverine wetland'. Black Tea Tree *M. bracteata*, was the dominant tree species throughout each of the areas of riparian vegetation assessed, however, up to 20ha of these were significantly impacted at the time of investigation by poisoning.

Brigalow TEC

Low – The Brigalow (*Acacia harpophylla* dominant and co-dominant) TEC extends from south of Charters Towers south to northern NSW (TSCC, 2001 and referenced within). This TEC is found in areas within the 500-750 mm annual rainfall belt on flat to gently undulating Cainozoic clay plains and on horizontally bedded fine grained sedimentary rocks. Vegetation is associated with deep gilgaied and cracking clays, sedentary clays, alluvial clays and loamy red soils that are relatively fertile but have a high salt content.

In communities representing the TEC, Brigalow is one of three most abundant species with Belah (*Casuarina cristata*) often occurring as co-dominant. Height of the tree canopy can vary depending on climatic conditions but ranges from 9-25m with a prominent shrub layer present. In Queensland this TEC occurs within the REs found in **Table 21** below with a short description from the Regional Ecosystem Description Database (REDD).

Table 21: REs and short descriptions that Brigalow TEC occurs within

Regional Ecosystem	REDD short description
RE 6.4.2	<i>Casuarina cristata</i> +/- <i>Acacia harpophylla</i> open forest on clay plains
RE 11.3.1	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on alluvial plains
RE 11.4.3	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> shrubby open forest on Cainozoic clay plains
RE 11.4.7	Open forest of <i>Eucalyptus populnea</i> with <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> on Cainozoic clay plains
RE 11.4.8	<i>Eucalyptus cambageana</i> open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains
RE 11.4.9	<i>Acacia harpophylla</i> shrubby open forest with <i>Terminalia oblongata</i> on Cainozoic clay plains
RE 11.4.10	<i>Eucalyptus populnea</i> or <i>E. pilligaensis</i> , <i>Acacia harpophylla</i> , <i>Casuarina cristata</i> open forest on margins of Cainozoic clay plains
RE 11.5.16	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest in depressions on Cainozoic sand plains/remnant surfaces
RE 11.9.1	<i>Acacia harpophylla</i> - <i>Eucalyptus cambageana</i> open forest on Cainozoic fine-grained sedimentary rocks
RE 11.9.5	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on Cainozoic fine-grained sedimentary rocks
RE 11.9.6	<i>Acacia melvillei</i> ± <i>A. harpophylla</i> open forest on Cainozoic fine-grained sedimentary rocks
RE 11.11.14	<i>Acacia harpophylla</i> open forest on deformed and metamorphosed sediments and interbedded volcanics
RE 11.12.21	<i>Acacia harpophylla</i> open forest on igneous rocks; colluvial lower slopes
RE 12.8.23	<i>Acacia harpophylla</i> open forest on Cainozoic igneous rocks
RE 12.9-10.6	<i>Acacia harpophylla</i> open forest on sedimentary rocks
RE 12.12.26	<i>Acacia harpophylla</i> open forest on Mesozoic to Proterozoic igneous rocks

Within Bioregion 11 (Brigalow Belt), the TEC is not known to occur on land zone 8, which dominates the study area. No REs consistent with those listed above and no vegetation communities containing Brigalow as a dominant species were recorded within the study area. There is a low likelihood of this TEC occurring within the proposed rail loop disturbance area.

Natural Grasslands TEC

Present - The Natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin Threatened Ecological Community (grassland TEC) is endangered under the *Environment Protection and Biodiversity Conservation Act 1999*. This grassland TEC occurs within the Brigalow Belt bioregion and extends from Collinsville south to Carnarvon National Park in Queensland (DEWHA, 2008). This community can be found within a few different Regional Ecosystems (RE). These along with a short description from the Regional Ecosystem Description Database (REDD) are presented below in **Table 22**.

Table 22: Regional Ecosystems within the grassland TEC

Regional Ecosystem	REDD short description
11.3.21	<i>Dichanthium sericeum</i> and/or <i>Astrebla</i> spp. grassland on alluvial plains. Cracking clay soils
11.4.4	<i>Dichanthium</i> spp., <i>Astrebla</i> spp. grassland on Cainozoic clay plains
11.4.11	<i>Dichanthium sericeum</i> and <i>Astrebla</i> spp. grassland with patchy <i>Acacia harpophylla</i> or <i>Eucalyptus coolabah</i> on Cainozoic clay plains
11.8.11	<i>Dichanthium sericeum</i> grassland on Cainozoic igneous rocks
11.9.3	<i>Dichanthium</i> spp., <i>Astrebla</i> spp. grassland on fine-grained sedimentary rocks
11.9.12	<i>Dichanthium sericeum</i> grassland with clumps of <i>Acacia harpophylla</i> on fine-grained sedimentary rocks
11.11.17	<i>Dichanthium sericeum</i> grassland on old sedimentary rocks with varying degrees of metamorphism and folding

This community is found on flat to gently undulating terrain on soils that have formed in situ on fresh basalt or fine-grained sedimentary rocks (TSSC, 2009a and reference there in). Diagnostic features provided by TSSC (2009a) include:

- Soils are often deeply cracked and dark in colour.
- Trees are very sparse to absent with crown cover not exceeding 10%, including *Eucalyptus*, *Corymbia* and *Melaleuca* species.
- The shrub layer is variable from absent up to 50% cover with typical species including *Pittosporum angustifolium*, *Acacia*, *Pimelea* and *Sclerolaena* species.
- The ground layer is typically dominated by native grasses and forbs. Dominant perennial native grasses include *Dichanthium*, *Aristida* and *Panicum* species but species composition can change in response to environmental conditions yearly.

General threats to this grassland TEC include:

- grazing,
- cropping and pasture improvement,
- weeds and pest animals,
- mining activities,
- construction of roads and other infrastructure (DEWHA, 2008)

Seven REs are considered to represent this TEC in Queensland, including RE 11.8.11 which was identified during desktop analysis to occur within the study area. Subsequent field surveys confirmed the presence of this RE and TEC within the impact area.

The Natural Grassland TEC was recorded throughout the proposed development area and within the surrounding landscape. No grassland TEC was recorded within the northern portion of the development footprint or within the slip lane on the southern boundary of the proposed development area. Details on the occurrence of the Natural Grassland TEC and relevant impacts are provided in Section 4.

Weeping Myall Woodlands TEC

Low – The Weeping Myall Woodlands TEC occurs on the inland alluvial plains west of the Great Dividing Range in Queensland (TSSC, 2009b and referenced within). In Queensland this TEC only occur within REs 11.3.2 (*Eucalyptus populnea* woodland on alluvial plains) and 11.3.28 (*Casuarina cristata* +/- *Eucalyptus coolabah* open woodland on alluvial plains). Myall (*Acacia pendula*) is the dominant overstory species, either living, defoliated or in a dead state, within the TEC.

No individual Myall plants were encountered during either baseline survey despite considerable survey effort. As this species was not recorded and REs associated with this TEC were not found within the disturbance area or surrounding area, there is a low likelihood of this species occurring within the proposed rail loop.

3.3.2 Threatened Species: Likelihood of Occurrence

SLR has developed an approach for ranking threatened species recorded from the desktop searches in terms of their likelihood of occurring within the study area. This approach is based on the presence of local records and the habitat requirements for each species, which are recommended criteria for desktop impact assessments in state-published survey guideline documents such as Eyre *et al.* (2018). Details of the criteria used to assess the likelihood of occurrence for threatened and near threatened species are provided in **Table 23**. The potential impacts to threatened species that may occur within the study area are discussed further in this report.

Table 23: Key Assessment Criteria for Likelihood of Occurrence

Likelihood of Occurring	Key Criteria	Definition
Present	Present during survey or historical records in the study area	<ul style="list-style-type: none"> Species was recorded during field surveys or a historical record of the species was located in the study area
High	<ul style="list-style-type: none"> Known records (<30 km) or within species known range; AND Suitable habitat of high quality is present 	<ul style="list-style-type: none"> Historical records of the species occur within a 30 km radius of the study area or the study area is within the species known range. Suitable habitat of high quality exists with the study area.
Moderate	<ul style="list-style-type: none"> Known records (<30 km) or within species known range; AND Suitable habitat is present, but degraded 	<ul style="list-style-type: none"> Historical records of the species occur within a 30 km radius of the study area or the study area is within the species known range. Suitable habitat is present but is significantly degraded or fragmented.

Likelihood of Occurring	Key Criteria	Definition
Low	<ul style="list-style-type: none"> No records (<30 km) and not within species known range; OR Habitat present is unsuitable, absent, or highly degraded 	<ul style="list-style-type: none"> No historical records of this species occur within a 30 km radius of the study area or within the known range for this species or: OR The habitat within the study area is not suitable and/or is in extremely poor condition, or is absent for the species

The section below provides justification for the 'likelihood of occurrence' determination for each species and TECs after desktop assessments and baseline field surveys.

3.3.2.1 Threatened Flora Species

A total of 60 flora species from 23 families were recorded within the study area, including 21 grass species. Of these, 16 species (26.67%) are introduced species, including two listed as restricted weeds under the Queensland *Biosecurity Act 2014*. Of the five threatened flora species identified in the desktop analyses, one threatened flora species was identified during the vegetation surveys; King Blue Grass *Dichanthium queenslandicum*, listed as 'Vulnerable' under the NC Act and 'Endangered' under the EPBC Act. This species was restricted to areas of RE 11.8.11, with 19.05ha of habitat mapped within the proposed disturbance footprint, however, no individuals were recorded within the Leucaena plantation area. King Blue grass is discussed in further detail in the Impact Assessment and Management section of this report.

Individual threatened species identified in the desktop review were assessed for their likelihood of occurrence following completion of field surveys, as described below.

Shrubby Bush Pear

Low – Shrubby Bush Pear (*Marsdenia brevifolia*) is a small shrub up to 1 m in height with a distinctive cylindrical stem and exudes white latex when cut (DEE, 2019 and referenced within). This species has three disjunct populations: 1) Townsville district (including Magnetic Island); 2) Springsure; and 3) north of Rockhampton (DEE 2019). In the Springsure population the habitat for this species includes a range of woodland communities, on rocky steep slopes and hillsides, on shallow ridges or along seasonal watercourses (Queensland Herbarium HerbreCs). Geology can vary from acid volcanic (basalt), serpentinite, or granite in different areas but is usually associated with large boulders and rock outcrops (Calvert *et al.* 2005). Trampling and grazing by cattle is known to kill plants (DEE 2019). As this species was not recorded during extensive flora surveys, the additional absence of known landforms, geology and preferred habitat type and vegetation associations from the study site, and the sensitivity to grazing that is a long term dominant feature of this site, determines a low likelihood of occurrence within the study area.

Aristida annua

Low - This species is listed as vulnerable under both the EPBC Act and NC Act. One record of the species exists within 30 km of the study area. *Aristida annua* is a small annual grass restricted to black soil woodlands in a small area in central Queensland (DEE, 2019). It occurs in two disjunct populations: one between Clermont, Capella and Dysart, and the second between Emerald, Carnarvon National Park and Blackdown Tableland National Park. It is a known inhabitant of the Natural Grasslands TEC, which was confirmed as occurring on the site during the 2018–2019 flora/fauna assessments.

The species flowers between March and June (Herbrechts, DEE, 2019). Despite intensive flora surveys conducted in late February - early March 2019 and subsequent targeted flora surveys in June and July 2019, this species was not recorded. The DEE SPRAT database (DEE 2019) maps the site as an area where 'species or species habitat may occur', indicating that expert analysis identified the site as outside the core habitat/distribution of the species. As the species was not recorded on site during any survey, is not known from nearby Albinia National Park or Meteor Downs South, this species is unlikely to be affected by the proposed development.

King Blue-grass

Present - This species has a vulnerable VM Act status and is endangered under the EPBC Act. This is a perennial grass to 0.8m tall that occurs on black cracking clay in tussock grasslands mainly in association with other species of blue grasses (*Dichanthium* spp. and *Bothriochloa* spp.) but also with other grasses restricted to this soil type (TSSC, 2013). This grass was upgraded from vulnerable to endangered under the EPBC Act in 2013 (TSSC, 2013 and reference therein). This species is endemic to central and southern Queensland where it occurs in three disjunct populations: 1) Hughenden district; 2) from Nebo to Monto and west to Clermont and Rolleston; and 3) Dalby district, Darling Downs. Its area of occupancy is unknown but based on the extent of occurrence it is likely to be restricted. The main identified threats to this species are habitat loss through agricultural and mining activities, road construction and other infrastructure developments, and weed invasion resulting in competition and potential displacement. This species was recorded during baseline flora and fauna surveys.

Targeted field surveys recorded King Blue-grass within the development area. The majority of King Blue-grass was recorded within a large grassland area south of the *Leucaena* area with individuals also recorded beside the Dawson Highway within the proposed slip lane. No King Blue-grass was recorded within areas of *Leucaena*.

Details on the occurrence of the King Blue-grass and relevant impacts are provided in Section 4.

Bluegrass

Low - There are nearby records of this species to the proposed disturbance area. No records were found on the WO database but the nearest record on Atlas of Living Australia (ALA) is a specimen collected in 2018 from 1.72km west of the study area. The species has been located on the nearby Albinia National Park (DNPRSR, 2013). The species is associated with heavy basaltic black soils and red-brown loams with clay subsoil. It is often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. It is often collected from disturbed open grassy woodlands on the northern tablelands, where the habitat has been variously grazed, nutrient-enriched and water-enriched. There are nearby records and there is suitable habitat for this species across the site, however, the site has a long history of being heavily grazed. The ungrazed roadside edge of the Dawson Highway also represents potential habitat, despite the invasion of Buffel Grass (*Cenchrus ciliaris**) along the margin, which is specifically listed as a threat to Bluegrass (DES 2019d).

Despite extensive surveys in suitable habitat during optimal timing for identification of this species, including two surveys dedicated to identifying grasses, no evidence of this species was recorded during any of the multiple targeted surveys. The species, if present, occurs at a density below the limit of detection from intensive surveying, and no important population or significant impact is likely to occur. It is highly unlikely that the development will significantly impact upon individuals or populations of this species.

Ooline

Low - There are two records of this species within 30km of the study area, the first of which is approximately 8km from the site (Atlas of Living Australia, 2019). This species occurs on the northwest slopes of New South Wales and in central and southern Queensland. In Queensland, Ooline occurs from Balcomba south to the New South Wales border and west to near Blackall. This species grows in semi-evergreen vine thickets and sclerophyll vegetation on undulating terrain of varying geology including sandstone, conglomerate and claystone (DEE, 2019 and references therein). Given that this is a distinctive tree, few trees were recorded within the disturbance area during surveys, the low numbers recorded near the study area and preferred habitat not recorded on site, there is a low likelihood for this species to occur within the study area.

3.3.2.2 Threatened Fauna Species

Fauna species detected on site included six amphibians, ten reptiles, 60 birds and 22 mammals, including 13-14 microbat species (SLR 2019). Of these, five animals are pest species, including two species listed under the Queensland *Biosecurity Act 2014*. Of the 18 threatened fauna species identified in the desktop analyses, none were considered likely to occur within the proposed impact area. No fauna was detected that are listed as threatened or migratory under the EPBC Act. The likelihood of occurrence of target fauna species identified in the desktop assessment are described below.

Southern Snapping Turtle

Low – The Southern Snapping Turtle (*Elseya albagula*) is listed as ‘Endangered’ under the NC Act and ‘Critically Endangered’ under the EPBC Act. There are two records of the species recorded in the local area but are associated with large watercourses.

This species is found in Queensland in the Fitzroy, Mary and Burnett Rivers, and associated smaller drainages in south-eastern Queensland (TSSC, 2014). This species prefers permanent flowing water habitats where there are suitable shelters and refuges (e.g. fallen trees) (DES, 2017 and references therein). This species requires a diet of fallen fruit, aquatic insects, molluscs and even small cane toads (DES and references therein 2017). Due to a lack of permanent water and other habitat features required for this species, there is a low likelihood of *Elseya albagula* occurring within the study area.

Fitzroy River Turtle

Low – The Fitzroy River Turtle (*Rheodytes leukops*) is listed as ‘Vulnerable’ under the NC Act and the EPBC Act. Three records of this species have occurred within 30km of the study area; however, the spatial uncertainty of these records is very high, with the most being approximately 10km away from the site.

This species is only found in the drainage system of the Fitzroy River, Queensland. Known sites include Coolburra, Gainsford, Glenroy Crossing, Theodore, Baralba, the Mackenzie River, the Connors River, Duaringa, Marlborough Creek and Gogango. This species is found in rivers with large deep pools with rocks, gravelly or sandy substrates, connected by shallow riffles and is often associated with *Eucalyptus tereticornis*, *Casuarina cunninghamiana*, *Callistemon viminalis* and *Melaleuca linariifolia* (DEE, 2019 and references therein). Preferred areas have low turbidity and low water temperatures concurrent with, and are often associated with Ribbonweed beds (DEE, 2019 and references therein). This species requires permanent water to persist, which does not occur in the study area. As such, the Fitzroy River Turtle has a low likelihood of occurring in the study area.

Collared Delma

Low – The Collared Delma (*Delma torquata*) is a ‘Vulnerable’ listed species under the NC Act and the EPBC Act. The WO database has no records of this species occurring within 30km of the study area. The closest record of this species occurs near Carnarvon National Park, situated approximately 80km from the study area (Atlas of Living Australia 2019).

This species has been recorded within the Bunya Mountains, Blackdown Tablelands, Expedition National Park, Western Creek near Millmerran, and in the Toowoomba Range. This species normally inhabits eucalypt-dominated woodlands and open-forests in Queensland where it is associated with micro-habitats of exposed rocky outcrops (DEE, 2019 and references therein). Habitats listed by DSEWPC (2011) include Land zones 3, 9 and 10, in contrast to the survey area which is entirely land zone 8. It is highly sensitive to grazing (DSEWPC, 2011), making its presence on the heavily grazed survey area unlikely. Due to the lack of local records, no suitable habitat or micro-habitat features, sensitivity to grazing and patchy distribution of this species it is unlikely to occur within the study area.

Yakka Skink

Low – The Yakka Skink (*Egernia rugosa*) is listed as ‘Vulnerable’ under the NC Act and the EPBC Act. The WO database has one record of the species occurring within 30km of the study area. The closest record of this species occurring is between Wandoan and Miles in Gurulmundi State Forest.

The known distribution of this species extends from the coast to the hinterland of sub-humid to semi-arid eastern Queensland. The core habitat of this species is within the mulga lands and Brigalow Belt South bioregions where it occurs in a variety of habitat types including woodlands and open forests of Poplar Box, Brigalow, Ironbark, Cypress Pine, Mulga, Bendee, and Lancewood (TSSC, 2014b). Suitable habitat listed by DSEWPC (2011) includes those vegetation communities on Land Zones 3, 4, 5, 7, 8, 9, 10 and 12, however, land zone 8 which dominates the study area is not considered core habitat.

It is more commonly found in cavities under and between partly buried rocks, logs or tree stumps, root cavities and abandoned animal burrows. This species often takes refuge in large hollow logs and has been known to excavate deep burrow systems, sometimes under dense ground vegetation. In cleared habitat, this species can persist where there are shelter sites such as raked log piles, deep gullies, tunnel erosion/sinkholes and rabbit warrens (DEE, 2019 and references therein).

Marginally suitable habitat is present in the study area in the form of root cavities and logs in the riparian forest, and small anthropogenic log piles. However, none of the vegetation associations or land zones on site match with known Yakka Skink habitat, and despite thorough examination of suitable microhabitat in association with the watercourse (a) from a distance with binoculars and (b) in close proximity to target signs of the species (e.g. burrows and excavation soil, frequented paths and basking areas, and communal latrines), no evidence of its presence was detected during the field surveys. Suitable microhabitat is generally restricted to the watercourse and is rare within the proposed footprint. The land zones, broad community types, and sparse microhabitat is indicative of a low likelihood of occurring.

Ornamental Snake

Low - The Ornamental Snake (*Denisonia maculata*) is listed as ‘Vulnerable’ under both the NC Act and EPBC Act. The WO database has identified three records of this species within 30 km of the study area. The nearest record from the ALA (-24.5651, 148.6428) is from 1997 on a location 28.39 km southeast of the study area.

The species is known only from the Brigalow Belt North and parts of the Brigalow Belt South biogeographical regions. The core of the species' distribution occurs within the drainage systems of the Fitzroy and Dawson Rivers. This species preys almost exclusively on amphibians and favours gilgai formations (which form on cracking clay soils) in open woodland (DEE, 2019 and references therein).

The majority of habitat within the proposed disturbance footprint is marginal for this species, being typically characterised by cleared open pasture on gentle slopes. None of the suitable habitat regional ecosystems listed by DSEWPC (2011) for the Ornamental Snake occur on site, and the only potential habitat of moderate suitability occurs within an area adjacent to the watercourse to the north of the proposed footprint, where the slope decreases, and cracking soil is present. Although the November 2018 and February-March 2019 surveys did not record this species, they were not conducted after significant rainfall events. Guidelines specify targeting this species using nocturnal searches from January to mid-March in and around suitable gilgai habitat 1–3 days after rainfall events when frog activity is at its peak (DEE, 2019). Unfortunately, surveys undertaken during this time coincided with un-seasonally dry weather and no rain or surface water occurred. However, surveys did not locate any areas of gilgai associated with the cracking clay soils.

Although there are records of this species in the local area, habitat was suboptimal and low value. Although cracking clays were present, the only watercourse is highly ephemeral and water retention within this area would be minimal. Although a small area of potential habitat for frog prey items occurs, it is outside of the proposed rail loop design and clearing will not exceed any of the significance thresholds for the Ornamental Snake provided by DSEWPC (2011). It is unlikely that the species occurs on site or that project would have a significant impact.

Fork-tailed Swift

Moderate - This species is a non-breeding visitor to all states and territories of Australia with scattered records of in the Gulf Country and a few records on Cape York Peninsula (DEE, 2019 and references therein). They are also widespread but scattered records in coastal areas in the south-eastern region of Queensland where they are more widespread west of the Great Divide and are commonly found west of the line joining Chinchilla and Hughenden. In Australia, they mostly occur over inland plains, cliffs and beaches, over islands and sometimes off the coast but are almost exclusively aerial. There are five local records within 30km of the study area and records throughout the surrounding landscape are scattered.

Despite multiple surveys for this species, the Fork-tailed Swift was not recorded within the study area or the surrounding landscape. There are a few records of this species in the local area but the most recent is 18 years old and the study area does not represent important habitat. It is likely that any occurrence in this area would be a pass-over as they are almost exclusively aerial.

There is a moderate likelihood that this species may fly over the proposed rail loop during seasonal migration periods, but the site does not represent important habitat and it is unlikely that any development from the proposed project will significantly impact either individuals or populations of this species.

Red Goshawk

Low – The Red Goshawk (*Erythrotriorchis radiatus*) is listed as 'Endangered' under the Nature Conservation Act and 'Vulnerable' under the EPBC Act. There are no records of this species occurring within 30km of the study area.

This species is known to occur sparsely across 15% of coastal and sub-coastal Australia, from western Kimberly Division to north-eastern NSW and occasionally continental islands. This species prefers forest and woodland with a mosaic of vegetation types, particularly near riverine systems and permanent water sources where there is an abundance of prey species (DEE, 2019 and references therein). The home range in northern Australia has been reported as up to 200 km² with indications it may be even larger (Aumann & Baker-Gabb, 1991). While this species has a large home range, suitable habitat is not present within the study area and there is a low likelihood of occurrence within the study area.

Squatter Pigeon

Low – The southern subspecies of the Squatter Pigeon *Geophaps scripta scripta* is listed as ‘Vulnerable’ under both the NC Act and EPBC Act. The WO database identified eight records of this species within 30 km of the study area.

The study area is within the known distribution of this species and some habitat within the study area is suitable. The Squatter Pigeon (Southern) *G. scripta scripta* is predominantly found near permanent water such as rivers, creeks and waterholes, as Squatter Pigeons need to drink daily, and consequently prefer to nest within 1 km of water. Foraging areas extend out to 3 km from a suitable, permanent or seasonal waterbody, where they feed primarily on seeds of grasses, herbs and shrubs that have fallen to the ground (DEE, 2019 and references therein). Foraging areas may include any areas of remnant or regrowth open-forest to sparse, open-woodland or scrub dominated by *Eucalyptus*, *Corymbia*, *Acacia* or *Callitris* species, preferably on sandy or gravelly soils with open and short grass cover that allows easier movement (DEE, 2019 and references therein). Squatter Pigeons are known to be less common on heavier soils with dense grass, particularly where Buffel Grass (*Cenchrus ciliaris*) is the dominant pasture species (Curtis *et al.* 2012). Typically, the ground cover in nesting and foraging habitat rarely exceeds 33%, however, cover tends to be variable over a given area (DEE 2019). The species often occurs in burnt areas and is sometimes found on tracks and roadsides (TSSC, 2015a). It has also been recorded in sown grasslands with scattered remnant trees, disturbed habitats, in scrub and *Acacia* growth, and remains common in heavily-grazed country north of the Tropic of Capricorn. Some degree of tree cover is generally required, with densities ranging from woodland and savannas to grassland with sparse or scattered remnant trees, as they often roost in trees at night (Higgins & Davies 1996). No thresholds of tree cover are available for determining habitat suitability.

Targeted surveys to flush Squatter Pigeon and intense observations along dirt roads and around cattle troughs over multiple surveys did not located this species. Squatter Pigeons drink at permanent water daily and are not found far from permanent water sources. As the only permanent water within the proposed development area is a cattle trough, it is likely this is the main limiting factor excluding this species from the disturbance area. The species was not identified at the permanent water sources supplied for cattle in the centre of the study area, in woodland or grassland habitats nor in the gilgai in the northeast of the study area during regular opportunistic and targeted surveys, including placement of a motion sensitive camera on a water trough.

Ideal foraging habitat is not present within the project area

The majority of the site, including the area within the proposed project footprint, is a treeless plain on heavy soils with dense grass cover (RE 11.8.11), described by Curtis *et al.* (2012) as being less desirable to Squatter Pigeons, except close to cattle watering points. Preferred habitat, consisting of open woodland dominated by *Eucalyptus*, *Corymbia*, or *Acacia* on gravelly soils with open and short grass cover (Curtis *et al.* 2012) is better represented by RE 11.8.5 (*Eucalyptus orgadophila* open woodland on Cainozoic igneous rocks). This vegetation type is widespread north of Aldebaran Creek. Although a 56ha heterogenous polygon of 11.8.5 / 11.8.11 was ground-truthed in the western portion of the study area, another small 2.4ha polygon is present in the northern portion of the rail loop. This area had a generally sparse canopy of Red Bloodwood *Corymbia erythrophloia*, and occasional Silver-leaved Ironbark *Eucalyptus melanophloia* subsp. *melanophloia*.

The suitable habitat adjacent to the proposed development site is within 1km of the artificial water points, however, its value for Squatter Pigeons is diminished by:

- restricted to a small isolated and discrete area surrounded by areas of unsuitable habitat,
- seasonally heavily grazed and of lower quality than that present in the broader region,
- not found to contain Squatter Pigeons, despite numerous traverse and active searches during different seasons

Despite targeted surveys at critical water points and within the highest quality habitat on site over multiple surveys this species was not recorded. It is likely that any utilisation of the study area is seasonal in nature. Despite the presence of local records and small area of suitable habitat within the study area, habitat conditions across the site are generally unfavourable, and the species was not detected during any of the multiple site assessments. This included installing a motion-sensitive game camera at the only watering points on site, where any Squatter Pigeons on site would have needed to access daily. The small area of potentially suitable habitat is located outside of the proposed rail loop and will not be impacted by design. It is unlikely that the proposed disturbance will affect individuals or populations of this species within the local or broader area.

Star Finch

Low – The southern subspecies of the Star Finch (*Neochmia ruficauda ruficauda*) is listed as ‘Endangered’ under the NC Act and EPBC Act. There are no records of this species occurring within 30km of the study area.

This species occurs only in Central Queensland and the overall distribution of Star Finch is very poorly known. The study area occurs within the suspected range of the species described in the conservation advice, however, there have not been any records since 1995 and it is possible that the subspecies is extinct (Curtis *et al.*, 2012, Garnett *et al.* 2011). The Star Finch occurred mainly in grasslands and grassy woodlands that are located close to bodies of fresh water. It also occurred in cleared or suburban areas such as along roadsides and in towns (DEE, 2019 and references therein). Due to the lack of recent or local records, the nearest record occurring approximately 230km to the northeast (Atlas of Living Australia, 2019) and this species not being recorded during multiple surveys, it is unlikely that the Star Finch occurs within the study area.

Southern Black-throated Finch

Low - The southern subspecies of the Black Throated Finch (*Poephila cincta cincta*) is listed as ‘Endangered’ under the NC Act and the EPBC Act. There are no records of this species occurring within 30km of the study area.

This species once extended from north east New South Wales through eastern Queensland and west to central Queensland, this distribution overlaps with the Northern Subspecies. The study area occurs within the suspected range of this species. The Southern subspecies *P. cincta cincta* occurs mainly in grassy, open woodlands and forests dominated by *Eucalyptus*, *Corymbia* and *Melaleuca*, and occasionally in tussock grassland. This Black-throated Finch is known to utilise habitat along or near watercourses, or in the vicinity of water (DEE, 2019 and references therein). The closest record of the species is within Carnarvon National Park, over 120km away from the study area (Atlas of Living Australia, 2019), and the study site is not within a ‘Black-throated Finch Important Area’ (DEWHA, 2009). While potentially suitable habitat exists, due to the limited distribution and the lack of records of this species within the study area, there is a low likelihood of the Southern Black-throated Finch occurring within the study area.

Painted Honeyeater

Low – The Painted Honeyeater (*Grantiella picta*) is listed as ‘Vulnerable’ under both the NC Act and the EPBC act. There are no records of this species occurring within 30km of the study area.

This species is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory. The greatest concentrations, and almost all records of breeding, come from inland slopes of the Great Dividing Range between the Grampians, Victoria and Roma, Queensland. The Painted Honeyeater exhibits seasonal north-south movements governed principally by the fruiting of mistletoe. Many birds move after breeding to semi-arid regions such as north-eastern South Australia, central and western Queensland, and central Northern Territory (DEE, 2019 and references therein). This species inhabits mistletoes in eucalypt forests/woodlands, riparian woodlands of black box and *Eucalyptus camaldulensis*, *Acacia* dominated woodlands, and *Melaleuca*, *Casuarina*, *Callitris* and trees on farmland or gardens. The Painted Honeyeater prefers woodlands which contain a higher number of mature trees that can host more mistletoe and it is more common in wider blocks of remnant woodland than in narrower strips, although it has been known to breed in narrow roadside strips if ample Mistletoe fruit is available (DEE, 2019 and references therein).

The nearest record of this species is approximately 80km to the southeast of the study area. Due to the absence of local records, the study area fringing the edge of this species distribution and no mistletoe recorded within the study area, it is unlikely that the Painted Honeyeater occurs within the study area.

Australian Painted Snipe

Low – The Australian Painted Snipe (*Rostratula australis*) is listed as ‘Vulnerable’ under the NC Act and ‘Endangered’ under the EPBC act. There are records of this species occurring within 30km of the study area, but are associated with areas of more permanent water like Naroo Dam at MDS.

This species has been recorded at wetlands in all States of Australia but is most common along eastern Australia where it has been recorded throughout much of Queensland, NSW, Victoria and south-eastern South Australia in scattered locations, the species its cryptic behaviour makes the species difficult to detect. The Australian Painted Snipe typically occurs in shallow freshwater wetlands and other permanently or temporarily inundated areas (DEE, 2019 and references therein). This species has also been recorded nesting in or near swamps, canegrass swamps, flooded areas including samphire, grazing land, among cumbungi, salt water couch, sedges, saltbush and grasses, also in ground cover of water-buttons, at the base of tussocks and under low saltbush (DEE, 2019; Morcombe, 2003). This species is estimated with low reliability to have an area of occupancy up to 1000km².

The study area is located within the known distribution for this species; however, limited suitable foraging habitat results in a low likelihood of this species occurring within the study area.

Curlew Sandpiper

Low – The Curlew Sandpiper (*Calidris ferruginea*) is listed as ‘Endangered’ under the NC Act and ‘Critically Endangered’ under the EPBC act. The WO database contains no records of this species occurring within 30km of the study area with the nearest recorded sighting at Lake Maraboon, south of Emerald (Atlas of Living Australia, 2019).

This species typically inhabits intertidal mudflats in sheltered coastal areas; however, it has also been recorded inland around ephemeral and permanent lakes, dams, waterholes, bore drains and floodplains (Higgins & Davies, 1996). This species forages amongst the edges of shallow pools and drains on intertidal mudflats and sandy shores, saltmarsh, and sometimes in flooded paddocks or inundates salt flats, wet mats of algae, and on seagrass and seaweed (DEE, 2019 and references therein). It is considered that the Curlew Sandpiper is unlikely to occur within the study area as there is no suitable habitat for this species within the study area and there are no local records.

Northern Quoll

Low – The Northern Quoll (*Dasyurus hallucatus*) is listed as ‘Least Concern’ under the NC Act and ‘Endangered’ under the EPBC Act. There are no recorded sightings of this species within 30km of the study area. The nearest record of this species is approximately 35km west of the study area (Atlas of Living Australia, 2019).

The Northern Quoll has disjunct population and highly fragmented groups across Queensland, the Northern Territory and Western Australia, and surveys indicate severe reductions from the species former distribution. This species occupies a diverse range of habitats across its range, including rocky areas, forests, woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert (DEE, 2019 and references therein). While the study area falls within the species known distribution and there are scattered records in the region, and very small, disjointed and degraded pockets of potential habitat in the broader area, this results in a low likelihood of occurrence.

Ghost Bat

Low – The Ghost Bat (*Macroderma gigas*) is listed as ‘Endangered’ under the NC Act and ‘Vulnerable’ under the EPBC Act. The nearest recorded is approximately 200km east of the study area (Atlas of Living Australia 2019). There has been one historical sighting on the WO database.

This species has a discontinuous range, with disjunct colonies occurring in the Pilbara Kimberley, northern Northern Territory, the Gulf of Carpentaria and coastal and near coastal eastern Queensland from Cape York to near Rockhampton. This species has a patchy distribution in rainforest, semi-deciduous vine thicket, open woodland, spinifex, black soil and grassland habitats. It has been recorded to roost in caves, boulder piles, shallow escarpments and mines (Van Dyck *et al.*, 2013). There is no suitable roosting habitat within the study area and no recent records, it is considered unlikely that this species occurs within the study area.

Koala

Low - The combined Queensland, New South Wales and Australian Capital Territory populations of the Koala (*P. cinereus*) are listed as ‘Vulnerable’ under both the NC Act and EPBC Act. Koala habitat can be broadly defined as any forest of woodland containing species that are known food trees. The Koala’s diet is restricted mainly to foliage of *Eucalyptus* species but may also consume foliage of related genera, including *Corymbia*, *Angophora* and *Lophostemon*, and at times supplement its diet with other species, including species from the genera *Leptospermum* and *Melaleuca* (Martin and Handasyde 1999; Moore and Foley 2000).

The study area is within the modelled distribution for Koala. Additionally, the WO database extract returned fifteen records within a 30 km radius of the study area, and they are known to occur on the adjacent Albinia National Park (DNPRSR, 2013). However, the nearest record from the ALA (-24.4873, 148.5761) is a 1987 record from 17.66 km east southeast in a sparse woodland near Rolleston.

Mountain Coolibah (*Eucalyptus orgadophila*) is a known Koala food plant and occurs sparsely in areas of RE11.8.5 to the north and west of the project area. North of the proposed rail loop is habitat associated with the watercourse that supports a very limited number of Koala food trees. The *Melaleuca* riverine woodland contains occasional emergent River Red Gum *Eucalyptus camaldulensis*, which is a preferred Koala food plant (Melzer & Plumb, 2007). Scattered trees in RE 11.8.5 included Silver-leaved Ironbark *E. melanophloia*, the leaves and buds of which are eaten by Koalas (Melzer & Plumb 2007). Moreton Bay Ash (*Corymbia tessellaris*) is rarely eaten by Koalas, while Red Bloodwood (*C. erythrophloia*) is not listed as a Koala food plant at all (Melzer & Plumb 2007). The very low density of food trees within the riparian vegetation and the sparse to very sparse structural composition of other habitats significantly limits the suitability of habitats throughout the site for Koala.

A habitat assessment was conducted in accordance with the *EPBC Act Referral Guidelines for the vulnerable Koala* (Department of the Environment, 2014). The outcome of this assessment was that, while there are no records of the Koala that are of significant relevance to the study area and the habitat values are low due to the very low density of food trees, the site contains habitat that may be important to the Koala. Key outcomes from the habitat assessment tool were:

- There is no evidence of any Koalas within 2 km of the edge of the impact area within the last 10 years.
- Emergent trees of three species that are known as Koala food trees are present.
- The Koala-relevant habitat within the study area is part of a contiguous landscape.
- The study area has some degree of vehicle threat present.
- Habitat within the study area is not considered important for achieving the interim recovery objective.

Table 24: Koala Habitat Assessment

Attribute	Score	Habitat Assessment
Koala occurrence	0	<p>Desktop studies</p> <p>The EPBC Act Protected Matters Report states that Koalas or Koala habitat is likely to occur within a 30 km radius from the centre point of the proposed disturbance area. A search of the Queensland Government WO database shows fifteen records of Koalas within 30 km from the centre point of the proposed disturbance area. All records were over 15 years old, with no new records in the local area.</p> <p>There are no records within 2 km of the study area within the last 10 years.</p> <p>Field studies</p> <p>Targeted searches throughout the study area revealed no evidence of Koalas inhabiting the area. Field studies included spotlighting, examining trees (particularly known Koala food species) for signs of Koala activity and scat searches.</p>

Attribute	Score	Habitat Assessment
Vegetation structure and composition	2	<p>Desktop studies</p> <p>The Queensland RE and Essential Habitat mapping reveals there is no mapped Koala essential habitat within 10 km of the study area. The RE mapping within the impact area for the proposed action shows vegetation communities that contain up to three known preferred Koala food trees in the canopy (<i>Eucalyptus orgadophila</i>, <i>E. melanophloia</i> and <i>E. crebra</i>).</p> <p>Field studies</p> <p>Vegetation surveys within the rail loop and adjacent riparian vegetation shows woodland communities with more than two known preferred Koala food trees in the canopy (<i>E. orgadophila</i>, <i>E. melanophloia</i>, and <i>E. camaldulensis</i>). <i>E. crebra</i> was not located in the study area. Notably, food trees were very sparsely distributed throughout all habitats within the site. A large proportion of the proposed disturbance area is within mapped areas of non-remnant vegetation planted with <i>Leucaena</i> (<i>L. leucocephala</i>*), which contains no Koala food plants.</p>
Habitat connectivity	2	<p>Desktop and field surveys indicate that the Koala habitat on the site forms part of a contiguous landscape greater than 1000 ha in size. Field surveys indicated that the contiguous habitat is primarily grassland which supports very low tree density; however, some of the trees within grassland habitats were suitable food trees.</p> <p>The Dawson Highway, located on the western boundary of the site, forms a barrier to Koalas that may be readily crossed but that experiences moderate to high volumes of traffic, including heavy vehicles. The highway bridge across the watercourse is elevated enough to form an effective wildlife underpass and is the only potential wildlife corridor for Koala movement. The railway located on the eastern edge of the site forms an equally penetrable but potentially and sporadically hazardous barrier.</p> <p>Following the riparian corridor to the north east, the tree canopy cover becomes increasingly sparse and non-remnant for over 2 km before connecting with higher value remnant woodland of potentially higher habitat value to the Koala. The broader landscape contains many areas of non-remnant habitat, and remnant habitat is generally very sparse in structural form.</p>
Key existing threats	0	<p>No Koala sightings have occurred in the study area or the surrounding landscape. Therefore, no records of Koala mortality from vehicle strike or dog attack exist.</p> <p>There is a threat of vehicle strike due to the highway situated to the west of the site, on which large vehicles pass frequently and at high speeds. However, there is an effective wildlife underpass at the point where the riparian corridor intersects with the Dawson Highway, albeit unfenced.</p> <p>Wild dogs were not recorded within the study area during the field survey program; however, personal communication with the landholder indicated that wild dogs are a semi-regular presence on the site.</p>
Recovery value	0	<p>Adjacent to the rail loop is remnant riparian vegetation; however, this vegetation has been significantly impacted by tree poisoning, has only sparse River Red Gum feed trees and is highly ephemeral, not holding significant soil moisture during periods of drought. Due to the paucity of food trees and the ephemeral condition of the riparian habitat, it is unlikely to provide a significant refuge for Koalas during times of drought. Additionally, the riparian habitat adjacent to the site is not subject to direct impact by the proposed activity.</p> <p>The grassland habitat, due to its separation from the majority of suitable habitat in the surrounding area by linear infrastructure, is not critical to the connectivity of suitable habitat in the broader area.</p>
Total Score	4	Decision: Not habitat critical to the survival of the Koala – assessment of significance not required.

Given the absence of any evidence this species occurs within the study area, it is important to consider the following characteristics for assessment of significance:

- A habitat assessment score of 4 represents low habitat value and in this case the score is based entirely on habitat suitability and connectivity, with no relevant records of the Koala in the local area.
- There are very few potential Koala food trees within the disturbance area, and the watercourse with associated riparian vegetation is not proposed as being disturbed.
- Due to the adjacent remnant vegetation being of poor effective habitat value and fragmented from large tracks of remnant vegetation units, it is unlikely it supports a functional population of Koala.

Habitat clearing associated with the proposed action would not occur within riparian vegetation and would not result in fragmentation or isolation of any habitats. There will be no impacts to connectivity values at any scale. The adjacent riparian habitat has been extensively modified through tree poisoning, which will further limit the potential for fauna passage.

On this basis, it is unlikely that the proposed action will result in significant impacts to any local population of the Koala that may occur in the area.

Due to the lack of any evidence for this species during the field survey, the lack of any relevant local records, the poor quality of habitat due to the scarcity and sparse distribution of food trees within all habitat types present and the minor loss some feed trees involved in the proposed development, it is unlikely the construction and operation of the proposed action will:

- lead to a long-term decrease in the size of the population of the species (if present);
- reduce the area of occupancy of the population;
- fragment any population into multiple populations;
- adversely affect habitat critical to the survival of the species;
- disrupt the breeding cycle of an important population;
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- result in the proliferation or establishment of invasive species that are harmful to Koalas in Koala habitat;
- introduce disease that may cause the species to decline; or
- interfere substantially with the recovery of the species.

Overall, it is considered unlikely that Koala inhabit the area of the rail loop and there will not be any significant impacts to the listed population of the Koala because of this proposed project.

Southern Greater Glider

Low - The Greater Glider (Southern Sub-species) (*P. volans Volans*) is listed as 'Vulnerable' under both the NC Act and EPBC Act. The WO database has 23 records of this species within 30 km of the study area. The nearest record from the ALA (-24.365, 148.4844) is from 2001 on a location on Aldebaran Creek 2.87 km west northwest of the study area.

The Greater Glider is the largest gliding possum in Australia and is physically distinct from similar species. This species is restricted to eastern Australia, occurring from the Windsor Tableland in north Queensland through to central Victoria. The historical area of occupancy of this species has decreased substantially, mostly due to land clearing since European settlement. This species is largely restricted to eucalypt forests and woodlands, and is found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows (TSSC, 2016). Throughout its range, it is dependent on mature forest with tree hollows (Strahan 1995), however, this distribution may be patchy even in suitable habitat. Home ranges of this species are typically small, although ranges are larger in low-productivity forests and more open woodlands (TSSC, 2016).

This species was not detected during the fauna surveys. Within the *Melaleuca bracteata* dominated riparian vegetation there were only a few large hollow-bearing River Red Gum (*Eucalyptus camaldulensis*) that could provide shelter habitat. While the riparian zone potentially contained marginally suitable habitat for the Greater Glider, this habitat is outside the proposed disturbance footprint and its quality has been significantly diminished by recent tree poisoning. There are no habitat features unique to the study area on which this species would be relying; however, the riparian vegetation may present connectivity value for the species in the broader area. Any proposed development that is restricted to non-riparian habitats, particularly those previously disturbed by agriculture, is unlikely to result in:

- a long-term decrease in the size of the local population;
- a reduced extent of occurrence of the species;
- fragmentation of the existing population;
- the formation of genetically distinct populations as a result of habitat isolation; or
- disruption to ecologically significant locations for the species.

It is therefore unlikely this species occurs within the proposed rail loop and there would not be any significant impacts to the Greater Glider as a result of the proposed development.

Corben's Long-eared Bat

Low – Corben's Long-eared Bat (*Nyctophilus corbeni*) is listed as 'Vulnerable' under both the NC Act and the EPBC Act. There are no local records of this species to the study area and the nearest record of this species is over 100km away.

This species is found in southern central Queensland, central western New South Wales, north-western Victoria and eastern South Australia, where it is patchily distributed and most of its range is in the Murray Darling Basin. This species is uncommon within this distribution and is rarely recorded, except in some areas including the Nandewar and Brigalow Belt South bioregions in New South Wales and Queensland. It is found in a wide range of inland woodland vegetation types, but in Queensland is distinctly more common in box/ironbark/cypress pine vegetation that occurs in a north-south belt along the western slopes and plains of New South Wales and southern Queensland. This species is more abundant in extensive stands of vegetation than in smaller woodland patches, suggesting its home range is probably large (TSSC, 2015b and references therein). The survey area does not represent likely habitat, and none of the bat acoustic surveys undertaken in different habitat types recorded this species. A *Nyctophilus* species was recorded but was assigned to an indistinguishable species pair *Nyctophilus geoffroyi/gouldi* (Balance! Environmental, in SLR 2019). The study area is situated on the northern edge of this species distribution and because of the lack of local records, and few trees within the disturbance area, it is unlikely this species occurs within the study area.

Large-eared Pied Bat

Low – The Large-eared Pied Bat (*Chalinolobus dwyeri*) is listed as ‘Vulnerable’ under the NC Act and EPBC Act. There are no records of this species occurring within the local area and the closest record is over 100km away (Atlas of Living Australia 2019).

This species distribution is poorly known, but records indicate that this species can be found from near Rockhampton, QLD with the furthest sighting at Carnarvon Gorge, and south to Ulladulla, NSW (DEE, 2019). This species has been recorded from a large range of vegetation types including dry and wet sclerophyll forest, *Callitris glauca* dominated forest, tall open eucalypt forest with a rainforest sub-canopy, sub-alpine woodland; and sandstone outcrop country. In Queensland this species has primarily been recorded in higher altitude moist tall open forest adjacent to rainforest (DEE, 2019 and references therein). While a majority of records are located within large sandstone escarpments this species has been known to occupy disused mines and adits. This species requires a combination of sandstone cliff/escapements across from higher fertility sites in particular box gum woodlands to provide roosting habitat for this species. This habitat type is absent from the study area, and none of the bat acoustic surveys undertaken in different habitat types recorded this species. As there are no local records or suitable habitat, this species has a low likelihood of occurring within the study area.

3.3.2.3 Migratory Species

Of the nine migratory species identified in the desktop analyses, only one species (Fork-tailed Swift) was considered to have a moderate likelihood of occurring within the rail loop, and only as a seasonal overflying migrant; the remaining species were considered to have a low likelihood of occurring. These are discussed individually below.

Fork-tailed Swift

Moderate - This species is a non-breeding visitor to all states and territories of Australia with scattered records of in the Gulf Country and a few records on Cape York Peninsula (DEE, 2019 and references therein). They are also widespread but scattered records in coastal areas in the south-eastern region of Queensland where they are more widespread west of the Great Divide and are commonly found west of the line joining Chinchilla and Hughenden. In Australia, they mostly occur over inland plains, cliffs and beaches, over islands and sometimes off the coast but are almost exclusively aerial. There are five local records within 30km of the study area and records throughout the surrounding landscape are scattered.

Despite multiple surveys for this species, the Fork-tailed Swift was not recorded within the study area or the surrounding landscape. There are a few records of this species in the local area but the most recent is 18 years old and the study area does not represent important habitat. It is likely that any occurrence in this area would be a pass-over as they are almost exclusively aerial. There is a moderate likelihood that this species may fly over the proposed rail loop during seasonal migration periods, but the site does not represent important habitat and it is unlikely that any development from the proposed project will significantly impact either individuals or populations of this species.

Oriental Cuckoo

Low – The Oriental Cuckoo (*Cuculus optatus*) is widespread in the northern and eastern parts of Australia, inhabiting rainforest margins, monsoon forest, vine scrubs, riverine thickets, densely canopied eucalypt forests, paperbark swamps and mangroves (Morcombe, 2003). As the proposed disturbance area is a grassland in a highly ephemeral area the habitat conditions for this species are not met. There is one record of this species approximately 20km to the west of the proposed site. This record is over 30 years old and associated with a large tract of remnant vegetation. Due to the habitat requirements of this species not being met within the study area and no recent records in the local area, it is unlikely this species occurs within the study area.

Satin Flycatcher

Low – The Satin Flycatcher (*Myiagra cyanoleuca*) is widespread but scattered in east Queensland in heavily vegetated gullies in eucalypt dominated forests, and can occur in coastal forests, woodlands, mangroves and drier woodlands and open forests on migration (DEE, 2019 and references therein). Specifically, they generally occur in moister, taller forests in gullies and feed on insects high in the canopy and subcanopy of trees. There is one record of this species within 30km of the study site; however, the proposed disturbance area consists of low quality habitat for this species as it is a grassland with very few scattered trees. It is considered of low likelihood that this species could occur within the proposed disturbance area.

Yellow Wagtail

Low – The Yellow Wagtail (*Motacilla flava*) is a rare but regular migrant to coastal areas within Australia and is found in damp or wet habitats with low vegetation such as damp meadows, marshes and waterside pastures to damp steppes (IUCN, 2019). Breeding occurs from Europe to Siberia and western Alaska, with non-breeding migrants visiting north-east Queensland from November to April (Pizzey & Knight 2002). Although scattered records occur south to Victoria, the study site is further south than any of the 'expert distribution' areas provided by the Atlas of Living Australia, and damp grasslands only occur periodically during the wet season when such habitat is widespread across the broader region. The combination of spatial rarity, and lack of suitable habitat reduces the likelihood of occurrence to low within the study area.

Common Sandpiper

Low – The Common Sandpiper (*Actitis hypoleucos*) has a widespread and patchy distribution along all coastlines of Australia. It is found in coastal and inland wetlands with varying levels of salinity and is found most commonly found in muddy or rocky shores of estuaries, deltas of streams, banks upstream, lakes, pools, billabongs, reservoirs, and dams (DEE, 2019 and references therein). Foraging occurs in shallow water and on bare, soft mud, though on occasion will venture into grassy areas adjoining wetlands. The diet of this species consists primarily of bivalves, crustaceans and a variety of insects. There are no records of this species in the local area. As the area does not support suitable habitat or foraging opportunities for this species and there are no records in the local area, the likelihood of occurrence is low.

Sharp-tailed Sandpiper

Low – The Sharp-tailed Sandpiper (*Calidris acuminata*) occurs around the entire coast of Australia outside its breeding season, although occurrence is very sparsely scattered in inland Queensland with the majority of records being of birds in passage (DEE, 2019 and references therein). In Australia the species prefers muddy edges of shallow fresh or brackish wetlands with inundated vegetation. The species will use flooded paddocks and will leave when the paddock dries. Foraging occurs at the edge of wetlands or shallow bodies of water. Their diet consists of seeds, worms, molluscs, crustaceans and insects. As suitable habitat in the region is mostly seasonal, the majority of birds are likely to be passage migrants. Suitable habitat is not found within the disturbance area, so there is a low likelihood of this species occurring within the study area.

Curlew Sandpiper

Low – The Curlew Sandpiper (*Calidris ferruginea*) has sparsely scattered records in inland Queensland and they typically occur on intertidal mudflats in sheltered coastal areas; however, it has also been recorded inland around ephemeral and permanent lakes, dams, waterholes and bore drains with bare edges of mud or sand (DEE, 2019 and references therein). Foraging occurs on mudflats and nearby shallow water in water generally 15-30mm deep. Occasionally the species will forage in flooded paddocks. Their diet consists of worms, molluscs, crustaceans and insects and some seeds. Roosting occurs on bare dry shingle, shell or sand beaches, sandspits and occasionally roosting in dunes. There are no records of this species within 30km of the study area and the nearest is at Lake Maraboon, south of Emerald. It is considered that this species is unlikely to occur within the study area, as there is no suitable foraging or typical roosting habitat for this species within the study area.

Pectoral Sandpiper

Low – The Pectoral Sandpiper (*Calidris melanotos*) breeds in Siberia and the American arctic, migrating mostly to south-east Australia during summer months (Pizzey & Knight 2002). . This species forages in in shallow water and feeds on algae, seeds, crustaceans, arachnids and insects. The primary habitat is coastal or near coastal shallow fresh to saline wetlands and can be found at coastal lagoons, estuaries, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands (DEE, 2019 and references therein). Wetlands that have open fringing mudflats and low, emergent or fringing vegetation is preferred and this species does not tend to use small or ephemeral water bodies. Due to their preference for coastal habitats and absence of suitable habitat and foraging opportunities the likelihood of this species occurring on the site is low.

Latham's Snipe

Low – Latham's Snipe (*Gallinago hardwickii*) is a passage migrant through northern Australia and occurs along the coast from the Cape York Peninsula through to south-east South Australia (DEE, 2019 and references within). In Queensland, their range extends inland over the eastern tablelands in south-eastern Queensland and occasionally from Rockhampton inland. The species occurs in open, freshwater permanent and ephemeral wetlands with low, dense vegetation, and occasionally in habitats with brackish or saline water where they feed on seeds and other plant material and a wide range of invertebrates. The structure and composition of the vegetation does not determine suitability of habitat. The foraging habitat is characterised by areas of mud and some form of cover and roosting occurs near or in the foraging area. Due to the lack of local records and suitable habitat, there is a low likelihood of this species occurring within the study area.

4 Relevant Impacts

4.1 An assessment of the direct and indirect loss and/or disturbance of threatened species populations and habitat

4.1.1 The quality of the habitat impacted, a quantification of the total individuals/populations and habitat area in hectares and analysis of the indirect impacts such as fragmentation of the habitat in the proposed action area and surrounding areas.

4.1.1.1 Grassland Threatened Ecological Community

Results of condition thresholds within the grassland TEC indicate the majority of the area is considered 'best quality' habitat with some small areas containing 'good quality' habitat (**Figure 8**). 'Good quality' habitat was mostly located in a broad band towards the southern portion of the proposed development, interspersed with areas of 'best quality'. The proposed development encompasses 79.70ha. Of this, 2.68ha contained no grassland TEC. The remaining 77.02ha of the rail loop footprint contains the grassland TEC.

Habitat condition scores were calculated at each transect within the grassland TEC (**Figure 9**). Results for each transect can be found below (**Table 25**). Habitat condition scores varied from 6.5 to 7.5. The average score for the entire TEC that intersects with the rail loop footprint is 7.0.

Table 25: Habitat condition scores recorded within and immediately adjacent to the proposed disturbance area.

Transect Number	Habitat Condition Score	Average Score of grassland TEC	Easting	Northing
HC1	6.9	7.0	646884	7303719
HC2	6.7		645757	7303464
HC3	7.5		646842	7303916
HC4	6.9		645902	7302907
HC16	7.5		646041	7302028
HC17	6.5		646852	7303270

*Data in GDA 94 with MGA Zone 55

The proposed development (79.70ha) would impact directly upon 77.02ha of the grassland TEC with an average habitat condition score of 7.0. No grassland TEC was recorded within the slip lane or within a small section in the northern portion of the design.

ENDOCOAL

METEOR DOWNS SOUTH RAIL LOOP

TEC DISTRIBUTION

Legend

- Proposed Site Disturbance
- Proposed RoL Boundary
- Proposed Management Zone
- Base Cadastre

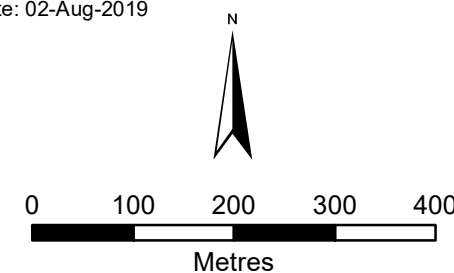
Proposed Management Zones

- Natural Grassland TEC
- Not TEC
- Not TEC (Slip-lane)

TEC Condition Assessment

- Best Quality
- Good Quality
- Not a TEC

Data Sources:
Digital Cadastral Database (extracted 30 July 2019)
dataset: © State of Queensland (Department of Natural
Resources, Mines, and Energy) 2019; Proposed Site
Disturbance dataset: supplied by client (May 2019);
Proposed RoL Boundary, and Proposed Management
Zones, and TEC Condition Assessment datasets: SLR
Consulting (2019).
Imagery Sources: 2014 Surat Basin North 25cm
resolution SISP PeriUrban Orthophoto Imagery Web
Service: © State of Queensland (Department of Natural
Resources, Mines, and Energy) 2019.
Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator
Datum: GDA 1994
Date: 02-Aug-2019



Scale: 1:7,500 at A3



ENDOCOAL

METEOR DOWNS
SOUTH RAIL LOOP

HABITAT
CONDITION

Map Note
Areas of Proposed Management Zones
within Proposed Site Disturbance:

Natural Grassland TEC: Abt 76.99 ha
Not TEC (Slip-lane): Abt 2.5 ha
Not TEC: Abt 0.23 ha
Total: Abt 79.7 ha

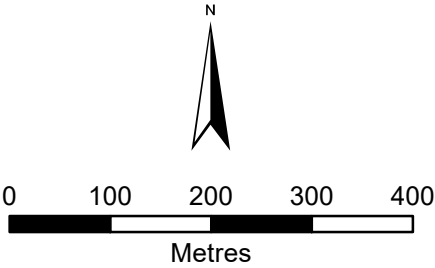
Legend

- Habitat Condition Assessment
Transect
- Proposed Site Disturbance
- Proposed RoL Boundary
- Proposed Management Zone

Proposed Management Zones

- Natural Grassland TEC
- Not TEC
- Not TEC (Slip-lane)

Data Sources:
Digital Cadastral Database (extracted 30 July 2019)
dataset: © State of Queensland (Department of Natural
Resources, Mines, and Energy) 2019; Proposed Site
Disturbance dataset: supplied by client (May 2019);
Proposed RoL Boundary, and Proposed Management
Zones, and Habitat Condition Assessment Transect
datasets: SLR Consulting (2019).
Imagery Sources: 2014 Surat Basin North 25cm
resolution SISP PeriUrban Orthophoto Imagery Web
Service: © State of Queensland (Department of Natural
Resources, Mines, and Energy) 2019.
Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator
Datum: GDA 1994
Date: 02-Aug-2019



Scale: 1:7,500 at A3

4.1.1.2 King Blue-grass

Within the 79.7ha project footprint, 60.2ha does not contain any King Blue-grass, however, the project will result in the removal of 19.5ha of potential habitat for the King Blue-grass. Tussocks in these areas ranged from 3 to 18 per 0.1ha survey plot. The large patch of grassland in the southern portion of the design area contained greater numbers of tussocks, which ranged from 2 to 181 per survey plot. The proposed slip lane bordering the Dawson Highway contained the highest range of tussocks, ranging from 2 to 207 per survey plot (**Figure 10**).

Due to the varying densities of tussocks recorded, the King Blue-grass habitat was delineated into specific areas. The area of King Blue-grass in the north and northeast portion of the design amounts to 6.5ha. Within this area approximately 715 tussocks would be impacted. South of the *Leucaena* plantation is a 10.5ha patch of grassland that contains approximately 3,686 tussocks of King Blue-grass. The slip-lane on the southern boundary of the design is 2.5ha and contains approximately 3,365 tussocks. In total, it is estimated that the 19.5ha of King Blue-grass habitat contains 7,766 tussocks that intersect with the design.

Average tussocks per survey plot (20 x 50m) are shown in **Table 26** below. Results were averaged to determine density per hectare in the three defined sections of King Blue-grass habitat:

- 110 tussocks per hectare for the small polygons in the north and northeast area;
- 351 tussocks per hectare for the grassland in the central area; and
- 1,346 tussocks per hectare for the slip lane.

By extrapolating the average density across the site, it is estimated that the proposed design footprint will impact approximately 715 tussocks for the northern polygons of grassland, 3,686 tussocks for the central grassland area and 3,365 tussocks for the Slip lane. In total it is estimated that 7,766 tussocks will be impacted within the 19.5ha of King Blue-grass habitat that intersects with the proposed design.

Table 26: King Blue-grass tussock counts and extrapolated densities

Area	Tussock Range	Average Number of Tussocks per assessment plot (20x50m)	Total Number of Tussocks in all assessment plots	Number of Tussocks per ha	Number of Tussocks per area
Grassland north (6.5ha)	3-18	11	33	11 x 10 = 110	110 x 6.5 = 715
Grassland central (10.5ha)	2-181	35.1	667	35.1 x 10 = 351	351 x 10.5 = 3,686
Slip lane (2.5ha)	2-207	134.6	404	134.6 x 10 = 1,346	1,346 x 2.5 = 3,365
Total (19.5ha)	2-207	44.2	1,104	602	7,766

A total of 68.23 ha of potential habitat for King Blue-grass will be retained in the 175 ha Project site.

ENDOCOAL

METEOR DOWNS SOUTH RAIL LOOP

DICHANTHIUM QUEENSLANDICUM OBSERVATIONS

Map Note
Areas of Proposed Management Zones
within Proposed Site Disturbance:

Dichanthium queenslandicum habitat: Abt 19.5 ha
Not *Dichanthium queenslandicum* habitat: Abt 60.2 ha
Total: Abt 79.70 ha

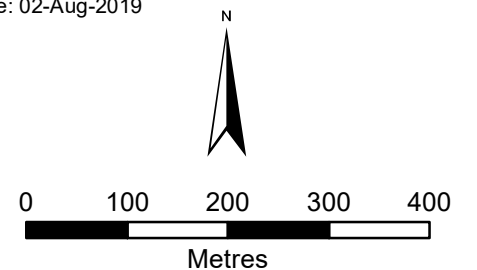
Legend

- Proposed Site Disturbance
- Proposed RoL Boundary
- Proposed Management Zone
- Survey Plot with no *Dichanthium queenslandicum* Observations
- Survey Plot with *Dichanthium queenslandicum* Observations
- Base Cadastre

Proposed Management Zones

- Dichanthium queenslandicum* habitat
- Not *Dichanthium queenslandicum* habitat

Data Sources:
Digital Cadastral Database (extracted 30 July 2019)
dataset: © State of Queensland (Department of Natural
Resources, Mines, and Energy) 2019; Proposed Site
Disturbance dataset: supplied by client (May 2019);
Proposed RoL Boundary, and Proposed Management
Zones, and *Dichanthium queenslandicum* observation
datasets: SLR Consulting (June-July 2019).
Imagery Sources: 2014 Surat Basin North 25cm
resolution SISP PeriUrban Orthophoto Imagery Web
Service: © State of Queensland (Department of Natural
Resources, Mines, and Energy) 2019.
Coordinate System: GDA 1994 MGA Zone 55
Projection: Transverse Mercator
Datum: GDA 1994
Date: 02-Aug-2019



Scale: 1:7,500 at A3

4.1.1.3 Indirect impacts

Other than physical, removal of King Blue-grass and the Grassland TEC, the project was also assessed for other indirect impact. These include:

- Fragmentation - The distribution of endangered Bluegrass grassland has been significantly reduced from previous known distributions, with a 64.8% reduction in extent, so that now only small remnants of Bluegrass grasslands remain (TSSC 2013c). This species is endemic to central and southern Queensland where it occurs in three disjunct populations: 1) Hughenden district; 2) from Nebo to Monto and west to Clermont and Rolleston; and 3) Dalby district, Darling Downs (DEE, 2019). Habitat for King Blue-grass extends beyond the extent of the rail loop project area and was recorded in grasslands to the immediate west of the project site. King Blue-grass occurs across 424 ha of natural grasslands within the adjacent Meteor Downs mine area (CO2 Australia, 2018). The 7,360ha Albinia National Park (Albinia NP) located to the immediately south of the proposed rail siding is described as having the largest and most intact representation of natural grassland TEC (RE 11.8.11) in the Brigalow Belt on QPWS estate, and contains populations of *Dichanthium queenslandicum* (Department of National Parks, Recreation, Sport and Racing, 2013). Connectivity values associated with remnant vegetation at in the study area were assessed using the Landscape Fragmentation and Connectivity (LFC) tool. The LFC tool is usually used to determine whether a specific action will significantly impact connectivity areas. Following input of all the vegetation parameters at the study area into the LFC tool, it was determined that the connectivity values of mapped remnant vegetation within the study area (47.05 ha) is not significant, in that the post-removal impact of removal would be 1.59%, which is below the 10% threshold for fragmentation. The removal of 19.5ha of King Blue-grass habitat will not cause fragmentation of the population.
- Result in genetically distinct populations forming as a result of habitat isolation – As described above, habitat isolation will not occur. Except for a few dioecious species, obligatory cross-pollination has not been recorded in any Australian native grasses and all are self-compatible (Whalley *et al.* 2013). Other *Dichanthium* species show a high level of variation in the wild, with many genotypes being largely apomictic (asexually reproducing) in nature (Chandra *et al.* 2004), however, the mode of reproduction in King Blue-grass is not known. Self compatibility generally ensure a high degree of inbreeding, together with occasional outcrossing opportunities resulting in limited gene flow from one population to another, even when the populations are in close proximity (Whalley *et al.* 2013). Without knowing whether genetically distinct populations of King Blue-grass occur in the region, the proposed project will retain areas of King Blue-grass that are continuous in nature, and will not prevent the potential for occasional outcrossing opportunities.
- Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat – A range of weed species were recorded on site, including introduced pasture species Red Natal Grass (*Melinis repens*) and Buffel Grass (*Cenchrus ciliaris*) and Leucaena which has been cultivated as cattle fodder. Parthenium (*Parthenium hysterophorus*) was recorded as widespread on site. This weed is a restricted invasive plants under the Queensland *Biosecurity Act 2014* and is listed as a threat to King Blue-grass (TSSC 2013). The project will have a weed management plan, however, grassland will be managed on site to allow the community to maintain a high level of competitiveness, which is one of the most effective ways to manage Parthenium and other weeds in natural grasslands (Vogler *et al.* 2006). By implementing a policy of early detection and eradication of all new weed species not currently occurring on site, particularly those listed as declared under the Queensland *Biosecurity Act 2014*, the potential for new invasive species to become established is effectively managed

- Introduce disease that may cause the population to decline – There are no known diseases of King Blue-grass. White leaf disease has been recorded infecting a commercial *Dichanthium* species in India (Rao *et al.* 2009), however, this disease does not occur in Australia.
- Interfere with the recovery of the species – There is no published recovery plan for this species or the TEC. The monitoring and management of these MNES at the Rail Loop Project and the Lexington Offset sites assist in meeting several of the research priorities outlined in the Approved Conservation Advice.

4.1.2 The impacts of changes to surface hydrology to habitat in the proposed action area and surrounding areas.

The Project falls within the Comet sub-catchment area of the Fitzroy Basin (*Water Resource (Fitzroy Basin) Plan 2011*). Surface water flows in area surrounding the Project are ephemeral, are associated with heavy rainfall and generally cease soon after the rainfall events leaving some semi-permanent localised pools. An assessment of the pre-development scenario indicates that there are three main flow paths which traverse the allotment which the development is located. To the north of the Project area (reconfigured lot boundary) is a second order unnamed tributary of Aldebaran Creek and flowing through the southern corner of the Project area is a second order unnamed tributary of Meteor Creek, (Qld Gov 2019^b). The Aldebaran Creek catchment which is 404 km² was modelled to represent the tail water conditions during coincident flows from the two creeks.

A flood study and stormwater management plan has been undertaken for the proposed development.

This assessment has determined that the proposed development has small localised impacts on flood levels for the surrounding locality, with very limited impact propagating past the property boundary. The 1 % AEP flood extent associated with these creeks do not impact the development area.

Surface water runoff from the proposed development is proposed to be captured in two sedimentation basins (A and B), to prevent any increase in discharge and to manage water quality leaving the site. The basin capacities are sufficient to capture the 1 % 24 hr AEP flood event without overtopping.

Findings from the flood impact assessment include:

- The Flood Impact Assessment showed no impact, actionable nuisance, or worsening of stormwater, flooding or drainage to the state-controlled road (Dawson Highway).
- The Flood Impact Assessment showed no increase in velocities, actionable nuisance, or worsening of stormwater, flooding or drainage to the railway corridor.
- The Stormwater Management Plan showed some minor increases in flood levels within the railway corridor. This is a result of localised drainage works. The impacts are confined to the extent of the channel and do not affect the existing railway line ballast. Impacts are very isolated, up to 350 mm but more typically up to 40 mm. Associated increases in velocity are 0.3-0.5m/s.
- Existing flow paths are maintained, and therefore no increase in concentration of overland flow occurs on the existing railway line.
- The modelling has sufficiently identified overland flow paths through rain on grid modelling and hydraulic conveyance through structures has been maintained. The proposed development does not impede or interfere with any drainage, stormwater or floodwater flows from the railway corridor.
- Proposed development does not adversely increase flood levels or velocities through existing drainage infrastructure.

Figure 11 below shows the limited extent of predicted afflux across the site during a peak flood level event of 1% Annual Exceedance Probability (AEP), often referred to as a one in a hundred year flood. This figure shows very little change in flood levels within areas identified as King Blue-grass habitat or TEC and is not expected have any significant impact on either of those natural values.

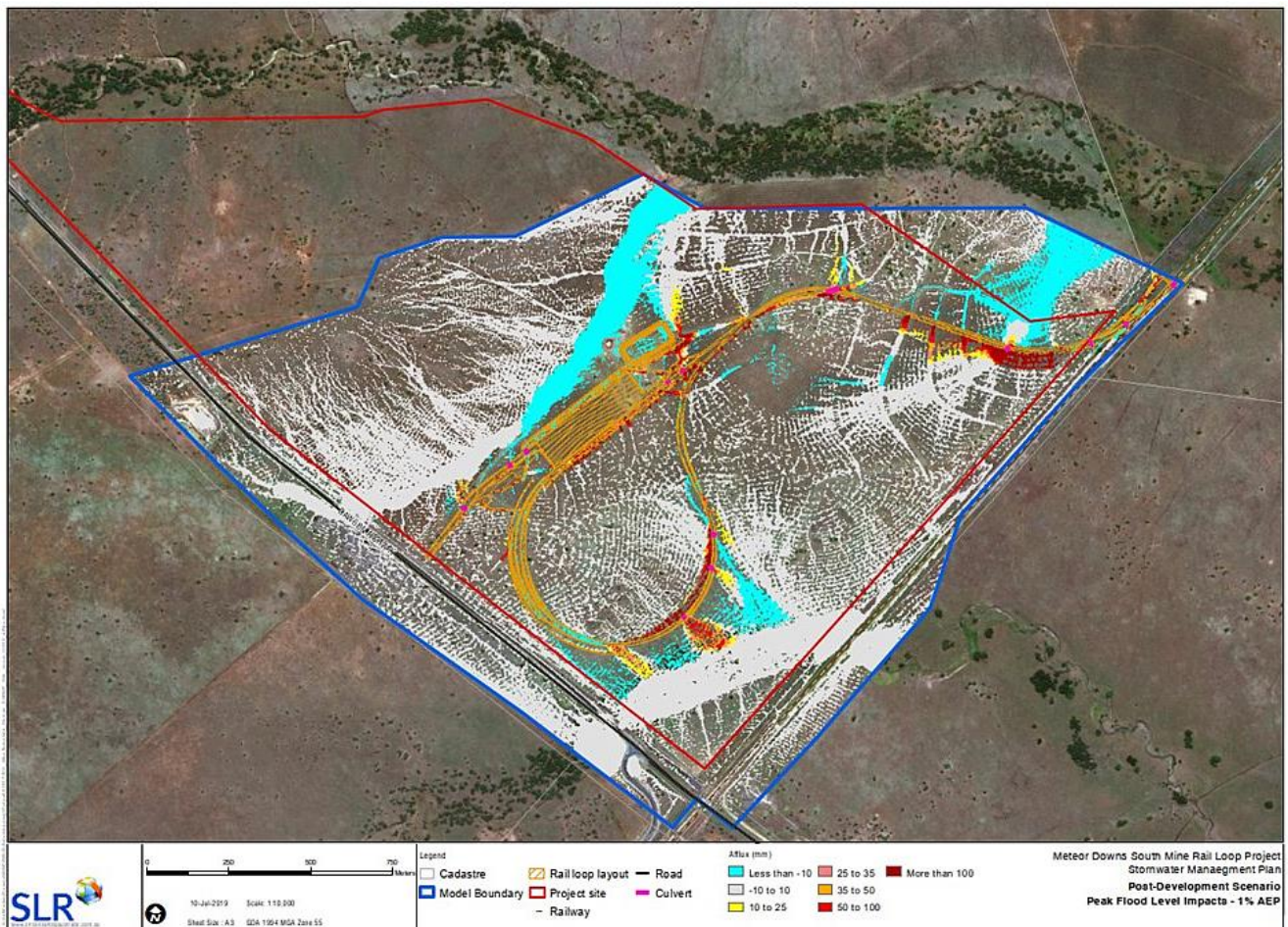


Figure 11: Predicted afflux levels during peak flood levels (1% AEP)

Further information on the impacts of changes to surface hydrology to habitats in the proposed action area and surrounding areas can be found in Appendix M.

4.1.3 The impacts of dust resulting from the construction and operation of the project to habitat in the proposed action area and surrounding areas.

Fugitive dust is considered to be the most likely potential impact to air quality from the Project. While Lodge *et al.* (1981) identify the main effects of dust deposition on vegetation to be stomata obstruction and blocking access of sunlight, Farmer (1993) identified described impairment of photosynthesis, respiration, transpiration and allow the penetration of phytotoxic gaseous pollutants. The types of effects such as changes to pH and formation of crusts on grass leaves depends on the source of the dust, such as alkaline limestone dust (Farmer, 1993). Dust may potentially originate from:

- excavation and construction material movement,

- stockpiling
- product transport activities.

While coal dust deposition is known to significantly reduce carbon dioxide exchange in mangrove leaves (Naidoo & Chirkoot, 2003), it is most likely that fugitive dust on site will be from the surface soil as coal dust will be subject to specific controls. This dust is unlikely to contain any chemical composition such as metals or nutrients that the surrounding grassland does not currently experience.

The amount of dust deposition required to cause environmental harm is difficult to quantify and Lodge *et al.* (1981) concluded that no firm numbers can be derived for the possible effects of dust on vegetation. The dust deposition guideline set out in the Model Mining Conditions (MMC) (DES, 2017) and the DES guideline 'Application requirements for activities with impacts to air' is based on avoiding nuisance in residential areas and does not relate to impacts to vegetation. McTainsh and Strong (2007) note that dust deposition can reduce the amount of light reaching the photosynthetic apparatus of the leaves, leading to up to 20% reduction in leaf photosynthesis, however, the level of dust deposition causing that level of impact was not noted. An assessment of coal dust on cattle grazing (Andrews & Skiskandarajah, 1992) found that dust deposition of 4,000 mg/m²/day did not affect the selection of feed or the amount of feed ingested. The MCC dust deposition guideline of 120 mg/m²/day is significantly below this level.

An Air Quality Impact Assessment (AQIA) was undertaken by SLR (SLR 2019), and concluded that significant separation distances from the Rail Loop Project area meant that there is no potential for fugitive dust emissions from construction to have adverse health or amenity impacts at the nearest sensitive receptor, even if no emissions controls were implemented. Similarly, they found that no exceedances of the annual average TSP guideline or monthly dust deposition guideline are predicted at any off-site receptor (SLR 2019). However, in this case, sensitive receptors did not include the surrounding TEC and King Blue-grass populations.

Potential impacts of fugitive dust emissions from the construction and/or operation of the Project on natural grasslands and King Blue-grass at the Rail Loop project site may include:

- may smother King Blue-grass or other plants within the Natural Grasslands TEC.
- may reduce the photosynthetic capacity of King Blue-grass and degrade its habitat adjacent to the Project site.

It was determined from the MMC (DES, 2017) that dust deposition must not exceed 120 mg per square metre per day, averaged over one month when measured at any sensitive receptor. In this case, a 'sensitive receptor' will include areas of the natural grasslands TEC and King Blue-grass that are being managed at the project site for conservation purposes.

The following control / mitigation measures will be applied to reduce fugitive dust in proximity to the project and reduce impacts on surrounding sensitive species:

- Water truck will be maintained on site for dust suppression of construction activities as required;
- The designated site speed limit will be a maximum 40 km/hr;
- Construction topsoil, subsoil and parent material stockpiles will be retained in a tidy condition and reused or stabilised as soon as practical;
- Detailed project planning which limits ground disturbance to only that necessary and within the proposed disturbance footprint;

- Development and implementation of a Permit to disturb system which required supervisory sign off prior to clearing and surface disturbance;
- Visual monitoring of dust and prevailing weather conditions and appropriate direction of water trucks as necessary or modification of certain construction activities in extreme circumstances; and
- Development and implementation of a complaints management and investigation system through which legitimate complaints will be managed.
- Consistent with industry best practice a coal veneering (chemical sealing) unit will be included at the loading facilities and loaded wagons will be veneered prior to exit to aid in dust control along the route to the port facilities.
- Increasing the frequency of dust suppression techniques, particularly during dry and windy conditions;

Throughout construction and operation activities, dust and prevailing weather conditions will be monitored visually to direct dust suppression activities and modify work practices. Dust deposition monitoring will also take place 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'. This includes the use of a dust gauge mounted on a 2 m high pole and installed in potentially affected dust-sensitive locations. Monitoring with the dust gauge will be undertaken when requested by the administering authority or as a result of a complaint. During the biannual general site inspections, notes will be taken of signs of dust deposition on vegetation located adjacent to the project site. Exceedance of dust deposition thresholds will result in a review of dust suppression procedures and implement new procedures if necessary. The corrective actions may include the use of dust suppression polymers which will reduce the amount of water required for dust suppression.

4.2 An assessment of the likely duration of impacts to MNES

Construction of the Project will commence in late 2019 following the necessary approvals. All impacts to MNES will occur during the construction phase, and no impacts are anticipated during the operational phase. The life of the operating phase is estimated at ten years, consistent with the current MDS Mine schedule. Following completion of the operational phase, the infrastructure will be removed and the site rehabilitated. The post rehabilitation land use for the site will be as natural areas that are compatible with the Natural Grasslands TEC. The site will be rehabilitated through the reuse of existing topsoil and seed bank following restoration of the natural landform. All impacts to MNES on site will continue from construction until rehabilitation.

4.3 An assessment of whether impacts are likely to be repeated, for example as part of maintenance

Impacts to MNES on site are the consequence of clearing and construction activities. These activities will be within an area clearly marked and defined to ensure adherence to permitted clearance areas and minimise any potential clearing outside of the proposed design. The operational area will be fenced post-construction to ensure no accidental incursions into the TEC or King Blue-grass habitat areas results in adverse impacts. This includes stockpiling of soil or equipment, and unauthorised vehicle traverse. No impacts to MNES on site are anticipated as a consequence of maintenance.

4.4 Discussion of the risk of introduction and spread of weeds and pathogens during construction on MNES

A range of weed species were recorded on site, including introduced pasture species Red Natal Grass (*Melinis repens*) and Buffel Grass (*Cenchrus ciliaris*) and Leucaena which has been cultivated as cattle fodder. Parthenium (*Parthenium hysterophorus*) was recorded as widespread on site. This weed is a restricted invasive plants under the Queensland *Biosecurity Act 2014* and is listed as a threat to King Blue-grass (TSSC, 2013). The project will have a weed management plan, however, grassland will be managed on site to allow the community to maintain a high level of competitiveness, which is one of the most effective ways to manage Parthenium and other weeds in natural grasslands (Vogler *et al.* 2006). By implementing a policy of early detection and eradication of all new weed species not currently occurring on site, particularly those listed as declared under the Queensland *Biosecurity Act 2014*, the potential for new invasive species to become established is effectively managed

There are no known diseases of King Blue-grass. White leaf disease has been recorded infecting a commercial *Dichanthium* species in India (Rao *et al.* 2009), however, this disease does not occur in Australia.

4.5 Details on whether any impacts are likely to be unknown, unpredictable or irreversible

Impacts on MNES through clearing and construction are clearly predictable and the extent will be clearly defined. None of the impacts are likely to be irreversible. Rehabilitation of the site will be aligned with the on-site rehabilitation research program at the nearby MDS Mine, where the proponent will continue to research the most appropriate species mix of grasses, revegetation methods and rehabilitation success criteria for natural grassland communities.

4.6 Information Resources

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Department of the Environment and Energy (DEE). (2019b). *Species Profile and Threats Database*, Department of the Environment and Energy, Canberra. Available from: <http://www.environment.gov.au/sprat>

Department of Environment & Science (DES) (2017). *Guideline - Model Mining Conditions*. Queensland: Department of Environment and Science.

Department of National Parks, Recreation, Sport and Racing, (DNPRSR) (2013) Albinia/Snake Range Area Management Statement 2013. Retrieved from: <http://www.sport.qld.gov.au/managing/plans-strategies/statements/pdf/albinia-snake-range.pdf>

Farmer A. (1993) The effects of dust on vegetation—a review. *Environmental Pollution* 79 (1): 63-75

Lodge J.P., Waggoner A.P., Klodt D.T., Crain C.N. (1981) Non-health effects of airborne particulate matter *Atmospheric Environment* 15 (4): 431-482

McTainsh G., Strong C. (2007) The role of aeolian dust in ecosystems. *Geomorphology* 89 (2007): 39–54

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Queensland Government database (Queensland Globe) (Qld Gov 2019^b), Inland waters layers viewed 7 February 2019, gldglobe.information.qld.gov.au/inlandwaters

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Whalley R. D. B., Chivers I. H., Waters C. M. (2013) Revegetation with Australian native grasses – a reassessment of the importance of using local provenances. *The Rangeland Journal*, 35: 155–166

Vogler W., Navie S., Adkins S., Setter C. (2006) Use of Fire to Control Parthenium Weed. Rural Industries Research and Development Corporation Publication No. 06/130. Retrieved from: <https://www.agrifutures.com.au/wp-content/uploads/publications/06-130.pdf>

5 Proposed Avoidance and Mitigation Measures

5.1 Proposed measures to be undertaken to avoid and mitigate the relevant impacts of the project on the above listed threatened species

The proponent adheres to the environmental management hierarchy—*avoid, minimise and manage*—as their overall approach to managing environmental issues and potential impacts on site. In adopting this approach, the proponent commits to:

- *Avoiding* impacts to MNES through design and positioning of infrastructure, by placing the majority of the project footprint within the *Leucaena* plantation to avoid impacts to King Blue-grass.
- *Avoiding* unplanned negative impacts on MNES;
- *Minimising* negative impacts associated with planned activities on MNES by restricting clearing and disturbance to the minimum area necessary for the project construction and operation in accordance with permits and approvals;
- *Minimising* loss of MNES by revegetating or facilitating rehabilitation of construction disturbance areas no longer necessary for the operational phase of the project;
- *Minimising* disturbance to vegetation by applying dust suppression during construction and operation. This will reduce dust impacts to the TEC and King Blue-grass population.
- *Managing* the effects of planned and unplanned activities on MNES by implementing a monitoring program to identify necessary management and intervention tasks required;

- *Managing* the ongoing health and viability of MNES on site by adopting principles of adaptive management based on monitoring effectiveness of management actions, as described below.
- *Managing* people on site. The existing Environmental Management System (EMS) for MDS will be modified to incorporate management of the rail loop infrastructure, and its implementation will align with that of the MNESMP. The EMS ensures site staff and contractors have sufficient environmental training, understand their roles and responsibilities and have environmental operating procedures. All personnel, staff and contractors working on site will be required to participate in a site-specific induction before beginning their employment. This induction will focus on workplace hazards and safe workplace behaviour but will include environmental requirements and risks associated with the project. Environmental issues that will be covered in the induction will include, but not be limited to, weed hygiene, spill management, and incident reporting requirements. Workers will be advised that access to the grassland areas will be prohibited to unauthorised personnel, particularly restrictions on vehicle use off designated roads and tracks.
- *Managing* grazing on site. Cattle grazing is incompatible with management and operation of the rail loading facility, and their exclusion is anticipated to improve habitat quality, growth and reproduction of the TEC and King Blue-grass. Grazing exclusion is considered necessary to allow the grassland community to maintain a high level of competitiveness to reduce weed invasion (Vogler *et al.* 2006). This is considered critical for the effective management of *Parthenium* in this type of grassland community (Vogler *et al.* 2006).
- *Managing* weeds on site, especially high biomass grasses (e.g. Buffel Grass) that has the potential to significantly degrade surrounding grassland that represents the TEC and is critical for populations of King Blue-grass. Weed control measures will include:
 - Maintaining grasslands in an undisturbed condition, including excluding cattle grazing
 - Treat weed infestation prior to clearing using suitably qualified and experienced operators
 - Conserve weed free topsoil for reuse in site rehabilitation
 - Undertake routine weed inspection and control in heavy traffic areas including roads and hardstand areas
 - Implement a policy of early detection and eradication of all new weed species not currently occurring on site, particularly those listed as declared under the Queensland *Biosecurity Act 2014*.
 - Actively manage *Leucaena* regrowth in TEC areas where cattle are excluded to ensure that the condition thresholds for the TEC are not diminished. Chemical control of regenerating foliage with a broad-leaved selective foliar spray, or basal bark treatment of trunks may be necessary to prevent *Leucaena* dominating the site. *Leucaena* should not be allowed to set seed. Fire may be necessary to manage a dormant seedbank (see below).
- *Managing* burning regimes: Where practical, a mosaic burning regime should be in accordance with the fire guideline recommendations for RE 11.8.11 provided in the REDD V.11.1 (Queensland Herbarium, 2009). These guidelines recommend burning in the late wet to early dry season when there is adequate soil moisture, burning less than 30% in any year. A fire experiment undertaken at the adjacent Albinia National Park from July 1999 until June 2002 showed a general increase in the frequency of *D. queenslandicum* in burnt areas, however, post-fire grazing exclusion is necessary to maintain pasture competitiveness and follow up fires may be necessary to manage regrowth and invasion of weeds such as Mimosa Bush (Vogler *et al.* 2006). Burning may be necessary to manage residual dormant seedbanks of hard-seeded introduced legumes such as Mimosa Bush or *Leucaena*. While the *Leucaena* plants in the plantation may have had only limited opportunities to develop seed, *Leucaena* can have seed dormancy extending up to 20 years (Walton 2003), and heat scarification by the fire can stimulate the seed bank to germinate, thereby depleting the seed bank and making long term management more achievable.

5.2 Assessment of the expected or predicted effectiveness of the proposed mitigation measures

Avoiding impacts to the TEC and King Blue-grass is the most effective mitigation measure. Due to the location of the existing rail line, mine and the Dawson Highway, there are few options available for the location of the proposed design. Initial designs were altered after the desktop assessment identified that the *Leucaena* area was non-remnant and the initial survey that identified that King Blue-grass was present in grassland areas. The initial design ensured that as much of the footprint as possible would be located in the northern portion of the study area that is dominated by *Leucaena* as no King Blue-grass was located in this area. Although the radius of the rail loop is constrained by engineering requirements, all infrastructure placement has been preferentially located within the *Leucaena* plantation area to avoid impacts to King Blue-grass.

All non-impact areas will be managed by the MNESMP which has been based on the MDS Mine MNESMP. The MNESMP is adaptive so will effectively manage the quality and extent of the TEC and King Blue-grass by ensuring habitat condition improves over time. The key tool for developing this is the MNESMP which is included as attachment.

5.3 Any statutory or policy basis for the proposed mitigation measures, including reference to approved conservation advices relevant to the listed threatened species, and discussion on how the proposed mitigation measures are not inconsistent with recovery plans and threat abatement plans relevant to the listed threatened species and communities

As per section 5(a), the MNESMP for the non-impact areas aligns with the majority of the approved conservation advice in regards to research priorities and priority actions for King Blue-grass and the TEC. Overlap of the MNESMP and research priorities and priority actions within the conservation advice for King Blue-grass (DSEWPC, 2013) include:

- Design and implement a monitoring program;
- Undertake survey work in suitable habitat and potential habitat to locate any additional population/occurrences/remnants;
- Identify optimal fire regimes for regeneration and response to other prevailing fire regimes;
- Establish the grazing threshold of the species to determine what grazing management practices are consistent with sustaining populations of this species;
- Monitor known populations to identify key threats;
- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary;
- Ensure there is no disturbance in areas where King Blue-grass occurs, excluding necessary actions to manage the conservation of the species/ecological community;
- Develop and implement a management plan for King Blue-grass for the control of Parthenium and Parkinsonia in the region;
- Ensure chemicals or other mechanism used to eradicate weeds do not have a significant adverse impact on King Blue-grass.

The MNESMP overlaps with many of the approved conservation advice for King Blue-grass. The MNESMP is based on adaptive management procedures that include implementing management actions while identifying which management actions are most effective at achieving particular environmental outcomes. Both the MNESMP and conservation advice aim to prevent degradation of King Blue-grass habitat and improve the extent and quality of existing habitat.

Overlap of the MNESMP and research priorities and priority actions within the conservation advice for the TEC (DEWHA, 2008) include:

- Design and implement a monitoring programme;
- Monitor known occurrences to identify key threats or the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary;
- Avoid mowing and slashing during peak flowering season from spring to summer;
- Ensure chemicals or other mechanisms used to eradicate weeds do not have a significant adverse impact on the ecological community;
- Ensure road widening and maintenance activities (or other infrastructure or development activities) in areas where the ecological community occurs minimise adverse impacts on known sites;
- Develop and implement management plans for the eradication of weeds such as Parthenium, Parkinsonia, Prickly Acacia and Buffel Grass;
- Manage sites to prevent introduction of invasive weeds, which could become a threat to the ecological community, using appropriate methods;
- Observe appropriate State protocols to avoid the spread of weeds. Implement good hygiene measure for mowing and grading equipment and take appropriate steps to avoid dispersing seeds when moving stock;
- Maintaining a good cover of native perennial grasses and spelling the grasslands from grazing are reliable methods of managing the risk of weed invasion.

The MNESMP overlaps with many of the approved conservation advice for the TEC. The MNESMP is based on adaptive management procedures that include implementing management actions while identifying which management actions are most effective at achieving particular environmental outcomes. Both the MNESMP and conservation advice aim to prevent degradation to the TEC and improve the extent and quality of existing habitat.

5.4 Any mitigation measures proposed to be undertaken by State and local governments

A Development Application was approved by the Central Highlands Regional Council (CHRC) for the project. Due to the DA requirements, including State interests, the DA was referred to relevant State Agencies through the State Assessment and Referral Agency (SARA) process and approved on 5 July 2019 (Appendix F).

The Queensland Department of Environment and Science issued Environmental Authority (EA) EA0001828 on 24 June 2019 for environmentally relevant activities associated with the construction and operation of the Rail Loop project (Appendix D). The EA imposes conditions to reduce or avoid environmental impacts, in conjunction with the general obligation to avoid environmental harm under the *Environmental Protection Act 1994* (Qld).

5.4.1 Protected Plants

A protected plants clearing permit is being sought from the Queensland Department of Environment and Science for impacts to King Blue-grass (*Dichanthium queenslandicum*). This species is listed as vulnerable under the Queensland *Nature Conservation Act 1992* (Qld). The impacts to this species as they pertain to Queensland legislation are the same as described in this Preliminary Documentation with respect to the EPBC Act. It is therefore not anticipated or proposed that there will be any further mitigation measures (beyond those described in this Preliminary Documentation and associated management plans) required by the Queensland Department of Environment and Science for a protected plants clearing permit to be issued.

5.4.2 Environmental Offsets

To avoid duplication of offset conditions between jurisdictions, Queensland and local governments can only impose an offset condition in relation to a proposed action if the same or substantially the same impact and the same or substantially the same matter has not been subject to assessment under the EPBC Act. All significant impacts to all matters of state environmental significance are the same, or largely the same, as those described in this Preliminary Documentation for assessment under the EPBC Act. No additional environmental offsets will be required for State or local government approvals.

5.4.3 General Commitments

The following impact mitigation commitments have been included in the documentation provided to support the DA and EA approval process.

5.4.3.1 Dust

- Water truck will be maintained on site for dust suppression of construction activities as required;
- The designated site speed limit will be a maximum 40 km/hr;
- Construction topsoil, subsoil and parent material stockpiles will be retained in a tidy condition and reused or stabilised as soon as practical;
- Detailed project planning which limits ground disturbance to only that necessary and within the proposed disturbance footprint;
- Development and implementation of a Permit to disturb system which required supervisory sign off prior to clearing and surface disturbance;
- Visual monitoring of dust and prevailing weather conditions and appropriate direction of water trucks as necessary or modification of certain construction activities in extreme circumstances; and
- Development and implementation of a complaints management and investigation system through which legitimate complaints will be managed;
- The Environmental Authority granted for the proposed action includes dust monitoring requirements and limits.

5.4.3.2 Water

Construction phase runoff will be managed in accordance with an ESCP which is expected to include temporary erosion control measures. The ESCP is being developed in accordance with international best practice (IECA 2008).

5.4.3.3 Operational activities

- A waste management strategy will be developed focused on containment and removal by licenced contractors;
- Minor quantities of hydrocarbons and chemicals (other than diesel) will be stored onsite in accordance with sound practice focused on container quality and location to protect from damage;
- Storage of diesel will be with AS1940 compliant secondary containment;
- Vehicles and machinery will be refuelled in a designated area with hardstand and drainage to an oil water separator;
- Spill clean-up equipment and procedures will be developed and implemented;
- Containment of Sewage effluent in storage tank(s) for offsite disposal by licenced contractor;
- Employees will be trained regarding significant flora and fauna species (including endangered and weed) and their management; and
- Weed treatment will be undertaken as deemed necessary following routine inspections.

5.5 Details of ongoing management, including monitoring programs to support an adaptive management approach and determine the effectiveness of the measures proposed

The MNESMP is based on adaptive management procedures that include implementing management actions while identifying which management actions are most effective at achieving particular environmental outcomes.

A key feature of adaptive management is the feedback process between learning and decision-making. There are two keys phases in implementing an adaptive management system. The first phase involves establishing the key components of a management framework, including:

1. Set clear objectives and measurable performance indicators.
2. Identify the threats and processes that may impact on the objective.
3. Describe how management actions will meet the objectives.
4. Plan which management actions will be trialled and implemented.
5. Plan monitoring protocols to determine the effectiveness of these actions in progressing towards objectives.
6. Implement the management action and subsequent monitoring.
7. Analyse and evaluate the monitoring data.
8. Use the information from the monitoring to update and refine the management decisions.

The last phases are a learning process which involves analysis of monitoring data to learn about the ecosystem being managed to allow adaptation and improvement of management strategies and approaches. Iterative learning in the second phase of the adaptive management approach will be communicated to the Department through annual reporting requirements of the approval.

5.6 The name of the agency responsible for endorsing or approving each mitigation measure or monitoring program

Table 27: Administering agencies responsible for approving mitigation or monitoring programs

Item	Administering Agency
Development Application	Central Highlands Regional Council
Environmental Authority EA0001828	Department of Environment and Science (Qld)
Protected Plants Clearing Permit	Department of Environment and Science (Qld)

6 Residual Impacts/Proposed Offsets

6.1 A description of the offset site(s) including location, size, condition and environmental values

The proposed offset consists of three paddocks at the Lexington property (10: DN40126; 14: DN40170; 13: DN40170). The paddocks are titled Contours, Harry's and North Promenade.

North Promenade is classified primarily as remnant vegetation RE 11.8.11, with a small area of RE 11.8.5 on the northern boundary that does not contain the offset matters. This site has not been cleared previously but has likely been used for cattle grazing. Harry's and Contours paddocks are classified as non-remnant. These sites show signs of previous disturbance but support large areas of the Natural Grassland TEC and areas of *Dichanthium queenslandicum* habitat.

The total areas of habitat suitable for offset at each paddock is as follows:

- North Promenade: 129ha of Natural Grassland TEC and 73.4ha of *Dichanthium queenslandicum* habitat;
- Harry's: 88ha of Natural Grassland TEC and habitat that may be improved to achieve Natural Grassland TEC, and 16ha of *Dichanthium queenslandicum* habitat;
- Contours: 151ha of Natural Grassland TEC and 46.6ha of *Dichanthium queenslandicum* habitat.

The total study area was approximately 370ha.

6.2 Details of the surveys undertaken in accordance with the survey guidelines used to confirm the presence of the protected matter at the offset site

In total, 85 combined Grassland TEC and targeted *Dichanthium queenslandicum* surveys and 15 habitat condition assessments were conducted at the three MDS Rail Loop offset paddocks. Survey density met or exceeded relevant guidelines.

Assessments were as follows:

- Targeted searches for *Dichanthium queenslandicum*, which involved tussock counts within a 50m x 20m survey area;
- Habitat condition assessments in accordance with the *Guide for Determining Terrestrial Habitat Quality* (EHP, 2017); and
- Determination of the grassland TEC, using key diagnostic criteria and condition thresholds for 'Natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin' as defined in the relevant Listing Advice by the Threatened Species Scientific Committee (TSSC, 2009).

6.3 Details of the quality of the offset site including vegetation condition assessment (VQA) and habitat characteristics for the protected matter

The three paddocks are dominated by native perennial grasslands, with varying but generally minor degrees of impact by non-native species and previous disturbance. Habitat condition transects revealed that tree and shrub cover are entirely below 10% within the proposed offset area.

North Promenade received a rounded mean habitat condition score of 8. A total of 27 of the 30 Grassland TEC assessments reported 'best' quality TEC at this paddock and a further 2 reported 'good' quality TEC, totalling 129.3ha. Two areas of *Dichanthium queenslandicum* habitat were identified by targeted surveys (totalling 46.6ha). One patch of habitat contained the species at low and variable density (120 tussocks / ha), and the smaller at high density (over 1500 tussocks / ha). Localised areas of infestation by *Vachellia farnesiana* and *Parthenium hysterophorus* were identified.

Harry's paddock received a rounded mean habitat condition score of 6. In total, 13 of the 19 Grassland TEC assessment sites met the requirements for the Grassland TEC, four of which reported 'best' quality TEC. Approximately 55ha of the 88ha total area was modelled as containing the TEC; however, the remaining 33ha was considered likely to achieve TEC status with increased management targeting non-native species. A small area of moderate-density *Dichanthium queenslandicum* habitat, supporting approximately 420 tussocks / ha, occurred.

Contours paddock received a rounded mean habitat condition score of 7. A total of 36 TEC sites were conducted, 33 of which scored either 'good' or 'best' Grassland TEC quality. This represented the entire paddock—the three sites that did not meet TEC requirements were separated by sites which received 'good' TEC status and likely indicative of variable habitat quality. *Dichanthium sericeum* dominated in some areas, resulting in low native ground cover richness. The northern section of the site contained extremely high densities of *Dichanthium queenslandicum*, which in some areas was sub-dominant to dominant.

6.4 Details of on-going threats to the protected matter at the offset site

As detailed in the Lexington Offset Management Plan, ongoing threats to the offset sites include encroachment of non-native species, fire, pest fauna species including feral pigs and rabbits, cattle grazing, and clearing for mining or development.

Non-native flora species identified on the three offset paddocks during field surveys include:

- Parthenium (*Parthenium hysterophorus*);
- Mimosa Bush (*Vachellia farnesiana*);
- Angleton Grass (*Dichanthium aristatum*);
- Sorghum spp.
- Red Natal Grass (*Melinis repens*);
- Indian Bluegrass (*Bothriochloa pertusa*).

6.5 A comparison of the environmental values as compared to the impact site

The proposed action includes direct impacts to 76.9ha of Grassland TEC and 19.5ha of *Dichanthium queenslandicum* habitat. The rounded mean habitat score within the development site is 8. The development site is primarily non-remnant, with a long history of land use as a Leucaena fodder paddock. Remnant habitat within the impact site was confirmed during field surveys as a combination of REs 11.8.11 and 11.8.5.

The area of proposed offset totals 369.1ha of Grassland TEC containing 136ha of *Dichanthium queenslandicum* habitat. The current habitat scores of the three proposed offset sites are 8 (North Promenade), 6 (Harry's) and 7 (Contours). These scores are not expected to decrease without the offset, but with the offset and subsequent management the scores are intended to increase by 1 point, 2 points and 2 points for the respective sites. The North Promenade paddock is currently mapped as remnant vegetation, primarily of RE 11.8.11; Harry's and Contours paddocks are mapped as non-remnant. Each of the paddocks contains areas of non-native plant infestation which may worsen without management, but which would be managed under the Lexington OMP.

The *Dichanthium queenslandicum* habitat areas at the impact site were modelled as containing approximately 7,765 individual tussocks of the species. Field surveys indicated that the three offset paddocks supported modelled populations of 16,597 tussocks (North Promenade), 6,752 tussocks (Harry's) and 112,026 tussocks (Contours).

6.6 Justification of how the offset package meets the EPBC Act Environmental Offsets Policy

The results of Grassland TEC, King Blue-grass and habitat condition assessments informed the completion of the EPBC offset assessment guide (OAG). Three paddocks were assessed as individual assessable units and their percent contribution for each offset matter combined to arrive at a total offset provision percent, relative to the offset required by the proposed action. Paddocks were assessed as discrete units in order to maximise resolution of offset value and to facilitate adaptive management approaches tailored to each paddock throughout the offset management period.

The OAG output indicated that, as a combined offset comprising three paddocks, the proposed Rail Loop offset acquits 100.04% of required offsets for significant residual impacts to the Grassland TEC and 101.2% of significant residual impacts to King Blue-grass (**Table 28**). Further details of provided offsets can be found in the MDS Rail Loop OMP and Ecological Assessment Report.

Table 28: OAG inputs and results for the MDS Rail Loop offset

Inputs	Natural Grasslands TEC			King Blue-grass		
	North Promenade	Harrys	Contours	North Promenade	Harrys	Contours
Impact area (ha)	76.9	76.9	76.9	19.5	19.5	19.5
Quality of impact area	8	8	8	8	8	8
Quality of offset area	8	6	7	8	6	7
Future quality without offset management	8	6	7	8	6	7
Future quality with offset management	9	8	9	9	8	9
Confidence in result – future quality (%)	85	85	85	85	85	85
Risk of loss without offset (%)	10	10	10	10	10	10
Risk of loss with offset (%)	0	0	0	0	0	0
Confidence in result – risk of loss (%)	90	90	90	90	90	90
Time over which loss is averted (years)	20	20	20	20	20	20
Time until ecological benefit (years)	15	15	15	15	15	15
Offset area (ha)	127.3	88.7	151	30.5	16.0	46.6
% acquittal	26.40	26.38	47.26	24.98	18.94	57.28
Combined offset % acquittal	100.04			101.2		

6.7 The specific environmental outcomes to be achieved

The total proposed offset area of 369ha contains approximately 336ha of Grassland TEC and 136ha of *Dichanthium queenslandicum* habitat. The three paddocks contain habitat at varying condition and will resultantly be managed as discrete units in order to best inform adaptive management processes. The ultimate aim of the offset is to increase habitat condition at each of the offset sites by:

- reducing the prevalence of non-native flora;
- controlling pest fauna, particularly feral pigs and rabbits;
- managing risk of fire;
- increasing native grass and forb richness and cover.

The offset strategy aims to achieve the following increases in habitat quality at the three offset sites:

- 1 point increase at North Promenade (to a score of 9);
- 2 point increase at Harry's (to a score of 8);
- 2 point increase at Contours (to a score of 9).

The Grassland TEC at the offset sites currently occurs as a combination of 'best' quality and 'good' quality TEC, with some assessments indicating that patches of grassland do not meet TEC requirements. By managing the aforementioned threats and increasing habitat quality indicators such as native grass species richness and ground cover the Lexington OMP aims to increase the total area within the offset that meets TEC requirements, and to increase the overall TEC quality throughout the sites from 'good' to 'best'.

Dichanthium queenslandicum habitat currently covers approximately 38% of the proposed offset area. By managing the aforementioned threats and increasing habitat quality indicators such as native grass species richness and ground cover the Lexington OMP aims to increase the total area of *Dichanthium queenslandicum* habitat, and the area of occupancy of the species, within the offset area.

6.8 Details on how the offset will be secured, managed and monitored to meet these environmental outcomes

6.8.1 Management actions, performance targets, monitoring methodology and review criteria

Details of the monitoring and management implementation schedule are contained in the Lexington OMP (Table 21) and are reproduced in **Table 29**.

Details of the monitoring methodology required to ensure the Lexington OMP achieves objectives and completion criteria are detailed in Section 7 of the Lexington OMP. Monitoring activities have been designed to measure how successful the OMP is in:

- improving the condition of habitat and vegetation communities for MNES and MSES;
- progressing toward achieving specific management objectives, interim performance targets and completion criteria (Table 10 of the Lexington OMP);
- implementing management actions to ensure management targets are met (Table 11 of the Lexington OMP).

The results of ongoing monitoring events will be compared to assess habitat changes over time. Monitoring activities within the Rail Loop offset areas will include:

- general offset site monitoring;
- habitat condition assessments and photo monitoring;
- targeted fauna and flora surveys;
- weed monitoring;
- pest animal monitoring;
- biomass monitoring.

Specifics of monitoring activities, including timing and number of permanent monitoring points are outlined in the Lexington OMP.

Table 29: Management objectives, interim performance targets and completion criteria for each offset matter in the MDS Rail Loop offset area

Offset matter	Relevant management objective	Interim performance target	Completion criteria		
			North Promenade	Harry's	Contours
Natural Grasslands TEC	<p>minimise habitat degradation caused by pest animals (pigs and rabbits) within the offset area to reduce impacts on habitat for threatened species and vegetation communities including those that are representative of TEC</p> <p>control invasive weed species to reduce impacts on habitat for threatened species and vegetation communities including those that are representative of TEC</p> <p>minimise impact of livestock grazing on the condition of habitat and vegetation communities for the offset values</p> <p>reduce the risk of adverse impacts on habitat condition of the offset matters caused by unplanned fire and improve the condition of habitat and vegetation communities for the offset matters within offset areas through fire management.</p>	<p>At Contours and North Promenade paddocks, by 2029, increase condition of offset area to achieve 'best quality' condition class for the Natural Grasslands TEC (in accordance with Table 1 TSSC 2008b).</p> <p>At Harry's paddock, by 2029, increase condition of offset area to achieve 'good quality' condition class for the Natural Grasslands TEC (in accordance with Table 1 TSSC 2008b).</p>	<p>By 2039, increase habitat quality score to 9 in accordance with the Guide to Determining Terrestrial Habitat Quality (DEHP, 2014) by achieving the following scores for each ecological attribute including:</p> <p>Native plant species richness (grass) >90% of benchmark score of 11</p> <p>Native plant species richness (forbs and other) >90% of benchmark score of 17</p> <p>Native perennial grass cover (%) >90% of benchmark score of 43%</p> <p>Organic litter cover (%) >50%-<200% of benchmark score of 13%</p> <p>Non-native plant cover <5%</p> <p>Attain and maintain 'best quality' condition class for the Natural Grasslands TEC (in accordance with Table 1 TSSC 2008b), within a 0.1 ha quadrat with:</p> <p>at least four native perennial grass species from the list of perennial native grass indicator species</p> <p>at least 200 native grass tussocks</p> <p>total projected canopy cover of shrubs is less than 30%</p> <p>perennial non-woody introduced species are less than 5% of the total projected perennial plant cover.</p>	<p>By 2039, increase habitat quality score to 8 in accordance with the Guide to Determining Terrestrial Habitat Quality (DEHP, 2014) by achieving the following scores for each ecological attribute including:</p> <p>Native plant species richness (grass) >80% of benchmark score of 11</p> <p>Native plant species richness (forbs and other) >80% of benchmark score of 17</p> <p>Native perennial grass cover (%) >80% of benchmark score of 43%</p> <p>Organic litter cover (%) >50%-<200% of benchmark score of 13%</p> <p>Non-native plant cover <5%</p> <p>Attain and maintain 'best quality' condition class for the Natural Grasslands TEC (in accordance with Table 1 TSSC 2008b), within a 0.1 ha quadrat with:</p> <p>at least four native perennial grass species from the list of perennial native grass indicator species</p> <p>at least 200 native grass tussocks</p> <p>total projected canopy cover of shrubs is less than 30%</p> <p>perennial non-woody introduced species are less than 5% of the total projected perennial plant cover.</p>	<p>By 2039, increase habitat quality score to 9 in accordance with the Guide to Determining Terrestrial Habitat Quality (DEHP, 2014) by achieving the following scores for each ecological attribute including:</p> <p>Native plant species richness (grass) >90% of benchmark score of 11</p> <p>Native plant species richness (forbs and other) >90% of benchmark score of 17</p> <p>Native perennial grass cover (%) >90% of benchmark score of 43%</p> <p>Organic litter cover (%) >50%-<200% of benchmark score of 13%</p> <p>Non-native plant cover <5%</p> <p>Attain and maintain 'best quality' condition class for the Natural Grasslands TEC (in accordance with Table 1 TSSC 2008b), within a 0.1 ha quadrat with:</p> <p>at least four native perennial grass species from the list of perennial native grass indicator species</p> <p>at least 200 native grass tussocks</p> <p>total projected canopy cover of shrubs is less than 30%</p> <p>perennial non-woody introduced species are less than 5% of the total projected perennial plant cover.</p>
King blue-grass			<p>By 2039, increase habitat quality score to 9 in accordance with the Guide to Determining Terrestrial Habitat Quality (DEHP, 2014) by achieving the following scores for each ecological attribute including:</p> <p>Native plant species richness (grass) >90% of benchmark score of 11</p> <p>Native plant species richness (forbs and other) >90% of benchmark score of 17</p> <p>Native perennial grass cover (%) >90% of benchmark score of 43%</p> <p>Organic litter cover (%) >50%-<200% of benchmark score of 13%</p> <p>Non-native plant cover <5%, and/or</p> <p>Observed presence of king blue-grass species and/or population from >50% targeted flora survey sites (Section Error! Reference source not found.)</p>	<p>By 2039, increase habitat quality score to 8 in accordance with the Guide to Determining Terrestrial Habitat Quality (DEHP, 2014) by achieving the following scores for each ecological attribute including:</p> <p>Native plant species richness (grass) >80% of benchmark score of 11</p> <p>Native plant species richness (forbs and other) >80% of benchmark score of 17</p> <p>Native perennial grass cover (%) >80% of benchmark score of 43%</p> <p>Organic litter cover (%) >50%-<200% of benchmark score of 13%</p> <p>Non-native plant cover <5%, and/or</p> <p>Observed presence of king blue-grass species and/or population from >50% targeted flora survey sites (Section Error! Reference source not found.)</p>	<p>By 2039, increase habitat quality score to 9 in accordance with the Guide to Determining Terrestrial Habitat Quality (DEHP, 2014) by achieving the following scores for each ecological attribute including:</p> <p>Native plant species richness (grass) >90% of benchmark score of 11</p> <p>Native plant species richness (forbs and other) >90% of benchmark score of 17</p> <p>Native perennial grass cover (%) >90% of benchmark score of 43%</p> <p>Organic litter cover (%) >50%-<200% of benchmark score of 13%</p> <p>Non-native plant cover <5%, and/or</p> <p>Observed presence of king blue-grass species and/or population from >50% targeted flora survey sites (Section Error! Reference source not found.)</p>

6.8.2 Responsibility and timing for implementation of actions

Sojitz, as the project operator, is responsible for implementation of all elements of the Lexington OMP.

Persons implementing management and monitoring activities described in the Lexington OMP will have appropriate skills and qualifications (**Table 30**). The activities and the timing of management actions within the Lexington OMP can be found in **Table 31**.

Table 30: Qualification requirements for monitoring

Species	Qualifications required	Demonstrated experience required
King Blue-grass	Ecologist/botanist	Grass surveys
Bluegrass	Ecologist/botanist	Grass surveys
Squatter pigeon	Ecologist/ornithologist	Bird surveys
Feral dog	Nil	Pest surveys
Feral cat	Nil	Pest surveys
Feral pig	Nil	Pest surveys
Fox	Nil	Pest surveys
Rabbit	Nil	Pest surveys

Table 31: Implementation of MDS Rail Loop offset (Lexington OMP)

Activity		Timing
General restrictions	Install locks on gates Erect signs on access points into offset site Annually inspect fence, gates and locks to ensure maintained in a serviceable condition.	At the start of management and maintained at all times
Access tracks	Maintain unsealed access tracks to no more than 5 m width and in safe condition.	At all times
Fencing	Map location of additional fencing and install by July 2021.	In year 1 existing and required additional fencing will be mapped and additional fencing will be constructed within the first three years of management to assist with livestock management.
Pest animal management	Complete baseline assessment of pest animals to determine control measures, location and timing for management.	As required based on results of year 1 baseline assessment
Weed management	Implement weed hygiene measures as part of access requirements applicable to the offset areas. Complete baseline assessment to determine distribution and abundance of invasive and other weed infestations and determine control measures, location and timing for management including: a strategic grazing regime to reduce the presence of exotic pasture grasses to less than 25% of the total groundcover in the offset areas. spraying of exotic grasses following strategic grazing events.	Weed control activities in addition to fire management and livestock management to be undertaken as required following year 1 baseline assessment
Fire management	Maintain existing firebreaks, access tracks and roads annually. Implement strategic grazing regime to maintain fuel loads. Undertake a mosaic low intensity burns to maintain ecological functioning.	As required, with frequency determined by biomass monitoring and fire management guidelines for each of the component RE contributing to the offset management zones. Burns should only be undertaken in the late wet to early dry season when there is adequate soil moisture, burning less than 30% in any year.
Livestock management	Strategic grazing regime in offset management zone B – light grazing	At all times
Monitoring	General offset site monitoring	Annually
	Establishment of monitoring points	Year 1 to establish monitoring points
	Habitat condition assessments and photo monitoring	Calculate baseline condition at established monitoring points, with habitat condition assessments and photo monitoring undertaken every 2 years for the first 10 years and then a minimum of every 5 years thereafter up to 31 October 2039. Monitoring frequency to be reviewed at Year 10 and frequency based on attainment of interim performance target
	King blue-grass surveys	Baseline assessment in year 1, with follow-up surveys every five years until end of management period.
	Baseline weed survey	To inform requirements for ongoing weed control a baseline survey is required in year 1
	Weed monitoring	Every two years following baseline survey event
	Baseline pest animal survey	To inform requirements for ongoing pest animal management a baseline survey is required in year 1 Two events to be completed in year 1 – one dry season survey and one post wet survey
	Pest animal monitoring	Every two years following baseline survey event Two events to be completed in each survey year – one dry season survey and one post wet survey

Activity		Timing
	Monitoring biomass for grazing and fire management	At least annually, including at the end of the wet season Prior to and during grazing events
Reporting	Annual report	By 30 June each management year
	Review and update OMP	By 30 July each management year

7 Other Approvals and Conditions

7.1 Approvals Required

In addition to the Commonwealth approval, the proposed action triggers a number of State and Local Government approvals. The site is located within the Rural Zone under the Central Highlands Regional Council Planning Scheme 2016 and the project is considered impact assessable development and triggers the following approvals:

- Material Change of Use (MCU);
- Reconfiguration of a Lot (RoL);
- Environmentally Relevant Activity (ERA) 50 (1)(a) and (b)-Bulk material handling; and
- Operational Works.

Aside from the operation works permit, which is required for the earthworks component, the remaining State and Local Government approvals have already been received.

The purpose of the Rural Zone Code of the *Planning Scheme* states:

“The purpose of the Rural zone code is to:

(a) provide for rural uses including cropping, intensive horticulture, intensive animal industries, animal husbandry, animal keeping and other primary production activities;

(b) provide opportunities for non-rural uses that are compatible with agriculture, the environmental features, and landscape character of the rural area where the uses do not compromise the long-term use of the land for rural purposes; and

(c) protect or manage significant natural resources and processes to maintain the capacity for primary production.”

The Project site is currently used for primary production (cattle grazing) however the site is also classified as suitable for cropping.

As indicated above, under Section 115 of the EP Act the project will trigger a Prescribed Concurrence ERA as follows:

ERA 50 (1) (a) and (b) Bulk material handling –

- (a) loading or unloading minerals at a rate of 100 t or more a day; and
- (b) stockpiling 50,000 t or more of minerals.

The project triggers referrals to the following State Agencies in accordance with the QLD *Planning Regulation 2017* (Planning Regulation), including:

- Clearing native vegetation [Department of Natural Resources, Mines & Energy (DNRME)];

- Impacts to a State Controlled Road [Department of Transport and Main Roads (DTMR)]; and
- Works in the Railway Corridor (DTMR).

Other general statutory permits and obligations include:

- Notice to an electricity entity of works near electricity works (*Electricity Act 1994*);
- Approval to source water for use in construction and operations (*Water Act 2000*); and
- Cultural Heritage management through the Duty of Care (*Cultural Heritage Act 2003*).

A Development Application has been lodged with the Central Highlands Regional Council for the project. Due to the combined Development Application requirements, including State interests, the applicable Assessment Manager is the CHRC with referral to the State Assessment and Referral Agency (SARA). SARA (through the Department of State Development Manufacturing Infrastructure and Planning (DSDMIP)) are responsible for the coordination of the application including referral to the other relevant State Agencies. The Development Application, EA and SARA approvals are in place and provided in the appendices of this report.

8 Social and Economic

8.1 Public consultation

The MDS mine project has been the subject of several public notifications for the mining lease and environmental authority approvals as well as the associated EPBC referral. Since commencing operations at the mine site, Sojitz has participated in the Springsure community forum which is held quarterly and is run by the CHRC with significant participation from the local community. In addition to this, a number of open days and community forums have been held locally.

For the MDS Rail project, a series of public consultations have already occurred for the local and State approvals, including:

- Public notification of the Environmental Authority, including publication in the local newspaper circulating in the area;
- Public notification of the Development Application, including publication in the local newspaper circulating in the area and discussion at a general Council meeting in August 2019;
- Consultation with the relevant traditional owner group including completion of detailed survey of the site;
- Engagement with the local landholder, including negotiating an option to secure the site through a long term lease arrangement;
- Several meetings with the State authorities (SARA in Rockhampton, March 2019 and DES in Emerald, March, April and May 2019);
- Engagement with the local Springsure school community, particularly around the safety implications of the project and removing the interaction with the school zones in Springsure. The new location removes this interaction.

- A meeting with DEE on 6 August 2019 to discuss the referral.

8.2 Details of any consultation with Indigenous stakeholders

The Karingal people are the traditional owners for the project area. A cultural heritage survey and salvage was undertaken over 14 to 17 May 2019 within the project area. The survey team comprised three Karingbal Traditional Owner Representatives (TOR), two Spinifex Pty Ltd Field Representatives (Ellis White and Tom Forde) and Archaeologist (Su Davies). The Karingbal TOR's present during the CH Clearance Survey and Salvage were:

- Susan Albury;
- Darren McLeod; and
- Sandra Sigbart.

The Karingbal people have consented to the project. A fully copy of the survey report is included as Appendix J.

8.3 Projected economic costs and benefits of the project (in dollars), including the basis for their estimation through cost/benefit analysis or similar studies

At current production levels from the mine of 500ktpa, the project employs around 50 people locally as well as supporting a number of indirect jobs within the Springsure community. Development of the rail project has an approved CAPEX of \$36 million most of which will be spent locally during the construction phase. The construction workforce is expected to be around 100 people for the 6 month duration. The ongoing production workforce will increase to around 80 people all of whom will be housed locally within the Springsure and Emerald region. Sojitz does not use mining camps or employ a fly-in-fly-out workforce and so the impact of 80 mining jobs in the local region is significant, supporting a range of social utilities such as housing and schooling in the otherwise agricultural town of Springsure. The project has large support from the local Council and State Government because of this local employment philosophy.

In addition to the CAPEX, the project will quadruple State royalties payable commensurate with the increased production. Whilst royalties are variable based on the prevailing market conditions, they are likely to be over \$20 million per annum for the duration of the project (based on \$150/ tonne revenue and the current royalty rate of 7.5% of revenue).

8.4 Employment opportunities expected to be generated by the project (including construction and operational phases).

As noted at 8.3 above, around 100 people will be employed during the 6 month construction period with around 80 jobs once the site is fully operational. Given the remoteness of the location, the availability of jobs locally is scarce and so the job creation is significant in a local context. Sojitz does not employ a fly-in-fly out workforce and so all the operational roles will be locally based.

9 Ecologically Sustainable Development (ESD)

9.1 Discussion of how the project will conform to the principles of Ecologically Sustainable Development

'Ecologically sustainable development' is defined in the *National Strategy for Ecologically Sustainable Development (1992)* as: 'using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased'.

Within the national strategy, there are no specific strategies provided for rail transport of ore, with the most suitable strategy applicable to this project being that provided for the mining industry. The mining strategy lists the following objectives:

5.1: ensure mine sites are rehabilitated to sound environmental and safety standards, and to a level at least consistent with the condition of surrounding land

5.2: provide appropriate community returns for using mineral resources and achieve better environmental protection and management in the mining sector

5.3: improve community consultation and information, improve performance in occupational health and safety and achieve social equity objectives

Objective 5.1

Post-operation rehabilitation at the MDS Rail Loop site will be undertaken in accordance with principles and methodologies outlined in the MDS Rehabilitation Management Plan (Appendix K).

A referral (2019/8482) was submitted to the Commonwealth Department of Environment and Energy (DEE) on 11 July 2019, including commitments for post-operational rehabilitation of the site. Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the proponent is required to carry out the proposed action in the manner prescribed in the referral documentation. The following commitments to rehabilitation are included in the referral unless an alternate operator continues operation of the facility:

- Decommissioning and rehabilitation would commence after the cessation of MDS Mine operations and is expected to take in the order of 6 to 9 months;
- Dismantling of all buildings and infrastructure with resulting materials and wastes managed in accordance with the waste hierarchy and waste management strategy;
- The Sediment Dams will be desilted with the material removed from site for appropriate burial in MDS Mine overburden or alternative licensed disposal;
- Remaining carboniferous material from the coal stockpile pad will be scraped and removed from site for appropriate burial in MDS Mine overburden or alternative licensed disposal;
- Imported material from roads, hardstands, stockpile, bases, and water management infrastructure will be excavated and either backfilled in cuttings and borrow areas where capacity is available or removed from site for reuse or disposal;
- Post decommissioning rehabilitation will involve re-instatement of the Project area contours similar to pre-disturbance levels via backfilling of cuts including sequential placement of materials;

- Topsoil will be replaced spread as near to its source as possible at similar depths to pre-stripping and appropriately ameliorated;
- Disturbed area rehabilitation will focus on re-establishment of the pre-existing vegetation species and communities during the medium term (during operational life of the Project) and post decommissioning;
- The rehabilitation strategy for the site is proposed to return the site to pre-Project status of grazing on agricultural class A1 land, return the potential of the areas mapped as Strategic Cropping Land and maximise the re-establishment of EPBC Act listed *Dichanthium queenslandicum* (King Blue Grass);
- A seed mix consisting of species as representative of the pre-disturbance grassland as possible will be sown to rehabilitated areas;
- Weed management will be undertaken to selectively support the growth of *Dichanthium queenslandicum* (King Blue-grass);
- Ongoing monitoring of rehabilitation success will be undertaken until the post Project landholder consents to accept the rehabilitated land.

The *Environmental Protection Act 1994* (EP Act) regulates environmentally relevant activities (ERAs) and issues environmental authorities (EAs) that identify environmental conditions to be met to ensure the prevention or minimisation of environmental harm caused by the authorised ERAs. The MDS Rail Loop will be operated under EA0001828 for ERA 50 (Bulk Material Handling) and ERA 08 (Chemical Storage), however, no conditions under this EA relate to post operative site rehabilitation.

A detailed Rehabilitation and Exit Plan for the decommissioning and rehabilitation will be prepared as the Project approaches closure as per the Central Highlands Regional Council Decision Notice Approval (COB001.1-2019).

Objective 5.2

In order to provide appropriate community returns for using mineral resources and achieve better environmental protection and management in the mining sector, the proponents will deliver a range of social and community benefits which are discussed in greater detail in Section 8 (Social and Economic). Specific benefits include, but are not limited to the following:

- Employment for 100 people during construction phase;
- Ongoing employment for 80 people for 10 years during the operational phase;
- Removal of frequent road trains from a 80 km length of the Dawson Highway, including removing road train traffic through the Springsure township, to Minerva Mine;
- Facilitating ongoing payment of mining royalties to the Queensland Government, increased from 0.5Mtpa to 1.5Mtpa;
- Undertake to comply fully with the stringent environmental conditions set out in the Environmental Authority, clearing permits and EPBC conditions of approval to meet the environmental requirements of the Commonwealth Department of Energy and Environment (DEE), the Queensland Department of Natural Resources, Mining and Energy (DNRME), and the Queensland Department of Environment and Science (DES).

Through its Environmental Policy, Sojitz is committed to reducing greenhouse gases such as CO₂ to prevent climate change and preserving biodiversity. The MDS rail loop project will export metallurgical coal for making steel, which is used as a reductant rather than being burnt in coal-fired power stations.

Objective 5.3

The MDS Rail Loop Project aims to improve community consultation and information, improve performance in occupational health and safety and achieve social equity objectives. Sojitz will strive to meet its objectives under its Environment and Community Policy, the aim of which is to be an industry-leading Coal Explorer and Emerging Producer, where we as a company create sustainable value from our resources and relationships in a way that is safe, environmentally responsible and respectful of all stakeholders.

To achieve this aim, Sojitz and U&D Mining will:

- Minimise the impact of our operations by effectively preventing pollution, damage or other harm to the environment by mitigating harmful risks;
- Respect and work with the current occupiers of any land impacted by our exploration or mine development activities;
- Take all reasonable steps to prevent or recover any incident that may or has breached environmental legislation, license requirements, tenure conditions, or any specific U&D Mining requirements;
- Work to build long-term partnerships with communities, governments, business partners and other stakeholders;
- Accept that everyone is personally accountable for operating in an environmentally responsible manner, as well as are those who they work with, manage and supervise;
- Honour, respect and work cooperatively with the Traditional Owners of the land impacted by our activities, as well as ensure we work within any Native Title or Cultural Heritage legislation, licenses, or any specific U&D Mining requirements.

10 Environmental Record of Person Proposing to take the Action

The information provided as part of the EPBC referral has not been updated.

The project proponents are Endocoal Limited (Endocoal (a subsidiary of U & D Coal Limited)) and Sojitz Coal Mining Pty Ltd (Sojitz) in a joint venture arrangement. Both Endocoal and Sojitz have multiple mining interests within the Bowen Basin. Neither of the companies has been the subject of any environmental legal proceedings that have resulted in fines or prosecution.

The environmental policy of both Sojitz and U&D Mining Industry are included in Appendix L also submitted as part of the EPBC referral.

11 Conclusion

The proposed MDS Rail Loop project represents a critical piece of infrastructure for the ongoing operation of the MDS mine. The current location and design for the MDS rail loop has been determined to be the most suitable location to enable connection to the existing Bauhinia rail network. The project aligns to the principles of Ecologically Sustainable Development (ESD) and the requirements of the EPBC Act through comprehensive adherence to the hierarchy of controls – avoid, mitigate, manage, offset.

The project location has been designed to avoid impacts to MNES wherever possible by locating disturbance in areas of pre-existing habitat modification (i.e. Leucaena plantation) and/or degradation. Significant residual impacts to MNES will be offset through augmentation of the existing environmental offset management area on the Lexington property which is fully owned by Sojitz. These additional proposed offsets will be delivered through the updated OMP, which includes additional areas surveyed specifically to address their suitability with respect to the MNES proposed to be impacted.

A new MNESMP has been prepared to avoid, mitigate, manage and monitor potential impacts to MNES associated with the proposed action. The MDS Rail Loop MNESMP is modelled on the approved MNESMP for the MDS Mine and includes adaptive management strategies to ensure impacts are effectively managed over the life of the project.

Collectively the OMP and MNESMP provide delivery mechanisms to ensure the maintenance of the relevant MNES surrounding the project area and within the Lexington offset area. Further, these management plans provide for an improvement in the habitat condition for these matters and an increase in the extent of occurrence to deliver a significant conservation outcome.

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APPENDIX A

Title Searches

CURRENT TITLE SEARCH

NATURAL RESOURCES, MINES AND ENERGY, QUEENSLAND

Request No: 32245754

Search Date: 01/10/2019 13:14

Title Reference: 50816232

Date Created: 05/07/2010

Previous Title: 50794326

REGISTERED OWNER

Dealing No: 713318103 28/06/2010

MINERVA COAL PTY LTD A.C.N. 075 056 058

ESTATE AND LAND

Estate in Fee Simple

LOT 10 CROWN PLAN DN40126
Local Government: CENTRAL HIGHLANDS

EASEMENTS, ENCUMBRANCES AND INTERESTS

1. Rights and interests reserved to the Crown by
Deed of Grant No. 40059542 (Lot 10 on CP DN40126)

ADMINISTRATIVE ADVICES

Dealing	Type	Lodgement Date	Status
708809506	VEG NOTICE	08/07/2005 16:18	CURRENT
	VEGETATION MANAGEMENT ACT 1999		
716725106	VEG NOTICE	01/09/2015 14:20	CURRENT
	VEGETATION MANAGEMENT ACT 1999		

UNREGISTERED DEALINGS - NIL

CERTIFICATE OF TITLE ISSUED - No

** End of Current Title Search **

COPYRIGHT THE STATE OF QUEENSLAND (NATURAL RESOURCES, MINES AND ENERGY) [2019]
Requested By: D-ENQ CITEC CONFIRM

CURRENT TITLE SEARCH

NATURAL RESOURCES, MINES AND ENERGY, QUEENSLAND

Request No: 32245755

Search Date: 01/10/2019 13:14

Title Reference: 50816233

Date Created: 05/07/2010

Previous Title: 50794326

REGISTERED OWNER

Dealing No: 713318103 28/06/2010

MINERVA COAL PTY LTD A.C.N. 075 056 058

ESTATE AND LAND

Estate in Fee Simple

LOT 11 CROWN PLAN DN40126
Local Government: CENTRAL HIGHLANDS

EASEMENTS, ENCUMBRANCES AND INTERESTS

1. Rights and interests reserved to the Crown by
Deed of Grant No. 40059542 (Lot 11 on CP DN40126)

ADMINISTRATIVE ADVICES

Dealing	Type	Lodgement Date	Status
716725106	VEG NOTICE	01/09/2015 14:20	CURRENT
VEGETATION MANAGEMENT ACT 1999			

UNREGISTERED DEALINGS - NIL

CERTIFICATE OF TITLE ISSUED - No

** End of Current Title Search **

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Requested By: D-ENQ CITEC CONFIRM

CURRENT TITLE SEARCH

NATURAL RESOURCES, MINES AND ENERGY, QUEENSLAND

Request No: 32245751

Search Date: 01/10/2019 13:14

Title Reference: 30493244

Date Created: 07/04/1982

Previous Title: 30358157

30358158

30358159

30358160

REGISTERED OWNER

Dealing No: 708283697 10/12/2004

MINERVA COAL PTY LTD A.C.N. 075 056 058

ESTATE AND LAND

Estate in Fee Simple

LOT 13 CROWN PLAN DN40170

Local Government: CENTRAL HIGHLANDS

EASEMENTS, ENCUMBRANCES AND INTERESTS

1. Rights and interests reserved to the Crown by
Deed of Grant No. 30181010 (POR 13V)

ADMINISTRATIVE ADVICES - NIL

UNREGISTERED DEALINGS - NIL

CERTIFICATE OF TITLE ISSUED - No

** End of Current Title Search **

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Requested By: D-ENQ CITEC CONFIRM

CURRENT TITLE SEARCH

NATURAL RESOURCES, MINES AND ENERGY, QUEENSLAND

Request No: 32245753

Search Date: 01/10/2019 13:14

Title Reference: 30493245

Date Created: 07/04/1982

Previous Title: 30359078

30359079

30359080

30359081

REGISTERED OWNER

Dealing No: 708283697 10/12/2004

MINERVA COAL PTY LTD A.C.N. 075 056 058

ESTATE AND LAND

Estate in Fee Simple

LOT 14 CROWN PLAN DN40170

Local Government: CENTRAL HIGHLANDS

EASEMENTS, ENCUMBRANCES AND INTERESTS

1. Rights and interests reserved to the Crown by
Deed of Grant No. 30111030 (POR 14V)

ADMINISTRATIVE ADVICES - NIL

UNREGISTERED DEALINGS - NIL

CERTIFICATE OF TITLE ISSUED - No

** End of Current Title Search **

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Requested By: D-ENQ CITEC CONFIRM

APPENDIX B

Updated Lexington OMP

APPENDIX C

Queensland Department of Transport and Main Roads Approval

14 May 2019

Department of
Transport and Main Roads

Sojitz MDS Mining Pty Ltd
c/- Harradynamics
Unit 5, 88 Macquarie Street
ST LUCIA QLD 4067

Dear Sir / Madam

**AMENDED ROAD-USE DIRECTION FOR HAULING PRODUCT COAL FROM METEOR
DOWNS SOUTH COAL MINE TO EXISTING MINERVA COAL MINE**

Proposed Development:	Hauling Product Coal
Proponent Name:	Sojitz MDS Mining
Street Address:	Dawson Highway (between Rolleston and Springsure) - MDS Coal Mine
Local Government Area:	Central Highlands Regional

On 5 April 2019, the Department of Transport and Main Roads (the department) received a request from Meteor Downs South (Sojitz) to consider reducing the conditioned curfew times for hauling coal through Springsure. On 10 May 2019 the department received a formal letter from Central Highlands Regional Council (CHRC) highlighting that CHRC, the Springsure Community Reference Group (CRG) and the Queensland Police Service support a reduced curfew of hauling coal through Springsure (as highlighted within condition 8 below).

In accordance with section 64 of the *Mineral and Energy Resources (Common Provisions) Act 2014* (the Act) and section 27 of *Mineral and Energy Resources (Common Provisions) Regulation 2016* (the Regulation), and in accordance with the Road Use Direction dated 14 March 2018, the department provides this written notice, taken to be an Amended Road Use Direction, that the proposed road haulage may continue, subject to conditions as listed below:

1. The Comet Road access/intersection to the Meteor Downs South (MDS) coal mine is to remain in accordance with the Works in State-controlled Road Reserve (WSCRR 207) approval.
2. The proposed haulage of coal between the Meteor Downs South (MDS) coal mine and the existing Minerva coal mine by road shall only occur for a maximum time of two (2) years (commencing from the date WSCRR 207 was approved), thus lapsing on 18 May 2020.
3. Haulage by road is limited to a maximum of 500,000 tonnes per annum.
4. Undertake haulage with a largest design vehicle of AB Triple road train, with a maximum length of 36.5m.
5. The proponent is to prioritise connection to a rail network for long term haulage of coal for the Meteor Downs South Coal Mine (as described as Stage 2).

6. Compensation payments of 36.55 cents per tonne must be paid to TMR for the impact on the State-controlled road network on an annual basis, starting from the date of the WSCRR approval for the new Comet Road access/intersection to the Dawson Highway.
7. Whilst the intersection of the Gregory Highway/Wurba Road is constructed to a reasonably high standard (AUL/CHR) and is operating within acceptable capacity limits, there are some concerns with the use of this road for haulage using AB triple vehicles.
 - i) Wurba Road must be upgraded to an appropriate standard to enable two AB triples to turn in and out of Wurba Road concurrently (left turns in and right turns out of Wurba Road).
 - ii) The abovementioned upgrade works must form part of a separate WSCRR approval.
 - iii) The required works at both Comet Road and upgrade works to Wurba Road must be completed within twelve (12) weeks from the date of this Road Use Direction.
8. Haulage is not permitted to occur through Springsure between the hours of 8:15am – 9am and 2:45pm – 3.30pm on school days.
9. Within one (1) month of receiving a written request from the Department of Transport and Main Roads, Sojitz MDS Mining Pty Ltd must provide a report to the department providing full details of any complaints / concerns raised by the public in relation to the haulage task undertaken or driver behaviour. This report must also include all relevant vehicle MT Data GPS information and the on-board vehicle camera footage.
10. Should Sojitz MDS Mining Pty Ltd change or engage new haulage contractors (including any subcontracted haulage), written notification of these changes must be provided to TMR within five (5) business days of the change occurring. This is to ensure that all haulage contractors are held to the same high standards as is required of Kalari Pty Ltd.
11. All haulage must be in accordance with the following documents / plans:

Drawing/Report title	Prepared by	Date	Reference no.	Version/ Issue
Kalari-HSE Safety Management Plan – Executive Summary	Kalari Pty Ltd	-	-	-
Work Instruction: Safe Arrival / Departure of AB-Triple Combinations at Minerva Train Load-Out Intersection / Wurba Road	Kalari Pty Ltd	8 February 2018	Sojitz WI-01	1
Work Instruction: Safe Arrival / Departure of AB-Triple Combinations at Minerva Train Load-Out Intersection / Wurba Road	Kalari Pty Ltd	9 February 2018	Sojitz WI-02	1
Work Instruction: Safe Working: Gregory Highway / Wurba Road Rail Crossing & Intersection	Kalari Pty Ltd	9 February 2018	Sojitz WI-03	1

TMR values your company's commitment to working in partnership with, including other agencies such as Qld Police Service, ensuring any increase in road safety risk and pavement impacts are adequately managed.

If you have any queries or wish to discuss this matter further, please contact Anton DeKlerk (Principal Town Planner) at FitzroyDistrict@tmr.qld.gov.au or on (07) 4931 1545.

Yours sincerely

A handwritten signature in black ink, appearing to read 'BSK', written over a horizontal line.

Brett Skyring

Manager (Planning Projects & Corridor Management)

APPENDIX D

Central Highlands Regional Council Approval

DECISION NOTICE APPROVAL

PLANNING ACT 2016, SECTION 63

I refer to your application and advise that at the General Council meeting on 13 August 2019, the Council resolved to approve the application in full subject to conditions. Details of the decision are as follows:

1. APPLICATION DETAILS

Application Number: COB001.1-2019
Properly Made Date: 18 April 2019
Decision Date: 13 August 2019
Planning Scheme: Central Highlands Regional Council Planning Scheme 2016 (Amendment No. 3)

2. APPLICANT DETAILS

Name: Sojitz Coal Mining Pty Ltd and Endocoal Limited
 C/- Murray & Associates (QLD) Pty Ltd
Postal Address: PO Box 665 EMERALD QLD 4720
Email Address: andrewb@mursurv.com

3. PROPERTY DETAILS

Street Address: Three Chain Road, Springsure QLD 4722
 Bauhinia Branch Railway, Comet Road Rolleston QLD 4702
Real Property Description: Lot 56 on DSN808 and Lot 2 on SP187945
Local Government Area: Central Highlands Regional Council

4. DECISION DETAILS

The following type of approval has been issued:

Development Permit for Material change of use – High impact industry (Coal Loadout Facility including Rail Loop and Siding)

Development Permit for Reconfiguring a lot (1 into 2 lot subdivision of land)

5. CURRENCY PERIOD FOR THE APPROVAL

This development approval will lapse at the end of the period set out in section 85 of *Planning Act 2016*.

6. STATEMENT OF REASONS

Description of the development	The approved development is for Material change of use for a High impact industry and Reconfiguring a lot (1 into 2 lot subdivision of land)
Reasons for decision	<p>The development application is approved for the following reasons:</p> <ul style="list-style-type: none"> - The proposed development provides a use that is sympathetic to the existing agricultural and cropping activities within the remainder of the subject site; - The High impact industry use does not adversely impact upon the

	<p>operational capacity of the existing agricultural uses that are to be relocated within proposed lot 1;</p> <ul style="list-style-type: none"> - The proposed development result in a built form that is sympathetic to and consistent with the rural character of the locality; - The proposed development is located outside of natural hazard areas and has received State approval for removal of significant native vegetation; and - The proposed development either complies with or can be made to comply with the abovementioned assessment benchmarks through the imposition of reasonable and relevant conditions.
Assessment benchmarks	<p>The following assessment benchmarks apply to this development:</p> <ul style="list-style-type: none"> - Central Queensland Regional Plan – October 2013; - State Planning Policy – July 2017; and - Central Highlands Regional Council Planning (Amendment No. 3) 2016: <ul style="list-style-type: none"> • Strategic framework; • Rural zone code; • Industry uses code; • Reconfiguring a lot code; • Landscaping code; • Transport, parking and access code; • Works, services and infrastructure code; • Agriculture overlay code; • Biodiversity areas, waterways and wetlands overlay code; • Bushfire hazard overlay code; and • Regional infrastructure overlay code.
Matters raised in any submission	Description of how matters were evaluated in reaching the decision
Sterilisation of Glencore Coal Queensland Pty Ltd coal (reserves)	It is acknowledged that the submitter is the authorised holder of an exploration permit for coal (EPC 595). The existence of an EPC does not preclude the granting of a development approval under the <i>Planning Act 2016</i> .
Other land may be suitable for the proposed development	The proposed location is determined by the applicant to be the most suitable option for the facility.
Community interests	The local spend of neither the applicant nor the submitter is a relevant consideration by Council in the assessment of the development.
Lifespan of the development	MDS mine has known coal resources to support the facility for a 10 year life span at the design capacity of around 2Mtpa. A sunset condition that details the procedure to occur after 10 years (extension of approval / removal and rehabilitation) has been applied.
Capacity of railway network	The proposed development was properly referred to the Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP) in accordance with Part 2 of the Development Assessment Rules (the 'DA Rules'). DSDMIP has considered the application, including any potential impact upon the capacity of the Railway network, and has supported the proposed development subject to compliance with recommended conditions. As such, it is taken that the proposed development, subject to compliance with the recommended conditions, will not adversely impact upon the capacity and efficiency of the railway network.
Impacts upon flooding, stormwater, water supply	The technical report submitted by the applicant has been accepted and forms part of the approved documents.
Cumulative air quality	The technical report submitted by the applicant has been accepted and forms

impacts	part of the approved documents.
Impacts upon safety and efficiency of State-controlled road	The proposed development was properly referred to DSDMIP in accordance with Part 2 of the DA rules. DSDMIP has considered the application, including any potential impact upon the State-controlled road and transport corridor, and has supported the proposed development subject to compliance with recommended conditions. As such, it is taken that the proposed development, subject to compliance with the recommended conditions, will not adversely impact upon the safety and efficiency of the State-controlled road network.

7. INFRASTRUCTURE

Where conditions relate to the provision of infrastructure, these are non-trunk infrastructure conditions unless specifically nominated as a ***“necessary infrastructure condition”*** for provision of trunk infrastructure as defined under section 127 of the *Planning Act 2016*.

8. ASSESSMENT MANAGER CONDITIONS

1. APPROVED PLANS AND DOCUMENTS

- a) Unless varied by the conditions of this approval, the development must be carried out generally in accordance with the following approved plan(s) and supporting documentation including any recommendations contained therein. Where any inconsistencies between the approved plans / supporting documents are identified, the conditions of this approval take precedence.

Document Name	Document Number	Prepared By	Date
<i>Proposal Plans: Material change of use</i>			
MDS Industrial Area Building Layout Plan	MDS-TLO-A-MIA-110 Rev A	Lever Engineered Advantage	04/02/2019
TLO Industrial Area Building Layout Elevations	MDS-TLO-A-MIA-111 Rev A	Lever Engineered Advantage	01/03/2019
Industrial Area Layout Plan	MDS-TLO-A-MIA-112 Rev B	Lever Engineered Advantage	18/03/2019
TLO Industrial Area Typical Fuel Tank Installation	MDS-TLO-A-MIA-113 Rev A	Lever Engineered Advantage	01/03/2019
TLO Access Road Plan and Profile	MDS-TLO-C-AR-030 Rev B	Lever Engineered Advantage	27/03/2019
MDS TLO Access Road Typical Cross-Sections	MDS-TLO-C-AR-031 Rev B	Lever Engineered Advantage	27/03/2019
Catchment Plan	MDS-TLO-C-CP-102 Rev A	Lever Engineered Advantage	08/03/2019
MDS Rail Loop & Loadout Pad Plan & Long Section	MDS-TLO-C-RAIL-070 Rev A	Lever Engineered Advantage	07/03/2019
MDS Rail Loop & Loadout Pad Plan	MDS-TLO-C-OO-071 Rev B	Lever Engineered Advantage	07/03/2019
MDS Rail Weighbridge & Veneer Plan	MDS-TLO-C-RAIL-073 Rev B	Lever Engineered Advantage	22/03/2019
MDS Rail Loop Earthworks Plan – 0 to 350m	MDS-TLO-C-R-075 Rev B	Lever Engineered Advantage	27/03/2019
MDS Rail Loop Earthworks Plan – 0 to 350m	MDS-TLO-C-R-076 Rev B	Lever Engineered Advantage	27/03/2019

Document Name	Document Number	Prepared By	Date
Dams and Drainage Typical Sections and Details	MDS-TLO-C-SD-100 Rev A	Lever Engineered Advantage	22/02/2019
Sediment Dam Plan and Profile Sections	MDS-TLO-SC-101 Rev B	Lever Engineered Advantage	01/04/2019
Loadout Pad Sections	MDS-TLO-C-TYP-012 Rev A	Lever Engineered Advantage	05/02/2019
Locality Plan	MDS-TLO-G-SL-001 Rev A	Lever Engineered Advantage	01/02/2019
Site Plan	MDS-TLO-G-SL-002 Rev A	Lever Engineered Advantage	08/03/2019
Site Disturbance Area Plan	MDS-TLO-G-SL-003 Rev A	Lever Engineered Advantage	22/03/2019
Pavement Plan	MDS-TLO-G-SL-005 Rev A	Lever Engineered Advantage	08/03/2019
Typical Drawing Raw Water Pipeline Install	MDS-TLO-P-TYP-061 Rev A	Lever Engineered Advantage	07/03/2019
Typical Drawing Fence and Gates	MDS-TLO-P-TYP-060 Rev A	Lever Engineered Advantage	07/03/2019
Typical Drawing Balloon Loop Level Crossing	MDS-TLO-R-TYP-082 Rev A	Lever Engineered Advantage	07/03/2019
Typical Drawing CMP Culvert Installations	MDS-TLO-R-TYP-083 Rev A	Lever Engineered Advantage	07/03/2019
Typical Drawing RCP Culverts	MDS-TLO-R-TYP-084 Rev A	Lever Engineered Advantage	07/03/2019
Typical Drawing Balloon Loop – Sections	MDS-TLO-R-TYP-085 Rev A	Lever Engineered Advantage	07/03/2019
Proposal Plans: Reconfiguring a Lot			
ROL Plan	MDS-TLO-G-ROL-004 Rev B	Lever Engineered Advantage	22/03/2019
Supporting Documents:			
MDS Intersection Traffic Impact Assessment	QTT18056 Rev 01	Cardno (QLD) Pty Ltd	28/03/2019
Road Safety Audit Existing Road	QTT18056 Rev 1	Cardno (QLD) Pty Ltd	01/03/2019
Pavement Impact Assessment	QTT18056 Rev 1	Cardno (QLD) Pty Ltd	15/03/2019
MDS Mine Rail Loading Facility Noise Impact Assessment	623.17200-R01 V1.0	SLR Consulting Australia Pty Ltd	03/04/2019
Meteor Downs Rail Siding Ecological Assessment	623.17200-R02 V1.3	SLR Consulting Australia Pty Ltd	08/04/2019

Document Name	Document Number	Prepared By	Date
MDS Mine Train Loading Facility Air Quality Impact Assessment	623.17200-R01 v1.0	SLR Consulting Australia Pty Ltd	08/04/2019
Meteor Downs South Rail Loop Flood Impact Assessment and Stormwater Management Plan	623.11129-R01 V4.1	SLR Consulting Australia Pty Ltd	22/05/2019

Timing:

At all times.

2. GENERAL

- a) The applicant is responsible for ensuring compliance with this development approval and the conditions of the approval by an employee, agent, contractor or invitee of the applicant.

Timing:

At all times.

- b) The cost of all works associated with the development and construction of the development including services, facilities and/or public utility alterations required are met at no cost to the Council or relevant utility provider, unless otherwise stated in a development condition.

Timing:

At all times.

- c) The applicant is required to have repaired any damage to existing infrastructure (e.g. kerb and channel, footpath or roadway) that may have occurred during any works carried out associated with the development. To the extent the damage is deemed to create a hazard to the community, it must be repaired immediately.

Timing:

As specified within the wording of this condition.

- d) Unless otherwise stated, all works must be designed, constructed and maintained in accordance with the relevant Council policies, guidelines and standards.

Timing:

As specified within the wording of this condition.

3. DECISION NOTICE AND APPROVED PLANS TO BE RETAINED ON-SITE

- a) A copy of this decision notice and approved plans/drawings/documents must be retained on site. This decision notice must be read in conjunction with the approved plans and documents to ensure constancy in construction, establishment and maintenance of approved works.

Timing:

At all times.

CONDITIONS SPECIFIC TO RECONFIGURING A LOT

4. GENERAL – APPROVED PLANS PLAN CERTIFICATION

- a) Certification must be provided by a Cadastral Surveyor that the lots have been created in accordance with the approved plans.

Timing:

Prior to the release of the survey plan.

5. BUILDINGS AND ENCUMBRANCES

- a) Provide evidence that all buildings and structures located on the site are fully contained within a single lot, generally in accordance with the approved plans.

Timing:

Prior to the release of the survey plan.

6. GENERAL – RELEASE OF SURVEY PLAN

- a) The applicant must submit a survey plan to Council for endorsement. The survey plan lodgement must include the following details to the extent relevant:
- i. A completed Plan Sealing lodgement form;
 - ii. Proof of payment of all required plan sealing fees;
 - iii. One copy of the survey plan, any easement and / or covenant documentation, each fully executed and ready for lodgement with the Titles Office for endorsement;
 - iv. Report demonstrating compliance with each condition of the reconfiguring a lot component of this approval;
 - v. Payment of any outstanding Council rates and charges in accordance with Schedule 18, Item 2(1)(c) of the *Planning Regulation 2017*; and
 - vi. Payment of any outstanding Adopted Infrastructure Charges.

Timing:

Prior to the release of the survey plan.

CONDITIONS SPECIFIC TO MATERIAL CHANGE OF USE

7. SUNSET CLAUSE, REHABILITATION AND EXIT PLAN

- a) The use authorised by this development approval must cease on or before ten (10) years from when the use commences, unless further approval has been obtained from Council.

Timing:

As specified within the wording of this condition.

- b) Six (6) months prior to the use ceasing, the operator must submit to Council for endorsement a Rehabilitation and Exit Plan prepared by a qualified person that, at a minimum:
- i. Demonstrates that the site will be restored to a standard capable of the level of productivity that was available prior to the Material change of use upon decommissioning of the load out facility;
 - ii. Clearly establishes the objectives of the Plan;
 - iii. Shows adopted performance criteria for rehabilitation efforts;
 - iv. Includes an Action Plan with timing for remedial work such as structure removal, removal of imported materials such as gravel, any soil erosion, drainage, and vegetation cover work along with weed and pest animal control activities required to meet the adopted rehabilitation performance criteria; and
 - v. Outlines a program for monitoring rehabilitation success using appropriate indicators.

Timing:

As specified within the wording of this condition.

- c) Post-operational rehabilitation of the site is to be carried out generally in accordance with the strategies identified in the approved Rehabilitation and Exit Plan.

Timing:

As specified within the wording of this condition.

- d) Rehabilitation work must commence immediately upon cessation of the approved use and be carried out in accordance with the approved Rehabilitation and Exit Plan for the length of time included in the Action Plan.

Timing:

As specified in the wording of this condition.

8. HOURS OF OPERATION

- a) The use is permitted to operate 24 hours a day, seven (7) days a week.

Timing:

At all times after commencement of use.

9. AMENITY – HOURS OF CONSTRUCTION

- a) Construction work that makes or causes audible noise must only be carried out on site on Mondays through to Saturday between the hours of 0630 and 1830. Any construction work outside these hours, including Sundays and public holidays must have the prior written approval of Council.

Timing:

At all times during construction.

10. AMENITY – LIGHTING

- a) Lighting at ground level associated with illuminating ground level areas must be focussed downward and be provided with hoods or shading devices to direct illumination downwards and away from sensitive land uses on the adjoining allotment. The provision of outdoor lighting must comply with AS4282:1997 Control of the Obstructive Effects of Outdoor Lighting (as amended), CPTED (Crime Prevention through Environmental Design) Guidelines and CASA guidelines Lighting Near Aerodromes: Advice to Lighting Designers.

Timing:

At all times.

11. FURTHER DEVELOPMENT APPROVALS REQUIRED

- a) All related development permits for Operational Works must be obtained from Council for the following:
 - i. Earthworks;
 - ii. Stormwater Management; and
 - iii. Car Parking and Access.

Timing:

Prior to commencement of construction.

12. ENGINEERING WORKS – EARTHWORKS (EROSION AND SEDIMENT CONTROL) – (REFER CONDITION 11)

- a) As part of the development application(s) for Operational Works (Earthworks), the applicant must submit a site-specific Sediment and Erosion Control Plan (SECP) to Council for review. The SECP must be certified by a Registered Professional Engineer of Queensland (RPEQ), and adequately demonstrate design and construction control measures for the management of sediment and erosion of the development in accordance with the requirements of the Central Highlands Regional Council Planning Scheme 2016 (Amendment No.3), relevant Planning Scheme Policies and the Capricorn Municipal Design Guidelines (CMDG).

Timing:

As specified within the wording of this condition.

- b) The SECP must:

- i. Demonstrate the release of sediment-laden stormwater is avoided for the nominated design storm and minimised where the design storm is exceeded such that target contaminants are treated to the design objectives specified in Table 8.4.5.3.2 (Construction phase – stormwater management design objectives) of the Central Highlands Regional Council Planning Scheme and the Capricorn Municipal Development Guidelines.
 - ii. Include erosion and sediment control measures that are to be designed and constructed in accordance with the document Best Practice Soil and Erosion Control (IECA 2008).
- c) The applicant must implement and maintain the SECP for the duration of the construction works, and until such time all exposed soil areas are permanently stabilised (for example, turfed, hydro mulched, concreted on landscaped).

Timing:

As specified within the wording of this condition.

13. ENGINEERING WORKS – EARTHWORKS (EXCAVATING AND FILLING) – (REFER CONDITION 11)

- a) As part of the development application(s) for Operational Works (Excavating and Filling), the applicant must provide an earthworks plan that clearly identifies the following:

- iii. The location of cut and/or fill;
- iv. The type of fill to be used and the manner in which it is to be compacted;
- v. The quantum of fill to be deposited or removed and finished cut and/or fill levels;
- vi. Retaining structures (if necessary); and
- vii. Surface and sub-surface drainage controls (if applicable).

Timing:

As part of a development application for operational work (excavating and filling).

- a) Carry out excavating and filling activities in accordance with the requirements of the Central Highlands Regional Council Planning Scheme 2016 (Amendment No.3), relevant Planning Scheme Policies, the Capricorn Municipal Design Guidelines (CMDG), the approved plans and the provisions of a development permit for operational work (excavating and filling).

Timing:

At all times.

- a) Ensure the excavating or filling does not concentrate or divert stormwater onto adjoining land to a degree which is worse than that which existed prior to the works.

Timing:

At all times.

- a) Ensure the excavating or filling does not result in the ponding or permanent retention of surface water either on the site or on adjoining land.

Timing:

At all times.

- b) Ensure areas of fill and excavation are graded, compacted and planted and/or mulched, unless otherwise approved, immediately after the dumping operation is complete and at all times thereafter.

Timing:

As specified within the wording of the condition.

- c) During the transportation of soil and other fill/excavated material:
 - i. All trucks hauling soil or fill/excavated material must have their loads secure and covered;
 - ii. Any spillage that falls from the trucks or their wheels must be collected and removed from the site and roads along which the trucks travel on a daily basis;
 - iii. Prior to vehicles exiting the site, measures must be taken to remove the soil from the wheels of the vehicles to prevent soil and other material being deposited on public roads.

14. ENGINEERING WORKS – STORMWATER – (REFER CONDITION 11)

a) Stormwater Management

As part of the development application(s) for Operational Works (Stormwater Management), the applicant must submit a Site Based Stormwater Management Plan (SWMP) for Council's review. The SWMP must be certified by a Registered Professional Engineer of Queensland specialised in this type of work and demonstrate a no worsening of site runoff onto adjoining road reserve and adjoining allotments. This SWMP should include an assessment of the risk associated with sediment basin failure and provide detail as to the mitigation of this risk.

b) Stormwater Drainage Works

All stormwater infrastructure must be constructed generally in accordance with the approved plans. Contaminated stormwater is to be retained within the property boundary. The proposed sediment basins must have sufficient capacity to avoid any release into adjacent waterways. Any stormwater to be drained from the site must be carried without causing annoyance or nuisance to any person. All works must be designed in accordance with the requirements of the Central Highlands Regional Council Planning Scheme 2016 (Amendment No.3), relevant Planning Scheme Policies and the Capricorn Municipal Design Guidelines (CMDG).

Timing:

As specified within the wording of this condition.

- c) Design, construct and maintain all stormwater drainage works for the development generally in accordance with the approved plans, Capricorn Municipal Development Guidelines and the provisions of a Development Permit for Operational Work (Engineering Work – Stormwater Drainage Works).

Timing:

Prior to the commencement of any stormwater works and at all times thereafter.

15. ENGINEERING WORK – CAR PARKING AND ACCESS – (REFER CONDITION 11)

- a) Obtain a development permit for Operational Work (Parking and Access Works).

Timing:

Prior to the commencement of any car parking or access works.

- b) Design, construct and maintain all car parking and access works generally in accordance with the approved plans and the requirements of the Central Highlands Regional Council Planning Scheme 2016 (Amendment No.3), relevant Planning Scheme Policies and the Capricorn Municipal Design Guidelines (CMDG) and the provisions of a Development Permit for Operational Work (Engineering Work – Parking and Access Works).

Timing:

Prior to the commencement of use and at all times thereafter.

- c) Provide and retain 15 car parking spaces onsite in accordance with the approved plans. All car parking spaces must be given an all-weather surface treatment.

Timing:

Prior to the commencement of use and at all times thereafter.

- d) Provide vehicle parking spaces that are of a dimension consistent with Australian Standard AS2890.1 – 1993 “Parking facilities – Part 1: Off Street Car Parking except that the minimum width of any car parking space must be 2750mm.

Timing:

Prior to the commencement of use and at all times thereafter.

- e) Provide the number of parking spaces for people with disabilities required by the Building Code of Australia and in any case must provide a minimum of one (1) space.

Timing:

Prior to the commencement of use and at all times thereafter.

- f) Ensure parking spaces for people with disabilities and access to them complies with Australian Standard AS1428 – General Requirements for Access: Buildings and AS 2890.6 – Parking facilities (Part 6: Off-street parking for People with Disabilities).

Timing:

At all times.

- g) Design, construct and maintain all driveways, internal circulation areas, manoeuvring areas, loading and unloading areas and refuse collection facilities generally in accordance with approved plans and the requirements of the Central Highlands Regional Council Planning Scheme 2016 (Amendment No.3), relevant Planning Scheme Policies and the Capricorn Municipal Design Guidelines (CMDG).

Timing:

Prior to the commencement of use and at all times thereafter.

- h) All vehicles associated with the development are only permitted to enter and exit the site in a forward gear.

Timing:

At all times.

- i) Vehicular access is only permitted at the approved crossover locations as shown on the approved plans. Vehicles are not permitted to enter or exit the site in any other location. Any redundant driveway crossovers must be removed.

Timing:

At all times.

16. ENGINEERING WORK – WATER WORKS

- a) Provide the development with appropriate onsite rainwater collection for operational and firefighting purposes to service the needs of the use.

Timing:

Prior to the commencement of use and at all times thereafter.

- b) Provide the development with an appropriate potable water supply to service the needs of the use.

Timing:

Prior to the commencement of use and at all times thereafter.

17. ENGINEERING WORK – SEWERAGE WORKS

- a) Provide and maintain onsite sewerage treatment and disposal in accordance with the requirements of the *Plumbing and Drainage Act 2018*, including the Queensland Plumbing and Wastewater Code.

Timing:

Prior to the commencement of use and at all times thereafter.

18. BUILDING, PLUMBING AND DRAINAGE WORKS

- a) All related development permits for proposed building works and associated structures must be obtained as required by the *Planning Act 2016*. Construction must comply with the requirements of the *Building Act 1975*, the Building Code of Australia and any requirements of other relevant standards and authorities.

Timing:

Prior to the commencement of use.

- b) The applicant must construct a 1.8m high chain wire fence around the project area at no cost to Council. The condition of the fence must be maintained for the life of the development at no cost to Council.

Timing:

Prior to commencement of the use.

19. CONSTRUCTION AND ENVIRONMENTAL MANAGEMENT PLAN

- a) The applicant must submit a Construction and Environmental Management Plan (CEMP) to Council for review. The CEMP must be prepared by a suitably qualified professional and adequately demonstrate how the development will:
 - i. how traffic and parking generated during construction activities and works will be managed to minimise impacts on the surrounding amenity;
 - ii. implement best practice waste management strategies during the construction phase;
 - iii. mitigate potential adverse impacts associated with dust, noise and lighting emissions, sediment and stormwater run-off on ALC Class A and B land, flora and fauna management, pest and weed management and cultural heritage.

Timing:

Prior to commencement of construction.

20. BIODIVERSITY

- a) The development footprint of the High impact industry must be in accordance with the approved Site Disturbance Area Plan.

Timing:

At all times.

Advisory Note: *Unauthorised clearing of assessable vegetation is not permitted without the required approval(s).*

- b) Ensure all vacant hollows and nests are relocated or rendered unusable to prohibit return during clearing works. All fauna is to be suitably relocated or humanely dealt with during the pre-clearing inspections or during clearing, as required.

Timing:

As specified within the wording of this condition.

21. POLLUTION

- a) Clean up any spillage of wastes, contaminants or other materials as soon as practicable to prevent contamination. Provision is to be made for spills to be bunded and retained onsite for removal and disposal by approved means.

Timing:

At all times.

- b) Provide appropriate materials and equipment on site at all times to contain and clean up spills of potentially polluting materials.

Timing:

At all times.

22. HAZARDOUS MATERIALS

- a) Locate all fuel pumps in accordance with AS1940. The storage and handling of flammable and combustible liquids.

Timing:

At all times.

- b) Locate inlets to bulk fuel storage tanks that ensures tankers, while discharging fuel, are standing wholly within the site and are on level ground.

Timing:

At all times.

- c) Provide and maintain sealed impervious surfaces in areas where potential spills of contaminants may occur.

Timing:

Prior to commencement of the use and at all times thereafter.

- d) Construct and maintain all Fuel Dispensing Areas (FDA) using impermeable materials, free of gaps or cracks. Suitable materials include waterproofed and reinforced concrete.

Timing:

At all times.

23. BUSHFIRE MANAGEMENT

- a) Where no reticulated water supply is available, the premises must be provided with a minimum 45,000L water supply capacity dedicated for firefighting purposes. The dedicated water supply must feature the appropriate fire brigade fittings, must be located within 100m of the immediate development footprint, and be readily identifiable with clearly placed signage.

Timing:

Prior to commencement of construction.

24. LAWFUL COMMENCEMENT

- a) The applicant must arrange for a compliance inspection to be undertaken by Council Officer/s during which time the applicant must adequately demonstrate that all conditions of this approval to its extent relevant has been complied with.

Timing:

Prior to commencement of the use.

- b) Upon receipt of confirmation from Council Officer/s that all conditions of this development permit are considered compliant, the applicant must notify Council in writing within 20 business days that the use has lawfully commenced.

Timing:

As specified within the wording of this condition.

9. ADVISORY NOTES

The following notes are included for guidance and information purposes only and do not form part of the assessment manager conditions:

GENERAL ENVIRONMENTAL DUTY

General environmental duty under the *Environmental Protection Act 1994* prohibits unlawful environmental nuisance caused by noise, aerosols, particles, dust, ash, fumes, light, odour or smoke beyond the boundaries of the property during all stages of the development including earthworks, construction and operation.

ABORIGINAL CULTURAL HERITAGE

It is advised that under section 23 of the *Aboriginal Cultural Heritage Act 2003*, a person who carries out an activity must take all reasonable and practicable measures to ensure the activity does not harm Aboriginal cultural heritage (the "cultural heritage duty of care"). Maximum penalties for breaching the duty of care are listed in the Aboriginal cultural heritage legislation. The information on Aboriginal cultural heritage is available on the Department of Aboriginal and Torres Strait Islander Partnerships website (www.datsip.qld.gov.au).

INFRASTRUCTURE CHARGES NOTICE

Infrastructure charges for this development have been levied in accordance with Central Highlands Regional Council Charges Resolution (No. 12.2) 2017. An Infrastructure Charges Notice No 361 has been issued and attached to this Decision Notice.

RETENTION OF VEGETATION

It is advised that the subject site is mapped by the Department of Environment and Heritage Protection as containing Category B Remnant Vegetation under the *Vegetation Management Act 1999*, which has requirements with regard to the clearing of regulated vegetation. Additional information on vegetation management and any requirements is available at: <https://www.qld.gov.au/environment/land/vegetation/management/>.

10. FURTHER DEVELOPMENT PERMITS REQUIRED

Please be advised that the following development permits may be required to be obtained before the development can be carried out:

- Development Permit for Operational Works
- Development Permit for Building Work
- Development Permit for Plumbing Works

11. SUBMISSIONS

Properly made submissions were received from the following principal submitters:

#	Name	Postal Address	Electronic Address
1	Glencore Coal Queensland Pty Limited	Level 44, 1 Macquarie Place Sydney NSW 2000	tom.cregan@glencore.com.au

12. RIGHTS OF APPEAL

The rights of applicants to appeal to a tribunal or the Planning and Environment Court against decisions about a development application are set out in chapter 6, part 1 of the *Planning Act 2016*. For particular applications, there may also be a right to make an application for a declaration by a tribunal (see chapter 6, part 2 of the *Planning Act 2016*).

A copy of the relevant appeal provisions are **attached**.

13. REFERRAL AGENCIES

Trigger	Referral Agency and Address	Nature of Agency	Response
Clearing Native Vegetation on prescribed land Material change of use that is assessable development with lot 5ha or greater: Schedule 10, Part 3, Division 4, Table 3, Item 1	Department of State Development, Manufacturing, Infrastructure and Planning Level 2, 209 Bolsover Street ROCKHAMPTON QLD 4700 Rockhampton SARA@dsdmip.qld.gov.au	Concurrence Agency	The Department provided their concurrence agency response on 5 July 2019. A copy of their response is attached, reference 1904-10901 SRA
Environmentally relevant activities (ERA) Non-devolved environmentally relevant activities. Material change of use that is assessable development under section 8: Schedule 10, Part 5, Division 4, Table 2, Item 1			
State transport infrastructure generally Development stated in Schedule 20 that is assessable development under section 21: Schedule 10, part 9, Division 4, Table 1, Item 1 (exceeding 10,000t threshold)			
Reconfiguring a lot near a State transport corridor Schedule 10, Part 9, Subdivision 2, Table 1, Item 1			
Material change of use of premises near a State transport corridor or that is a future State transport corridor Schedule 10, Part 9, Subdivision 2, Table 4, Item 1			

14. OTHER DETAILS

You are further advised that the truth and accuracy of the information provided in the application form and accompanying information is relied on when assessing and deciding this application. If you find an inaccuracy in any of the information provided above or have a query or need to seek clarification about any of these details, please contact Council's Development Assessment Unit on ☎ 1300 242 686.

Note: Please ensure you provide details of the application number and assessment manager when contacting council in relation to this application.

15. DELEGATED PERSON

Name: **Joseph Kirkwood**

Signature:

A handwritten signature in dark ink, appearing to read 'J. Kirkwood', followed by a small 'x' mark.

Date:

19 August 2019

COORDINATOR DEVELOPMENT AND PLANNING

Enc: Adopted Infrastructure Charges Notice 361
State Assessment Referral Agency Response
Approved Plans
Appeal Provisions

The following is an extract from the *Planning Act 2016* (Chapter 6 – Part 1)

Chapter 6 Dispute resolution

Part 1 Appeal rights

228 Appeals to tribunal or P&E Court

- (1) Schedule 1 states—
 - (a) matters that may be appealed to—
 - (i) either a tribunal or the P&E Court; or
 - (ii) only a tribunal; or
 - (iii) only the P&E Court; and
 - (b) the person—
 - (i) who may appeal a matter (the **appellant**); and
 - (ii) who is a respondent in an appeal of the matter; and
 - (iii) who is a co-respondent in an appeal of the matter; and
 - (iv) who may elect to be a co-respondent in an appeal of the matter.
- (2) An appellant may start an appeal within the appeal period.
- (3) The **appeal period** is—
 - (a) for an appeal by a building advisory agency—10 business days after a decision notice for the decision is given to the agency; or
 - (b) for an appeal against a deemed refusal—at any time after the deemed refusal happens; or
 - (c) for an appeal against a decision of the Minister, under chapter 7, part 4, to register premises or to renew the registration of premises—20 business days after a notice is published under section 269(3)(a) or (4); or
 - (d) for an appeal against an infrastructure charges notice—20 business days after the infrastructure charges notice is given to the person; or
 - (e) for an appeal about a deemed approval of a development application for which a decision notice has not been given—30 business days after the applicant gives the deemed approval notice to the assessment manager; or
 - (f) for any other appeal—20 business days after a notice of the decision for the matter, including an enforcement notice, is given to the person.

Note—

See the *P&E Court Act* for the court's power to extend the appeal period.

- (4) Each respondent and co-respondent for an appeal may be heard in the appeal.
- (5) If an appeal is only about a referral agency's response, the assessment manager may apply to the tribunal or P&E Court to withdraw from the appeal.
- (6) To remove any doubt, it is declared that an appeal against an infrastructure charges notice must not be about—
 - (a) the adopted charge itself; or
 - (b) for a decision about an offset or refund—
 - (i) the establishment cost of trunk infrastructure identified in a LGIP; or

- (ii) the cost of infrastructure decided using the method included in the local government's charges resolution.

229 Notice of appeal

- (1) An appellant starts an appeal by lodging, with the registrar of the tribunal or P&E Court, a notice of appeal that—
 - (a) is in the approved form; and
 - (b) succinctly states the grounds of the appeal.
- (2) The notice of appeal must be accompanied by the required fee.
- (3) The appellant or, for an appeal to a tribunal, the registrar must, within the service period, give a copy of the notice of appeal to—
 - (a) the respondent for the appeal; and
 - (b) each co-respondent for the appeal; and
 - (c) for an appeal about a development application under schedule 1, table 1, item 1—each principal submitter for the development application; and
 - (ca) for an appeal about a change application under schedule 1, table 1, item 2—each principal submitter for the change application; and
 - (d) each person who may elect to become a co-respondent for the appeal, other than an eligible submitter who is not a principal submitter in an appeal under paragraph (c) or (ca); and
 - (e) for an appeal to the P&E Court—the chief executive; and
 - (f) for an appeal to a tribunal under another Act—any other person who the registrar considers appropriate.
- (4) The service period is—
 - (a) if a submitter or advice agency started the appeal in the P&E Court—2 business days after the appeal is started; or
 - (b) otherwise—10 business days after the appeal is started.
- (5) A notice of appeal given to a person who may elect to be a co-respondent must state the effect of subsection (6).
- (6) A person elects to be a co-respondent by filing a notice of election, in the approved form, within 10 business days after the notice of appeal is given to the person.

APPENDIX E

Environmental Authority 0001828

Permit

Environmental Protection Act 1994

Environmental authority EA0001828

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Environmental authority number: EA0001828

Environmental authority takes effect on 24 June 2019

Environmental authority holder(s)

Name(s)	Registered address
SOJITZ COAL MINING PTY LTD	Level 34 345 Queen Street BRISBANE QLD 4001
Endocoal Limited	Rowes Arcade Level 4 235 Edward St BRISBANE CITY QLD 4000 Australia

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Prescribed ERA, ERA 50 - Bulk Material Handling, 1: Loading or unloading 100t or more of minerals in a day or stockpiling 50,000t or more of minerals, (a) within 5km of the highest astronomical tide or 1km of a watercourse	LOT 56/DSN808
Prescribed ERA, ERA 08 - Chemical Storage, 3: Storing more than 500 cubic metres of chemicals of class C1 or C2 combustible liquids under AS 1940 or dangerous goods class 3 under subsection (1)(c)	LOT 56/DSN808

Additional information for applicants

Environmentally relevant activities

The description of any environmentally relevant activity (ERA) for which an environmental authority (EA) is issued is a restatement of the ERA as defined by legislation at the time the EA is issued. Where there is any inconsistency between that description of an ERA and the conditions stated by an EA as to the scale, intensity or manner of carrying out an ERA, the conditions prevail to the extent of the inconsistency.

An EA authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the EA specifically authorises environmental harm.

A person carrying out an ERA must also be a registered suitable operator under the Environmental Protection Act 1994 (EP Act).

Environmental authority

Contaminated land

It is a requirement of the EP Act that an owner or occupier of contaminated land give written notice to the administering authority if they become aware of the following:

- the happening of an event involving a hazardous contaminant on the contaminated land (notice must be given within 24 hours); or
- a change in the condition of the contaminated land (notice must be given within 24 hours); or
- a notifiable activity (as defined in Schedule 3) having been carried out, or is being carried out, on the contaminated land (notice must be given within 20 business days);

that is causing, or is reasonably likely to cause, serious or material environmental harm.

For further information, including the form for giving written notice, refer to the Queensland Government website www.qld.gov.au, using the search term 'duty to notify'.

Take effect

Please note that, in accordance with section 200 of the EP Act, an EA has effect:

- a) if the authority is for a prescribed ERA and it states that it takes effect on the day nominated by the holder of the authority in a written notice given to the administering authority-on the nominated day; or
- b) if the authority states a day or an event for it to take effect-on the stated day or when the stated event happens; or
- c) otherwise-on the day the authority is issued.

However, if the EA is authorising an activity that requires an additional authorisation (a relevant tenure for a resource activity, a development permit under the Planning Act 2016 or an SDA Approval under the State Development and Public Works Organisation Act 1971), this EA will not take effect until the additional authorisation has taken effect.

If this EA takes effect when the additional authorisation takes effect, you must provide the administering authority written notice within 5 business days of receiving notification of the related additional authorisation taking effect.

If you have incorrectly claimed that an additional authorisation is not required, carrying out the ERA without the additional authorisation is not legal and could result in your prosecution for providing false or misleading information or operating without a valid environmental authority.

Christine Mooney
Department of Environment and Science
Delegate of the administering authority
Environmental Protection Act 1994

Enquiries:
Heritage, Utilities and Government Assessment
Department of Environment and Science
Phone: 1300 130 372
Email: palm@des.qld.gov.au

Date issued: 24 June 2019

Environmental authority

Obligations under the Environmental Protection Act 1994

In addition to the requirements found in the conditions of this environmental authority, the holder must also meet their obligations under the EP Act, and the regulations made under the EP Act. For example, the holder must comply with the following provisions of the Act:

- general environmental duty (section 319)
- duty to notify environmental harm (section 320-320G)
- offence of causing serious or material environmental harm (sections 437-439)
- offence of causing environmental nuisance (section 440)
- offence of depositing prescribed water contaminants in waters and related matters (section 440ZG)
- offence to place contaminant where environmental harm or nuisance may be caused (section 443)

Other permits required

This permit only provides an approval under the *Environmental Protection Act 1994*. In order to lawfully operate you may also require permits / approvals from your local government authority, other business units within the department and other State Government agencies prior to commencing any activity at the site.

Obligations under the *Mining and Quarrying Safety and Health Act 1999*

If you are operating a quarry, other than a sand and gravel quarry where there is no crushing capability, you will be required to comply with the *Mining and Quarrying Safety and Health Act 1999*. For more information on your obligations under this legislation contact Mine Safety and Health at www.dnrm.qld.gov.au, or phone 13 QGOV (13 74 68) or your local Mines Inspectorate Office.

Development Approval

This permit is not a development approval under the *Planning Act 2016*. The conditions of this environmental authority are separate, and in addition to, any conditions that may be on the development approval. If a copy of this environmental authority is attached to a development approval, it is for information only, and may not be current. Please contact the Department of Environment and Science to ensure that you have the most current version of the environmental authority relating to this site.

Conditions of environmental authority

Location: Lot 56 on Plan DSN808; Dawson Highway, Rolleston.

Activities: ERA 50 Bulk material handling, threshold 1 (a) loading or unloading 100t or more of minerals in a day or stockpiling 50,000t or more of minerals within 5km of the highest astronomical tide or 1km of a watercourse, and

ERA 8 Chemical storage, threshold 3 storing more than 500m³ of chemicals of class C1 or C2 combustible liquids under AS 1940 or dangerous goods class 3 under subsection (1)(c).

The environmentally relevant activities conducted at the locations as described above must be conducted in accordance with the following site specific conditions of the approval.

Agency interest: General	
Condition number	Condition
G1	Activities under this environmental authority must be conducted in accordance with the following limitations: <ul style="list-style-type: none"> a) Bulk material unloading/loading activities are restricted to the unloading/loading of coal; and b) Only coal may be stockpiled at the site; and c) Coal must be stockpiled on the coal stockpile pad, identified as the 'proposed coal stockpile pad' in <i>Appendix A – Site map</i>.
G2	Any breach of a condition of this environmental authority must be reported to the administering authority as soon as practicable within 24 hours of becoming aware of the breach. Records must be kept including full details of the breach and any subsequent actions taken.
G3	All reasonable and practicable measures must be taken to prevent or minimise environmental harm caused by the activities .
G4	The activity must be undertaken in accordance with written procedures that: <ul style="list-style-type: none"> a) identify potential risks to the environment from the activity during routine operations and emergencies; and b) establish and maintain control measures that minimise the potential for environmental harm; and c) ensure plant, equipment and measures are maintained in a proper and effective condition; and d) ensure plant, equipment and measures are operated in a proper and effective manner; and e) ensure that staff are trained and aware of their obligations under the <i>Environmental Protection Act 1994</i>; and f) ensure that reviews of environmental performance are undertaken at least annually.

G5	All records must be kept for a period of at least five years and provided to the administering authority upon request.
G6	An appropriately qualified person(s) must monitor, record and interpret all parameters that are required to be monitored by this environmental authority and in the manner specified by this environmental authority.
G7	Chemicals and fuels in containers of greater than 15 litres must be stored within a secondary containment system .
G8	When required by the administering authority , monitoring must be undertaken in the manner prescribed by the administering authority to investigate a complaint of environmental nuisance arising from the activity . The monitoring results must be provided within 10 business days to the administering authority upon its request.
Agency interest: Air	
Condition number	Condition
A1	Odours or airborne contaminants must not cause environmental nuisance to any sensitive place or commercial place .
A2	Dust and particulate matter emissions must not exceed the following concentrations at any sensitive place or commercial place: <ul style="list-style-type: none"> a) dust deposition of 120 milligrams per square metre per day, when monitored in accordance with Australian Standard AS 3580.10.1 (or more recent editions), or b) a concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (µm) (PM₁₀) suspended in the atmosphere of 50 micrograms per cubic metre over a 24 hour averaging time, when monitored in accordance with Australian Standard AS 3580.9.6 (or more recent editions) or any other method approved by the administering authority.
A3	Dust and particulate matter monitoring must: <ul style="list-style-type: none"> a) be undertaken upon request by the administering authority; and b) be carried out at places relevant to the potentially affected sensitive place or commercial place and at suitable representative reference site(s) unlikely to be affected by the activity; and c) be carried out at a sufficient number of monitoring points to enable compliance assessment with condition A2; and d) take into account: <ul style="list-style-type: none"> i. locations of dust and particulate sources; and ii. locations of persons or sites potentially affected by any release of dust or particulate matter from the activity; and e) be carried out in accordance with the latest edition of the administering authority's Air Quality Sampling Manual; and f) be undertaken in conjunction with the recording of precipitation, wind speed and direction in accordance with the requirements of the relevant standards within AS3580.

Agency interest: Water	
Condition number	Condition
W1	Other than as permitted within this environmental authority, contaminants must not be released to waters .
W2	The stormwater runoff from disturbed areas, generated by a storm event up to and including a 24 hour storm event with an average recurrence interval of 1 in 10 years must be retained on site or managed to remove contaminants before released offsite.
Agency interest: Land	
Condition number	Condition
L1	Contaminants must not be released to land .
Agency interest: Noise	
Condition number	Condition
N1	Noise generated by the activity must not cause environmental nuisance to any sensitive place or commercial place .
N2	Noise from the activity must not exceed an average maximum sound pressure level measured over 1 hour ($L_{Amax, 1hr}$) of 49 dB during the hours of 10pm-7am Monday to Saturday, and 10pm-9am on Sunday and Public Holidays, at any sensitive place or commercial place .
Agency interest: Waste	
Condition number	Condition
WA1	All waste generated in carrying out the activity must be lawfully reused, recycled or removed to a facility that can lawfully accept the waste.

Definitions

Key terms and/or phrases used in this document are defined in this section and **bolded** throughout this document. Applicants should note that where a term is not defined, the definition in the *Environmental Protection Act 1994*, its regulations or environmental protection policies must be used. If a word remains undefined it has its ordinary meaning.

Activity means the environmentally relevant activities, whether resource activities or prescribed activities, to which the environmental authority relates.

Administering authority means the Department of Environment and Science or its successors or predecessors.

Appropriately qualified person(s) means a person or persons who has professional qualifications, training, skills and experience relevant to the EA requirement and can give authoritative assessment, advice and analysis in relation to the EA requirement using the relevant protocols, standards, methods or literature.

Commercial place means a place used as a workplace, an office or for business or commercial purposes and includes a place within the curtilage of such a place reasonably used by persons at that place.

Environmental nuisance as defined in Chapter 1 of the *Environmental Protection Act 1994*.

Land does not include waters.

$L_{Amax,T}$ means the maximum A-weighted sound pressure level measured over a time period T of not less than 15 minutes, using Fast response.

Measures have the broadest interpretation and includes plant, equipment, physical objects, monitoring, procedures, actions, directions and competency.

Records include breach notifications, written procedures, analysis results, monitoring reports and monitoring programs required under a condition of this authority.

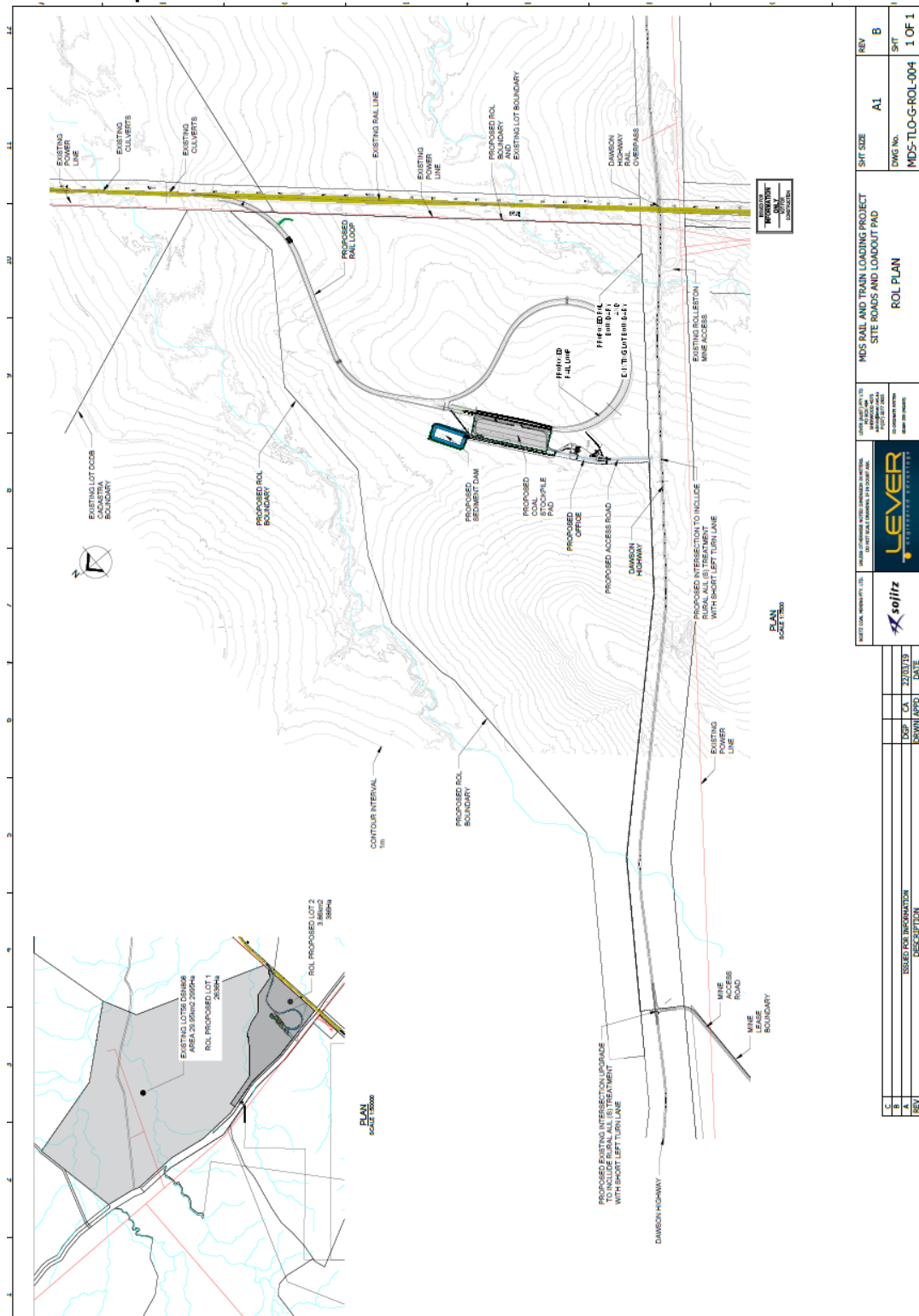
Secondary containment system means a system designed, installed and operated to prevent any release of contaminants from the system, or containers within the system, to land, groundwater, or surface waters

Sensitive place includes the following and includes a place within the curtilage of such a place reasonably used by persons at that place:

1. a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
2. a motel, hotel or hostel; or
3. a kindergarten, school, university or other educational institution; or
4. a medical centre or hospital; or
5. a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 2004* or a World Heritage Area; or
6. a public park or garden; or
7. for noise, a place defined as a sensitive receptor for the purposes of the Environmental Protection (Noise) Policy 2008.

Waters includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water, natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater and any part thereof.

Appendix A – Site map



END OF PERMIT

APPENDIX F

SARA Approval

PLANS AND DOCUMENTS
referred to in the REFERRAL
AGENCY RESPONSE

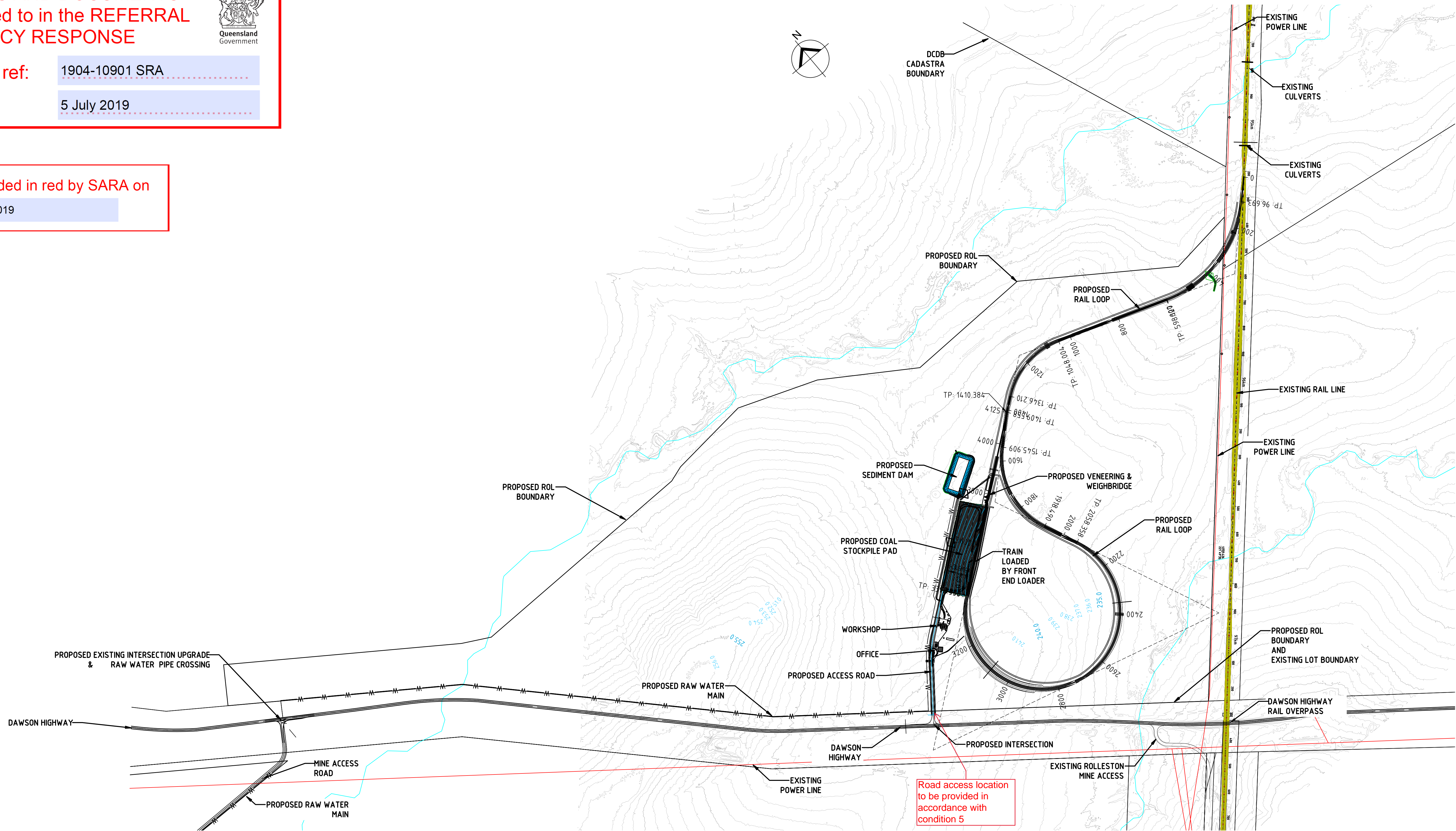


SARA ref: 1904-10901 SRA

Date: 5 July 2019

Amended in red by SARA on

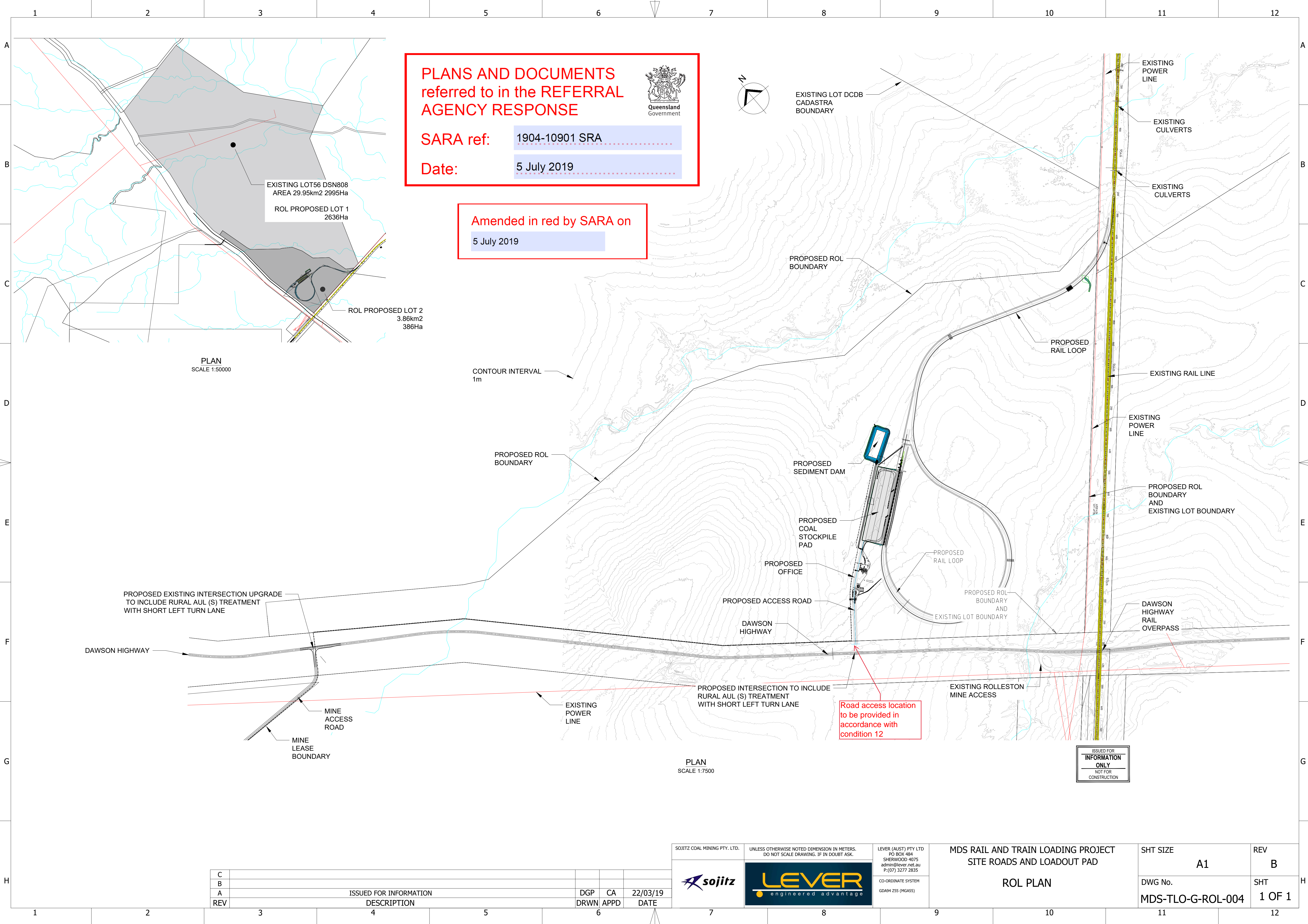
5 July 2019



PLAN
SCALE 1:7500

C					
B					
A					
REV					
		ISSUED FOR INFORMATION		DGP	CA
		DESCRIPTION		DRWN	APPD
					08/03/19
					DATE

SOJILZ COAL MINING PTY. LTD.	UNLESS OTHERWISE NOTED DIMENSION IN METERS. DO NOT SCALE DRAWING. IF IN DOUBT ASK.	LEVER (AUST) PTY LTD PO BOX 484 SHERWOOD 4075 admin@lever.net.au P:(07) 3277 2835	MDS RAIL AND TRAIN LOADING PROJECT SITE ROADS AND LOADOUT PAD	SHT SIZE A1	REV A
		CO-ORDINATE SYSTEM GDA94 255 (MGA55)	SITE PLAN	DWG No. MDS-TLO-G-SL-002	SHT 1 OF 1



MAIN MAP

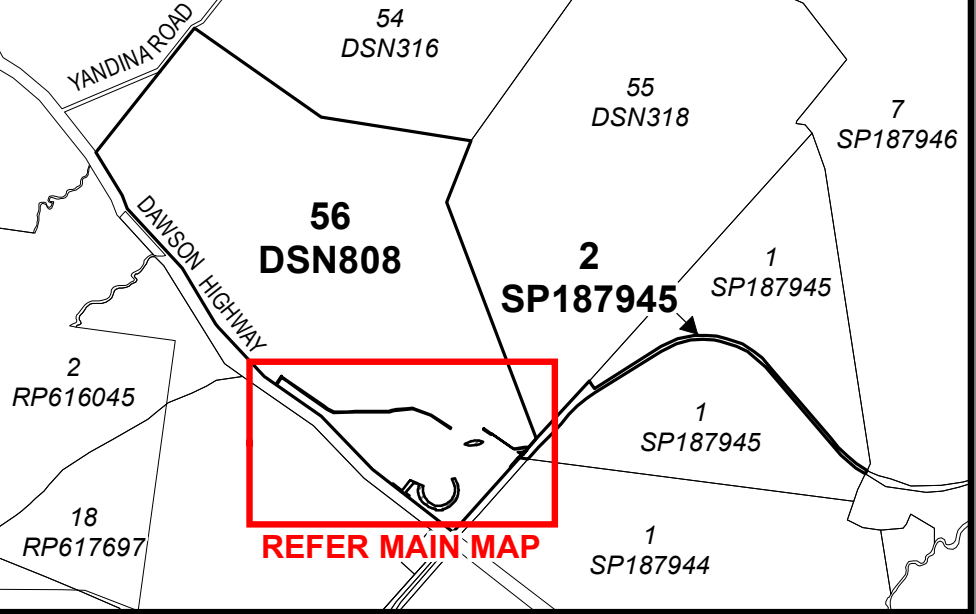
PLANS AND DOCUMENTS
referred to in the REFERRAL
AGENCY RESPONSE



SARA ref: 1904-10901 SRA

Date: 5 July 2019

PROPERTY VIEW

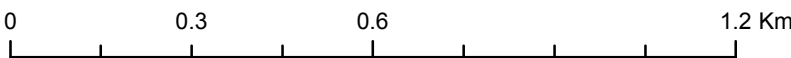


Legend

- Derived Reference Start Points (see attachment)
- Subject Lot(s)
- Area A (19.78)

Note: This is a colour plan and should only be reproduced in colour.

1:12500 @ A3 size



Projection: UTM (MGA Zone 55) Datum: GDA94

The property boundaries shown on this plan are APPROXIMATE ONLY.
They are NOT an accurate representation of the legal boundaries.

Note: Derived Reference Points are provided to assist in the location of
area boundaries. Responsibility for locating these boundaries lies solely
with the landholder and delegated contractor(s).

Technical Agency Response Plan

Plan of Area A (Parts A¹ - A⁷) in Lot 56 on DSN808 and
Lot 2 on SP187945

eLVAS Case ID:2019/002183

Version: 1

LOCAL GOVT: CENTRAL HIGHLANDS REGIONAL
LOCALITY OF ALBINIA

File Reference: N/A

Compiled from: DCDB & VMO Notes

Prepared by: DL

Department: DNRME

Region: CENTRAL

Date: 21/06/2019



Reference: **TARP**
1904-10901-SRA
Sheet 1 of 3

Attachment to Technical Agency Response Plan, reference TARP
1904-10901 SRA
Derived Reference Points for GPS coordinates

Note: Derived Reference Points are provided to assist in the location of area boundaries only
Responsibility for locating these boundaries lies solely with the landholder and delegated contractor(s).
Coordinates start at a point indicated on the accompanying plan and proceed in a clockwise direction.

Parcel	ID	Easting	Northing	Parcel	ID	Easting	Northing	Parcel	ID	Easting	Northing
A1	1	645557	7303339	A2	61	645713	7303049	A2	121	646172	7302957
A1	2	645682	7303282	A2	62	645707	7303064	A2	122	646184	7302965
A1	3	645662	7303283	A2	63	645701	7303079	A2	123	646195	7302974
A1	4	645655	7303283	A2	64	645697	7303094	A2	124	646206	7302983
A1	5	645648	7303284	A2	65	645693	7303110	A2	125	646217	7302993
A1	6	645642	7303285	A2	66	645690	7303126	A2	126	646227	7303003
A1	7	645614	7303294	A2	67	645688	7303142	A2	127	646236	7303014
A1	8	645613	7303295	A2	68	645687	7303158	A2	128	646245	7303026
A1	9	645612	7303295	A2	69	645686	7303171	A2	129	646253	7303037
A1	10	645610	7303294	A2	70	645687	7303184	A2	130	646260	7303049
A1	11	645609	7303294	A2	71	645688	7303196	A2	131	646267	7303062
A1	12	645609	7303294	A2	72	645689	7303209	A2	132	646273	7303075
A1	13	645608	7303293	A2	73	645692	7303222	A2	133	646279	7303088
A1	14	645607	7303292	A2	74	645695	7303235	A2	134	646283	7303101
A1	15	645606	7303291	A2	75	645698	7303247	A2	135	646288	7303114
A1	16	645497	7303150	A2	76	645702	7303259	A2	136	646291	7303128
A1	17	645492	7303144	A2	77	645707	7303271	A2	137	646294	7303142
A1	18	645480	7303129	A2	78	645775	7303240	A2	138	646296	7303156
A1	19	645542	7303080	A2	79	645773	7303229	A2	139	646297	7303170
A1	20	645532	7303067	A2	80	645771	7303219	A2	140	646297	7303184
A1	21	645262	7303278	A2	81	645770	7303208	A2	141	646297	7303198
A1	22	645262	7303278	A2	82	645769	7303197	A2	142	646296	7303212
A1	23	645272	7303291	A2	83	645769	7303195	A2	143	646295	7303226
A1	24	645424	7303173	A2	84	645768	7303181	A2	144	646292	7303240
A1	25	645436	7303188	A2	85	645769	7303168	A2	145	646289	7303254
A1	26	645442	7303195	A2	86	645770	7303155	A2	146	646285	7303267
A1	27	645546	7303324	A2	87	645771	7303142	A2	147	646281	7303281
A1	28	645551	7303332	A2	88	645774	7303129	A2	148	646279	7303285
A1	29	645557	7303339	A2	89	645777	7303116	A2	149	646244	7303363
A2	30	646094	7302861	A2	90	645781	7303103	A2	150	646250	7303365
A2	31	646096	7302846	A2	91	645785	7303090	A2	151	646303	7303368
A2	32	646079	7302844	A2	92	645790	7303078	A2	152	646324	7303315
A2	33	646062	7302842	A2	93	645796	7303066	A2	153	646331	7303301
A2	34	646046	7302841	A2	94	645798	7303061	A2	154	646336	7303287
A2	35	646029	7302841	A2	95	645804	7303050	A2	155	646341	7303272
A2	36	646012	7302842	A2	96	645812	7303038	A2	156	646346	7303257
A2	37	645995	7302843	A2	97	645819	7303028	A2	157	646349	7303242
A2	38	645979	7302846	A2	98	645827	7303017	A2	158	646352	7303227
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A2	44	645906	7302879	A2	104	645951	7302924	A2	164	646354	7303134
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A2	49	645839	7302915	A2	109	646021	7302914	A2	169	646335	7303059
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A2	52	645804	7302945	A2	112	646063	7302917	A2	172	646315	7303017
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A2	55	645763	7302967	A2	115	646104	7302926	A2	175	646289	7302978
A2	56	645753	7302980	A2	116	646108	7302927	A2	176	646279	7302966
A2	57	645744	7302993	A2	117	646121	7302932	A2	177	646268	7302955
A2	58	645735	7303006	A2	118	646135	7302937	A2	178	646257	7302944
A2	59	645727	7303020	A2	119	646148	7302943	A2	179	646246	7302934
A2	60	645719	7303034	A2	120	646160	7302950	A2	180	646234	7302924

Attachment to Technical Agency Response Plan, reference TARP
1904-10901 SRA
Derived Reference Points for GPS coordinates

Note: Derived Reference Points are provided to assist in the location of area boundaries only
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Coordinates start at a point indicated on the accompanying plan and proceed in a clockwise direction.

Parcel	ID	Easting	Northing	Parcel	ID	Easting	Northing	Parcel	ID	Easting	Northing
A2	181	646221	7302914	A5	241	646768	7303973	A7	301	644108	7304560
A2	182	646209	7302906	A5	242	646741	7303951	A7	302	643756	7304806
A2	183	646195	7302898	A5	243	646705	7303936	A7	303	643520	7304970
A2	184	646182	7302890	A5	244	646661	7303918	A7	304	643429	7305034
A2	185	646168	7302884	A6	245	646770	7304201	A7	305	643353	7304921
A2	186	646153	7302878	A6	246	647259	7303862	A7	306	643337	7304932
A2	187	646139	7302873	A6	247	647452	7303886	A7	307	643418	7305053
A2	188	646124	7302868	A6	248	647515	7303894	A7	308	643424	7305062
A2	189	646109	7302864	A6	249	647515	7303894	A7	309	643432	7305056
A2	190	646094	7302861	A6	250	647494	7303871				
A3	191	647449	7303820	A6	251	647455	7303866				
A3	192	647398	7303764	A6	252	647280	7303845				
A3	193	647390	7303755	A6	253	646898	7304110				
A3	194	647389	7303755	A6	254	646891	7304093				
A3	195	647389	7303755	A6	255	646768	7304178				
A3	196	647389	7303754	A6	256	646770	7304201				
A3	197	647381	7303745	A7	257	643432	7305056				
A3	198	647358	7303719	A7	258	643532	7304987				
A3	199	647336	7303696	A7	259	643768	7304822				
A3	200	647332	7303691	A7	260	644135	7304566				
A3	201	647215	7303560	A7	261	644192	7304527				
A3	202	647206	7303562	A7	262	644293	7304473				
A3	203	647330	7303695	A7	263	644506	7304476				
A3	204	647394	7303765	A7	264	644655	7304478				
A3	205	647339	7303803	A7	265	645214	7304487				
A3	206	647356	7303803	A7	266	645232	7304493				
A3	207	647374	7303804	A7	267	645275	7304507				
A3	208	647391	7303805	A7	268	645276	7304507				
A3	209	647410	7303809	A7	269	645277	7304507				
A3	210	647430	7303815	A7	270	645323	7304512				
A3	211	647449	7303820	A7	271	645492	7304528				
A4	212	647432	7303764	A7	272	645594	7304538				
A4	213	647422	7303761	A7	273	645594	7304538				
A4	214	647476	7303821	A7	274	645596	7304538				
A4	215	647488	7303834	A7	275	645597	7304538				
A4	216	647498	7303838	A7	276	645599	7304538				
A4	217	647432	7303764	A7	277	645620	7304530				
A5	218	646661	7303918	A7	278	645816	7304456				
A5	219	646540	7303909	A7	279	645820	7304455				
A5	220	646535	7303910	A7	280	645904	7304424				
A5	221	646456	7303927	A7	281	645905	7304423				
A5	222	646455	7303929	A7	282	645906	7304423				
A5	223	646471	7303939	A7	283	646238	7304206				
A5	224	646487	7303949	A7	284	646224	7304191				
A5	225	646503	7303958	A7	285	645896	7304405				
A5	226	646520	7303967	A7	286	645594	7304518				
A5	227	646537	7303974	A7	287	645494	7304508				
A5	228	646551	7303979	A7	288	645280	7304487				
A5	229	646566	7303984	A7	289	645219	7304467				
A5	230	646581	7303987	A7	290	645218	7304467				
A5	231	646596	7303990	A7	291	645216	7304467				
A5	232	646611	7303992	A7	292	644656	7304458				
A5	233	646626	7303994	A7	293	644291	7304453				
A5	234	646641	7303995	A7	294	644290	7304453				
A5	235	646657	7303995	A7	295	644289	7304453				
A5	236	646672	7303994	A7	296	644287	7304453				
A5	237	646687	7303993	A7	297	644286	7304454				
A5	238	646702	7303991	A7	298	644182	7304509				
A5	239	646717	7303988	A7	299	644181	7304509				
A5	240	646732	7303985	A7	300	644181	7304510				

Permit

Environmental Protection Act 1994

Environmental authority EA0001828

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Environmental authority number: EA0001828

Environmental authority takes effect on 24 June 2019

Environmental authority holder(s)

Name(s)	Registered address
SOJITZ COAL MINING PTY LTD	Level 34 345 Queen Street BRISBANE QLD 4001
Endocoal Limited	Rowes Arcade Level 4 235 Edward St BRISBANE CITY QLD 4000 Australia

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Prescribed ERA, ERA 50 - Bulk Material Handling, 1: Loading or unloading 100t or more of minerals in a day or stockpiling 50,000t or more of minerals, (a) within 5km of the highest astronomical tide or 1km of a watercourse	LOT 56/DSN808
Prescribed ERA, ERA 08 - Chemical Storage, 3: Storing more than 500 cubic metres of chemicals of class C1 or C2 combustible liquids under AS 1940 or dangerous goods class 3 under subsection (1)(c)	LOT 56/DSN808

Additional information for applicants

Environmentally relevant activities

The description of any environmentally relevant activity (ERA) for which an environmental authority (EA) is issued is a restatement of the ERA as defined by legislation at the time the EA is issued. Where there is any inconsistency between that description of an ERA and the conditions stated by an EA as to the scale, intensity or manner of carrying out an ERA, the conditions prevail to the extent of the inconsistency.

An EA authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the EA specifically authorises environmental harm.

A person carrying out an ERA must also be a registered suitable operator under the Environmental Protection Act 1994 (EP Act).

Environmental authority

Contaminated land

It is a requirement of the EP Act that an owner or occupier of contaminated land give written notice to the administering authority if they become aware of the following:

- the happening of an event involving a hazardous contaminant on the contaminated land (notice must be given within 24 hours); or
- a change in the condition of the contaminated land (notice must be given within 24 hours); or
- a notifiable activity (as defined in Schedule 3) having been carried out, or is being carried out, on the contaminated land (notice must be given within 20 business days);

that is causing, or is reasonably likely to cause, serious or material environmental harm.

For further information, including the form for giving written notice, refer to the Queensland Government website www.qld.gov.au, using the search term 'duty to notify'.

Take effect

Please note that, in accordance with section 200 of the EP Act, an EA has effect:

- a) if the authority is for a prescribed ERA and it states that it takes effect on the day nominated by the holder of the authority in a written notice given to the administering authority-on the nominated day; or
- b) if the authority states a day or an event for it to take effect-on the stated day or when the stated event happens; or
- c) otherwise-on the day the authority is issued.

However, if the EA is authorising an activity that requires an additional authorisation (a relevant tenure for a resource activity, a development permit under the Planning Act 2016 or an SDA Approval under the State Development and Public Works Organisation Act 1971), this EA will not take effect until the additional authorisation has taken effect.

If this EA takes effect when the additional authorisation takes effect, you must provide the administering authority written notice within 5 business days of receiving notification of the related additional authorisation taking effect.

If you have incorrectly claimed that an additional authorisation is not required, carrying out the ERA without the additional authorisation is not legal and could result in your prosecution for providing false or misleading information or operating without a valid environmental authority.

Christine Mooney
Department of Environment and Science
Delegate of the administering authority
Environmental Protection Act 1994

Enquiries:
Heritage, Utilities and Government Assessment
Department of Environment and Science
Phone: 1300 130 372
Email: palm@des.qld.gov.au

Date issued: 24 June 2019

Environmental authority

Obligations under the Environmental Protection Act 1994

In addition to the requirements found in the conditions of this environmental authority, the holder must also meet their obligations under the EP Act, and the regulations made under the EP Act. For example, the holder must comply with the following provisions of the Act:

- general environmental duty (section 319)
- duty to notify environmental harm (section 320-320G)
- offence of causing serious or material environmental harm (sections 437-439)
- offence of causing environmental nuisance (section 440)
- offence of depositing prescribed water contaminants in waters and related matters (section 440ZG)
- offence to place contaminant where environmental harm or nuisance may be caused (section 443)

Other permits required

This permit only provides an approval under the *Environmental Protection Act 1994*. In order to lawfully operate you may also require permits / approvals from your local government authority, other business units within the department and other State Government agencies prior to commencing any activity at the site.

Obligations under the *Mining and Quarrying Safety and Health Act 1999*

If you are operating a quarry, other than a sand and gravel quarry where there is no crushing capability, you will be required to comply with the *Mining and Quarrying Safety and Health Act 1999*. For more information on your obligations under this legislation contact Mine Safety and Health at www.dnrm.qld.gov.au, or phone 13 QGOV (13 74 68) or your local Mines Inspectorate Office.

Development Approval

This permit is not a development approval under the *Planning Act 2016*. The conditions of this environmental authority are separate, and in addition to, any conditions that may be on the development approval. If a copy of this environmental authority is attached to a development approval, it is for information only, and may not be current. Please contact the Department of Environment and Science to ensure that you have the most current version of the environmental authority relating to this site.

Conditions of environmental authority

Location: Lot 56 on Plan DSN808; Dawson Highway, Rolleston.

Activities: ERA 50 Bulk material handling, threshold 1 (a) loading or unloading 100t or more of minerals in a day or stockpiling 50,000t or more of minerals within 5km of the highest astronomical tide or 1km of a watercourse, and

ERA 8 Chemical storage, threshold 3 storing more than 500m³ of chemicals of class C1 or C2 combustible liquids under AS 1940 or dangerous goods class 3 under subsection (1)(c).

The environmentally relevant activities conducted at the locations as described above must be conducted in accordance with the following site specific conditions of the approval.

Agency interest: General	
Condition number	Condition
G1	Activities under this environmental authority must be conducted in accordance with the following limitations: <ul style="list-style-type: none"> a) Bulk material unloading/loading activities are restricted to the unloading/loading of coal; and b) Only coal may be stockpiled at the site; and c) Coal must be stockpiled on the coal stockpile pad, identified as the 'proposed coal stockpile pad' in <i>Appendix A – Site map</i>.
G2	Any breach of a condition of this environmental authority must be reported to the administering authority as soon as practicable within 24 hours of becoming aware of the breach. Records must be kept including full details of the breach and any subsequent actions taken.
G3	All reasonable and practicable measures must be taken to prevent or minimise environmental harm caused by the activities .
G4	The activity must be undertaken in accordance with written procedures that: <ul style="list-style-type: none"> a) identify potential risks to the environment from the activity during routine operations and emergencies; and b) establish and maintain control measures that minimise the potential for environmental harm; and c) ensure plant, equipment and measures are maintained in a proper and effective condition; and d) ensure plant, equipment and measures are operated in a proper and effective manner; and e) ensure that staff are trained and aware of their obligations under the <i>Environmental Protection Act 1994</i>; and f) ensure that reviews of environmental performance are undertaken at least annually.

G5	All records must be kept for a period of at least five years and provided to the administering authority upon request.
G6	An appropriately qualified person(s) must monitor, record and interpret all parameters that are required to be monitored by this environmental authority and in the manner specified by this environmental authority.
G7	Chemicals and fuels in containers of greater than 15 litres must be stored within a secondary containment system .
G8	When required by the administering authority , monitoring must be undertaken in the manner prescribed by the administering authority to investigate a complaint of environmental nuisance arising from the activity . The monitoring results must be provided within 10 business days to the administering authority upon its request.
Agency interest: Air	
Condition number	Condition
A1	Odours or airborne contaminants must not cause environmental nuisance to any sensitive place or commercial place .
A2	Dust and particulate matter emissions must not exceed the following concentrations at any sensitive place or commercial place: <ul style="list-style-type: none"> a) dust deposition of 120 milligrams per square metre per day, when monitored in accordance with Australian Standard AS 3580.10.1 (or more recent editions), or b) a concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (µm) (PM₁₀) suspended in the atmosphere of 50 micrograms per cubic metre over a 24 hour averaging time, when monitored in accordance with Australian Standard AS 3580.9.6 (or more recent editions) or any other method approved by the administering authority.
A3	Dust and particulate matter monitoring must: <ul style="list-style-type: none"> a) be undertaken upon request by the administering authority; and b) be carried out at places relevant to the potentially affected sensitive place or commercial place and at suitable representative reference site(s) unlikely to be affected by the activity; and c) be carried out at a sufficient number of monitoring points to enable compliance assessment with condition A2; and d) take into account: <ul style="list-style-type: none"> i. locations of dust and particulate sources; and ii. locations of persons or sites potentially affected by any release of dust or particulate matter from the activity; and e) be carried out in accordance with the latest edition of the administering authority's Air Quality Sampling Manual; and f) be undertaken in conjunction with the recording of precipitation, wind speed and direction in accordance with the requirements of the relevant standards within AS3580.

Agency interest: Water	
Condition number	Condition
W1	Other than as permitted within this environmental authority, contaminants must not be released to waters .
W2	The stormwater runoff from disturbed areas, generated by a storm event up to and including a 24 hour storm event with an average recurrence interval of 1 in 10 years must be retained on site or managed to remove contaminants before released offsite.
Agency interest: Land	
Condition number	Condition
L1	Contaminants must not be released to land .
Agency interest: Noise	
Condition number	Condition
N1	Noise generated by the activity must not cause environmental nuisance to any sensitive place or commercial place .
N2	Noise from the activity must not exceed an average maximum sound pressure level measured over 1 hour ($L_{Amax, 1hr}$) of 49 dB during the hours of 10pm-7am Monday to Saturday, and 10pm-9am on Sunday and Public Holidays, at any sensitive place or commercial place .
Agency interest: Waste	
Condition number	Condition
WA1	All waste generated in carrying out the activity must be lawfully reused, recycled or removed to a facility that can lawfully accept the waste.

Definitions

Key terms and/or phrases used in this document are defined in this section and **bolded** throughout this document. Applicants should note that where a term is not defined, the definition in the *Environmental Protection Act 1994*, its regulations or environmental protection policies must be used. If a word remains undefined it has its ordinary meaning.

Activity means the environmentally relevant activities, whether resource activities or prescribed activities, to which the environmental authority relates.

Administering authority means the Department of Environment and Science or its successors or predecessors.

Appropriately qualified person(s) means a person or persons who has professional qualifications, training, skills and experience relevant to the EA requirement and can give authoritative assessment, advice and analysis in relation to the EA requirement using the relevant protocols, standards, methods or literature.

Commercial place means a place used as a workplace, an office or for business or commercial purposes and includes a place within the curtilage of such a place reasonably used by persons at that place.

Environmental nuisance as defined in Chapter 1 of the *Environmental Protection Act 1994*.

Land does not include waters.

L_{Amax,T} means the maximum A-weighted sound pressure level measured over a time period T of not less than 15 minutes, using Fast response.

Measures have the broadest interpretation and includes plant, equipment, physical objects, monitoring, procedures, actions, directions and competency.

Records include breach notifications, written procedures, analysis results, monitoring reports and monitoring programs required under a condition of this authority.

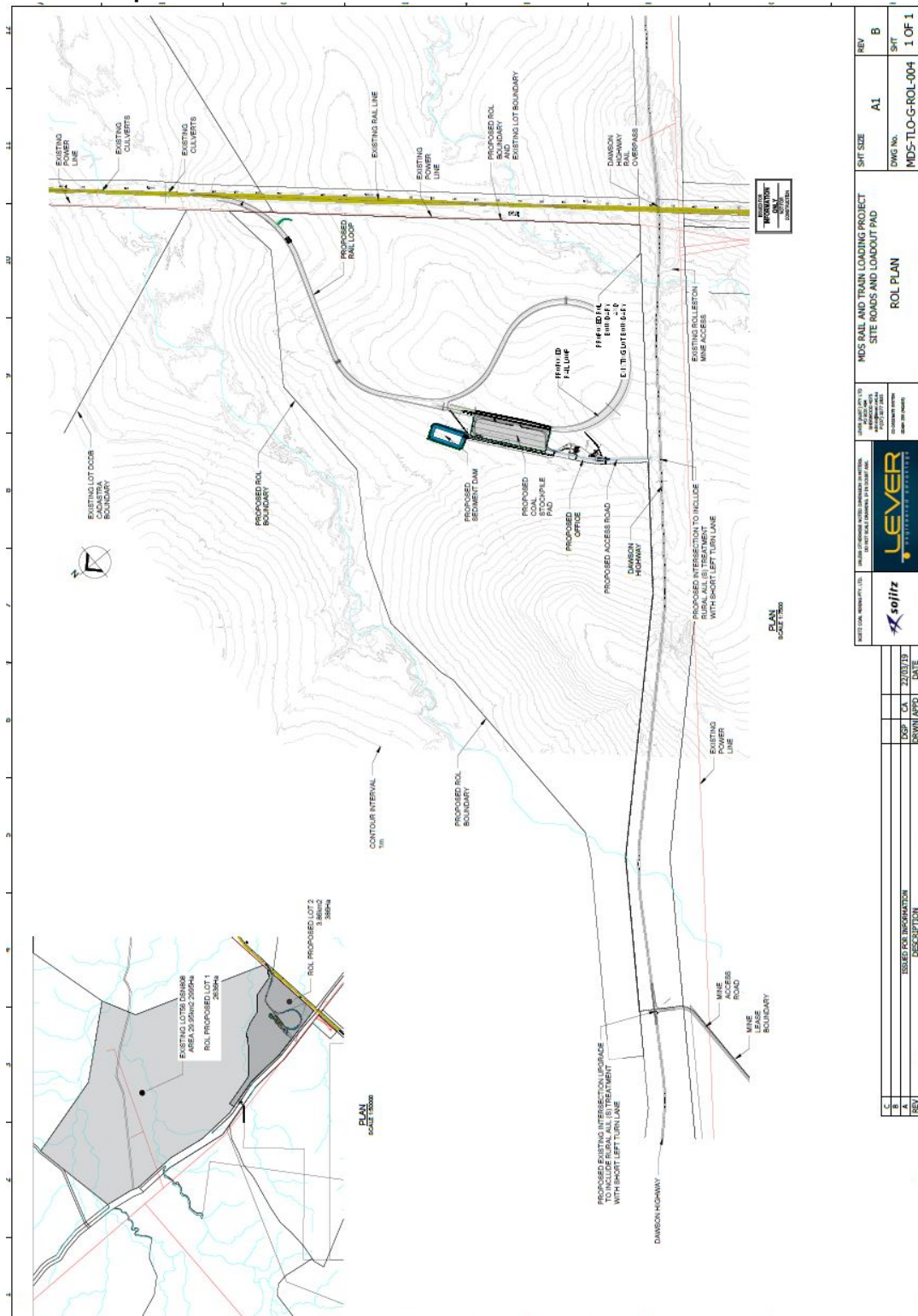
Secondary containment system means a system designed, installed and operated to prevent any release of contaminants from the system, or containers within the system, to land, groundwater, or surface waters

Sensitive place includes the following and includes a place within the curtilage of such a place reasonably used by persons at that place:

1. a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
2. a motel, hotel or hostel; or
3. a kindergarten, school, university or other educational institution; or
4. a medical centre or hospital; or
5. a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 2004* or a World Heritage Area; or
6. a public park or garden; or
7. for noise, a place defined as a sensitive receptor for the purposes of the Environmental Protection (Noise) Policy 2008.

Waters includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water, natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater and any part thereof.

Appendix A – Site map



END OF PERMIT

Our ref TMR19-027295
Your ref
Enquiries Jason Giddy



Department of
Transport and Main Roads

24 June 2019

Sojitz Coal Mining Pty Ltd and Endocoal Limited
C/- Murray & Associates (Qld) Pty Ltd
PO Box 665
Emerald QLD 4720

Decision Notice – Permitted Road Access Location **(s62(1) Transport Infrastructure Act 1994)**

This is not an authorisation to commence work on a state-controlled road¹

Development application reference number COB001.1-2019, lodged with Central Highlands Regional Council involves constructing or changing a vehicular access between Lot 56 on DSN808 and Lot 2 on SP187945, the land the subject of the application, and 46D Dawson Highway (a state-controlled road).

In accordance with section 62A(2) of the *Transport Infrastructure Act 1994* (TIA), this development application is also taken to be an application for a decision under section 62(1) of TIA.

Decision (given under section 67 of TIA)

It has been decided to approve the application, subject to the following conditions:

No.	Conditions of Approval	Condition Timing
1	The permitted road access location is to be located in accordance with ROL Plan, compiled by Lever, dated 22 March 2019, reference MDS-TLO-G-ROL-004, sheet 1 of 1, revision A. <ul style="list-style-type: none">Note: It is understood the access location is at approximate chainage 22.55km (RHS).	At all times.
2	Road access works comprising Auxillary Left Turn (short)/Basic Right Turn (AUL(S)/BAR) must be provided at the permitted access location, generally in accordance with the Road Planning and Design Manual 2 nd Edition. The access must be constructed to accommodate an AB-Triple Road Train.	Prior to submitting the Plan of Survey to the local government for approval
3	Any existing informal accesses into the site are to be removed and table drains reinstated in accordance with the Road Planning and Design Manual 2 nd Edition.	Prior to submitting the Plan of Survey to the local government for approval
4	Direct access is prohibited between the Dawson Highway and the subject land at any other location other than the permitted road access location described in Condition 1.	At all times.

¹ Please refer to the further approvals required under the heading 'Further approvals'

No.	Conditions of Approval	Condition Timing
5	The road access is to be constructed and maintained at no cost to the department in accordance with section 64(a) & (b) of the <i>Transport Infrastructure Act 1994</i> .	At all times.

Reasons for the decision

The reasons for this decision are as follows:

- a) To maintain the safety and efficiency of the state-controlled road

Please refer to **Attachment A** for the findings on material questions of fact and the evidence or other material on which those findings were based.

Information about the Decision required to be given under section 67(2) of TIA

1. There is no guarantee of the continuation of road access arrangements, as this depends on future traffic safety and efficiency circumstances.
2. In accordance with section 70 of the TIA, the applicant for the planning application is bound by this decision. A copy of section 70 is attached as **Attachment B**, as required, for information.

Further information about the decision

1. In accordance with section 67(7) of TIA, this decision notice:
 - a) starts to have effect when the development approval has effect; and
 - b) stops having effect if the development approval lapses or is cancelled; and
 - c) replaces any earlier decision made under section 62(1) in relation to the land.
2. In accordance with section 485 of the TIA and section 31 of the *Transport Planning and Coordination Act 1994* (TPCA), a person whose interests are affected by this decision may apply for a review of this decision only within 28 days after notice of the decision was given under the TIA. A copy of the review provisions under TIA and TPCA are attached in **Attachment C** for information.
3. In accordance with section 485B of the TIA and section 35 of TPCA a person may appeal against a reviewed decision. The person must have applied to have the decision reviewed before an appeal about the decision can be lodged in the Planning and Environment Court. A copy of the Appeal Provisions under TIA and TPCA is attached in **Attachment C** for information.

Further approvals

The Department of Transport and Main Roads also provides the following information in relation to this approval:

1. Road Access Works Approval Required – Written approval is required from the department to carry out road works that are road access works (including driveways) on a state-controlled road in accordance with section 33 of the TIA. This approval must be obtained prior to commencing any works on the state-controlled road. The approval process may require the approval of engineering designs of the proposed works, certified by a Registered Professional Engineer of Queensland (RPEQ). Please contact the department to make an application.

If further information about this approval or any other related query is required, Mr Jason Giddy, Town Planner should be contacted by email at CorridorManagement@tmr.qld.gov.au or on (07) 4931 1686.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Anton DeKlerk', with a horizontal line underneath.

Anton DeKlerk
Principal Town Planner

Attachments: Attachment A - Decision evidence and findings
Attachment B - Section 70 of TIA
Attachment C - Appeal Provisions
Attachment D - ROL Plan, compiled by Lever, dated 22 March 2019, reference
MDS-TLO-G-ROL-004, sheet 1 of 1, revision A.

CC: Central Highlands Regional Council
TMR Fitzroy Geospatial Services

Attachment A

Decision Evidence and Findings

Findings on material questions of fact:

- The development application is a combined Matieral Change of Use Application for a High Impact Industry (Coal Loadout Facility including Rail loop and Siding) and Reconfiguration of a Lot (1 lot into 2 lots) referred to the department under the provisions of the *Planning Act 2016*.
- The department undertook an assessment in accordance with the State Development Assessment Provisions v2.4 for the overall proposal and the *Transport Infrastructure Act 1994* for the proposed access location (and section 62 decision) respectively. It was recommended the development application be approved subject to conditions included in the TMR technical agency response to the State Assessment and Referral Agency on 24 June 2019.
- The application included a proposed access location into the loadout facility at approximate chainage 22.55km (RHS) on 46D Dawson Highway. The submitted Traffic Impact Assessment recommended that an Auxillary Left Turn (short)/Basic Right Turn (AUL(S)/BAR) was appropriate for the development. The department has conditioned this requirement on the section 62 decision under the *Transport Infrastructure Act 1994*.

Evidence or other material on which findings were based:

Title of Evidence / Material	Prepared by	Date	Reference no.	Version/Issue
Planning Report	Murray & Associates Surveyors & Town Planner	April 2019	61389	-
Traffic Impact Assessment	Cardno	29 March 2019	QTT18056	-

Attachment B

Section 70 of TIA

Transport Infrastructure Act 1994

Chapter 6 Road transport infrastructure

Part 5 Management of State-controlled roads

70 Offences about road access locations and road access works, relating to decisions under s 62(1)

- (1) This section applies to a person who has been given notice under section 67 or 68 of a decision under section 62(1) about access between a State-controlled road and adjacent land.
- (2) A person to whom this section applies must not—
 - (a) obtain access between the land and the State-controlled road other than at a location at which access is permitted under the decision; or
 - (b) obtain access using road access works to which the decision applies, if the works do not comply with the decision and the noncompliance was within the person's control; or
 - (c) obtain any other access between the land and the road contrary to the decision; or
 - (d) use a road access location or road access works contrary to the decision; or
 - (e) contravene a condition stated in the decision; or
 - (f) permit another person to do a thing mentioned in paragraphs (a) to (e); or
 - (g) fail to remove road access works in accordance with the decision.

Maximum penalty—200 penalty units.

- (3) However, subsection (2)(g) does not apply to a person who is bound by the decision because of section 68.

Attachment C
Appeal Provisions

Transport Infrastructure Act 1994
Chapter 16 General provisions

485 Internal review of decisions

- (1) A person whose interests are affected by a decision described in schedule 3 (the *original decision*) may ask the chief executive to review the decision.
- (2) The person is entitled to receive a statement of reasons for the original decision whether or not the provision under which the decision is made requires that the person be given a statement of reasons for the decision.
- (3) The *Transport Planning and Coordination Act 1994*, part 5, division 2—
 - (a) applies to the review; and
 - (b) provides—
 - (i) for the procedure for applying for the review and the way it is to be carried out; and
 - (ii) that the person may apply to QCAT to have the original decision stayed.

485B Appeals against decisions

- (1) This section applies in relation to an original decision if a court (the appeal court) is stated in schedule 3 for the decision.
- (2) If the reviewed decision is not the decision sought by the applicant for the review, the applicant may appeal against the reviewed decision to the appeal court.
- (3) The *Transport Planning and Coordination Act 1994*, part 5, division 3—
 - (a) applies to the appeal; and
 - (b) provides—
 - (i) for the procedure for the appeal and the way it is to be disposed of; and
 - (ii) that the person may apply to the appeal court to have the original decision stayed.
- (4) Subsection (5) applies if—
 - (a) a person appeals to the Planning and Environment Court against a decision under section 62(1) on a planning application that is taken, under section 62A(2), to also be an application for a decision under section 62(1); and

(b) a person appeals to the Planning and Environment Court against a decision under the Planning Act on the planning application.

(5) The court may order—

(a) the appeals to be heard together or 1 immediately after the other; or

(b) 1 appeal to be stayed until the other is decided.

(6) Subsection (5) applies even if all or any of the parties to the appeals are not the same.

(7) In this section—

original decision means a decision described in schedule 3.

reviewed decision means the chief executive's decision on a review under section 485.

31 Applying for review

- (1) A person may apply for a review of an original decision only within 28 days after notice of the original decision was given to the person under the transport Act.
- (2) However, if—
 - (a) the notice did not state the reasons for the original decision; and
 - (b) the person asked for a statement of the reasons within the 28 days mentioned in subsection (1)the person may apply within 28 days after the person is given the statement of the reasons.
- (3) In addition, the chief executive may extend the period for applying.
- (4) An application must be written and state in detail the grounds on which the person wants the original decision to be reviewed.

32 Stay of operation of original decision

- (1) If a person applies for review of an original decision, the person may immediately apply for a stay of the decision to the relevant entity.
- (2) The relevant entity may stay the original decision to secure the effectiveness of the review and any later appeal to or review by the relevant entity.
- (3) In setting the time for hearing the application, the relevant entity must allow at least 3 business days between the day the application is filed with it and the hearing day.
- (4) The chief executive is a party to the application.
- (5) The person must serve a copy of the application showing the time and place of the hearing and any document filed in the relevant entity with it on the chief executive at least 2 business days before the hearing.
- (6) The stay—
 - (a) may be given on conditions the relevant entity considers appropriate; and
 - (b) operates for the period specified by the relevant entity; and
 - (c) may be revoked or amended by the relevant entity.
- (7) The period of a stay under this section must not extend past the time when the chief executive reviews the original decision and any later period the relevant entity allows the applicant to enable the applicant to appeal against the decision or apply for a review of the decision as provided under the QCAT Act.

(8) The making of an application does not affect the original decision, or the carrying out of the original decision, unless it is stayed.

(9) In this section—

relevant entity means—

(a) if the reviewed decision may be reviewed by QCAT—QCAT; or

(b) if the reviewed decision may be appealed to the appeal court—the appeal court.

35 Time for making appeals

(1) A person may appeal against a reviewed decision only within—

(a) if a decision notice is given to the person—28 days after the notice was given to the person; or

(b) if the chief executive is taken to have confirmed the decision under section 34(5)—56 days after the application was made.

(2) However, if—

(a) the decision notice did not state the reasons for the decision; and

(b) the person asked for a statement of the reasons within the 28 days mentioned in subsection (1)(a);

the person may apply within 28 days after the person is given a statement of the reasons.

(3) Also, the appeal court may extend the period for appealing.

SARA reference: 1904-10901 SRA
Council reference: COB001.1-2019

5 July 2019

Chief Executive Officer
Central Highlands Regional Council
PO Box 21
Emerald QLD 4720
tplanning@chrc.qld.gov.au

Attention: Sarah Ronnfeldt

Dear Sir/Madam

SARA response—Bauhinia Branch Railway, Albinia; Dawson Highway, Albinia

(Referral agency response given under section 56 of the *Planning Act 2016*)

The development application described below was confirmed as properly referred by the Department of State Development, Manufacturing, Infrastructure and Planning on 8 May 2019.

Response

Outcome:	Referral agency response – with conditions
Date of response:	5 July 2019
Conditions:	The conditions in Attachment 1 must be attached to any development approval
Advice:	Advice to the applicant is in Attachment 2
Reasons:	The reasons for the referral agency response are in Attachment 3

Development details

Description:	Development permit	Material change of use for high impact industry (coal loadout facility including rail loop and siding) Reconfiguring a lot (1 into 2 lots)
SARA role:	Referral Agency	
SARA trigger:	Planning Regulation 2017:	

	<p>Schedule 10, Part 3, div 4, table 3—Clearing native vegetation</p> <p>Schedule 10, Part 5, div 4, table 2—Environmentally relevant activities</p> <p>Schedule 10, Part 9, div 4, sub 1, table 1—State transport infrastructure</p> <p>Schedule 10, Part 9, div 4, sub 2, table 1—State transport corridors (ROL)</p> <p>Schedule 10, Part 9, div 4, sub 2, table 4—State transport corridors (MCU)</p>
SARA reference:	1904-10901 SRA
Assessment Manager:	Central Highlands Regional Council
Street address:	Bauhinia Branch Railway, Albinia; Dawson Highway, Albinia
Real property description:	2SP187945; 56DSN808
Applicant name:	Sojitz Coal Mining Pty Ltd and Endocoal Limited
Applicant contact details:	<p>PO Box 665</p> <p>Emerald QLD 4720</p> <p>andrewb@mursurv.com</p>
Environmental Authority:	<p>This referral included an application for an environmental authority under section 115 of the <i>Environmental Protection Act 1994</i>. Below are the details of the decision:</p> <ul style="list-style-type: none"> • Approved • Reference: EA0001828 • Effective date: 24 June 2019 • Prescribed environmentally relevant activity (ERA): <ul style="list-style-type: none"> o ERA 50 - Bulk Material Handling, 1: Loading or unloading 100t or more of minerals in a day or stockpiling 50,000t or more of minerals, (a) within 5km of the highest astronomical tide or 1km of a watercourse o ERA 8 - Chemical Storage, 3: Storing more than 500 cubic metres of chemicals of class C1 or C2 combustible liquids under AS 1940 or dangerous goods class 3 under subsection (1)(c) <p>If you are seeking further information on the environmental authority, the Department of Environment and Science's website includes a register. This can be found at: www.des.qld.gov.au</p>
State-controlled road access permit:	<p>This referral included an application for a road access location, under section 62A(2) of <i>Transport Infrastructure Act 1994</i>. Below are the details of the decision:</p> <ul style="list-style-type: none"> • Approved • Reference: TMR19-027295 • Date: 24 June 2019 <p>If you are seeking further information on the road access permit, please contact the Department of Transport and Main Roads at fitzroydistrict@tmr.qld.gov.au</p>

Representations

An applicant may make representations to a concurrence agency, at any time before the application is decided, about changing a matter in the referral agency response (s.30 Development Assessment Rules) Copies of the relevant provisions are in **Attachment 4**.

A copy of this response has been sent to the applicant for their information.

For further information please contact Carl Porter, Principal Planning Officer, on 07 4924 2918 or via email RockhamptonSARA@dsdmip.qld.gov.au who will be pleased to assist.

Yours sincerely

A handwritten signature in black ink, appearing to be 'Steve Conner', written over a light grey rectangular background.

Steve Conner
Executive Director

cc Sojitz Coal Mining Pty Ltd and Endocoal Limited, andrewb@mursurv.com

enc Attachment 1 - Referral agency conditions
 Attachment 2 - Advice to the applicant
 Attachment 3 - Reasons for referral agency response
 Attachment 4 - Change representation provisions
 Attachment 5 - Approved plans and specifications

Attachment 1—Referral agency conditions

(Under section 56(1)(b)(i) of the *Planning Act 2016* the following conditions must be attached to any development approval relating to this application) (Copies of the plans and specifications referenced below are found at Attachment 5)

No.	Conditions	Condition timing
Material change of use		
State transport infrastructure and State transport corridors—The chief executive administering the <i>Planning Act 2016</i> nominates the Director-General of the Department of Transport and Main Roads (DTMR) to be the enforcement authority for the development to which this development approval relates for the administration and enforcement of any matter relating to the following condition(s):		
1.	The setback and location of the development in relation to the railway corridor must be generally in accordance with the Site Plan, prepared by Lever, date 08/03/19, DWG No. MDS-TLO-G-SL-002, SHT 1 of 1, REV A, as amended in red.	At all times
2.	<p>(a) Any excavation, filling/backfilling/compaction, track works, retaining structures, batters, stormwater management measures and other works involving ground disturbance must not encroach upon or de-stabilise the railway corridor or the land supporting this infrastructure, or cause similar adverse impacts.</p> <p>(b) Registered Professional Engineer Queensland (RPEQ) certification with supporting documentation must be provided to the Program Delivery and Operations Unit, Central Queensland Region (Central.Queensland.IDAS@tmr.qld.gov.au) within the Department of Transport and Main Roads, confirming that the development has been constructed in accordance with part (a) of this condition.</p>	<p>(a) At all times</p> <p>(b) Prior to the commencement of use</p>
3.	<p>(a) Stormwater and flooding management of the development must ensure no worsening or actionable nuisance to the railway corridor.</p> <p>(b) Any works on the land must not:</p> <ol style="list-style-type: none"> create any new discharge points for stormwater runoff onto the railway corridor interfere with and/or cause damage to the existing stormwater drainage on the railway corridor surcharge any existing culvert or drain on the railway corridor reduce the quality of stormwater discharge onto the railway corridor reduce the floodplain storage capacity of the site interfere with or reduce overland flow conveyance on the site. <p>(c) RPEQ certification with supporting documentation must be provided to Program Delivery and Operations Unit, Central Queensland Region (Central.Queensland.IDAS@tmr.qld.gov.au) within the Department of Transport and Main Roads, confirming</p>	<p>(a) and (b) At all times</p> <p>(c) Prior to the commencement of use</p>

	that the development has been constructed in accordance with parts (a) and (b) of this condition.	
4.	The existing fencing along the site boundary with the railway corridor must be retained except where the rail loop will connect to the railway corridor.	Prior to the commencement of use and to be maintained at all times
5.	<p>(a) The road access location, is to be located generally in accordance with the Site Plan, prepared by Lever, date 08/03/19, DWG No. MDS-TLO-G-SL-002, SHT 1 of 1, REV A, as amended in red.</p> <p>(b) Road access works comprising an Auxiliary Left Turn (Short)/Basic Right Turn must be provided at the road access location.</p> <p>(c) The road access works must be designed and constructed in accordance with the Department of Transport and Main Roads' Road Planning and Design Manual 2nd Edition.</p>	<p>(a) At all times</p> <p>(b) and (c): Prior to the commencement of use</p>
6.	Any redundant access locations to the site are to be removed and reinstated in accordance with the Department of Transport and Main Roads' Road Planning and Design Manual 2 nd Edition.	Prior to commencement of use
7.	Direct access to the state-controlled road is not permitted at any other location than the road access location referred to in Condition 5.	At all times
Environmentally relevant activities—The chief executive administering the <i>Planning Act 2016</i> nominates the Director-General of the Department of Environment and Science (DES) to be the enforcement authority for the development to which this development approval relates for the administration and enforcement of any matter relating to the following condition(s):		
8.	<p>The development must be carried out generally in accordance with the following plan:</p> <ul style="list-style-type: none"> Site Plan, prepared by Lever, date 08/03/19, DWG No. MDS-TLO-G-SL-002, SHT 1 of 1, REV A, as amended in red. 	At all times
Vegetation clearing—The chief executive administering the <i>Planning Act 2016</i> nominates the Director-General of the Department of Natural Resources Mines and Energy (DNRME) to be the enforcement authority for the development to which this development approval relates for the administration and enforcement of any matter relating to the following condition(s):		
9.	Any person(s) engaged or employed to carry out the clearing of vegetation under this development approval must be provided with a full copy of this development approval, and must be made aware of the full extent of clearing authorised by this development approval.	Prior to clearing
10.	Enter into an agreed delivery arrangement to deliver an environmental offset in accordance with the <i>Environmental Offsets Act 2014</i> to counterbalance the significant residual impacts on the matter of state environmental significance being 19.78 ha of Category B Of Concern Remnant Vegetation Clearing.	Prior to commencing any works that impact on the Category B Of Concern Remnant Vegetation.
11.	The clearing of vegetation under this development approval is limited to the area identified as:	At all times

	<p>(a) Area A as shown on attached Technical Agency Response Plan, reference: TARP 1904-10901-SRA Sheet 1 of 3, Date: 21/06/2019.</p> <p>(b) Derived Reference Points for GPS coordinates listed in Attachment to Technical Agency Response Plan, reference: TARP 1904-10901-SRA Sheets 2 - 3, Date: 21/06/2019.</p>	
Reconfiguring a lot		
State transport corridors—The chief executive administering the <i>Planning Act 2016</i> nominates the Director-General of the Department of Transport and Main Roads (DTMR) to be the enforcement authority for the development to which this development approval relates for the administration and enforcement of any matter relating to the following condition(s):		
12.	<p>(a) The road access location, is to be located generally in accordance with the ROL Plan, prepared by Lever, date 22/03/19, DWG No: MDS-TLO-G-ROL-004, SHT 1 of 1, REV B as amended in red.</p> <p>(b) Road access works comprising an Auxiliary Left Turn (Short)/Basic Right Turn, must be provided at the road access location.</p> <p>(c) The road access works must be designed and constructed in accordance with the Department of Transport and Main Roads' Road Planning and Design Manual 2nd Edition.</p>	<p>(a) At all times</p> <p>(b) and (c): Prior to submitting the Plan of Survey to the local government for approval</p>
13.	Any redundant access locations to the site are to be removed and reinstated in accordance with the Department of Transport and Main Roads' Road Planning and Design Manual 2 nd Edition.	Prior to submitting the Plan of Survey to the local government for approval
14.	<p>(a) Stormwater and flooding management of the development must ensure no worsening or actionable nuisance to the state-controlled road.</p> <p>(b) Any works on the land must not:</p> <ol style="list-style-type: none"> create any new discharge points for stormwater runoff onto the state-controlled road; interfere with and/or cause damage to the existing stormwater drainage on the state-controlled road; surcharge any existing culvert or drain on the state-controlled road; reduce the quality of stormwater discharge onto the state-controlled road; reduce the floodplain storage capacity of the site; interfere with or reduce overland flow conveyance on the site. <p>(c) RPEQ certification with supporting documentation must be provided to Program Delivery and Operations Unit, Central Queensland Region (Central.Queensland.IDAS@tmr.qld.gov.au)</p>	<p>(a) And (b) At all times</p> <p>(c) Prior to the commencement of use</p>

	within the Department of Transport and Main Roads, confirming that the development has been constructed in accordance with parts (a) and (b) of this condition.	
15.	Direct access to the state-controlled road is not permitted at any other location than the road access location referred to in Condition 12.	At all times
Vegetation clearing—The chief executive administering the <i>Planning Act 2016</i> nominates the Director-General of the Department of Natural Resources Mines and Energy (DNRME) to be the enforcement authority for the development to which this development approval relates for the administration and enforcement of any matter relating to the following condition(s):		
16.	Any person(s) engaged or employed to carry out the clearing of vegetation under this development approval must be provided with a full copy of this development approval, and must be made aware of the full extent of clearing authorised by this development approval.	Prior to clearing
17.	<p>The clearing of vegetation under this development approval is limited to the area identified as:</p> <p>(a) Area A as shown on attached Technical Agency Response Plan, reference: TARP 1904-10901-SRA Sheet 1 of 3, Date: 21/06/2019.</p> <p>(b) Derived Reference Points for GPS coordinates listed in Attachment to Technical Agency Response Plan, reference: TARP 1904-10901-SRA Sheets 2 - 3, Date: 21/06/2019.</p>	At all times

Attachment 2—Advice to the applicant

General advice

- | | |
|----|---|
| 1. | <p>Under section 33 of the <i>Transport Infrastructure Act 1994</i>, written approval is required from the Department of Transport and Main Roads (DTMR) to carry out road works, including road access works, on a State-controlled road. The approval process shall require the approval of engineering designs of the proposed works, certified by a Registered Professional Engineer of Queensland (RPEQ).</p> <p>No works are to commence within the State-controlled road reserve until approval of the plan/s showing the proposed works is issued by the DTMR accordingly with Section 33 of the <i>Transport Infrastructure Act 1994</i>.</p> <p>Please contact the Department of Transport and Main Roads (Fitzroy District / Central Queensland Region) at FitzroyDistrict@tmr.qld.gov.au or (07) 4931 1500 to make an application for works in the State-controlled road reserve (WSCRR).</p> |
|----|---|

Attachment 3—Reasons for referral agency response

(Given under section 56(7) of the *Planning Act 2016*)

The reasons for the department's decision are:

- The development is for a coal loadout facility including a rail Loop and siding
- The development does not compromise the safety and efficiency of the state-controlled road
- The development can be conditioned to ensure no adverse impacts on the railway
- The development is located and designed to mitigate environmental harm to environmental values
- The development minimises and mitigates impacts to matters of state environmental significance (MSES) and will provide an offset for significant residual impacts to MSES (regulated vegetation)
- The development complies with State codes 1, 2, 6, 16 & 22 with the application of conditions

Material used in the assessment of the application:

- The development application material and submitted plans
- *Planning Act 2016*
- Planning Regulation 2017
- The *State Development Assessment Provisions* (version 2.4), as published by the department
- The Development Assessment Rules
- SARA DA Mapping system
- State Planning Policy mapping system

Attachment 4—Change representation provisions

Planning Act 2016 – Change representation provisions

The following provisions are the **change representation provisions** as defined in the Planning Act 2016, section 75.

Chapter 3 Development Assessment

Division 2 Changing development approvals

Subdivision 1 Changes during appeal period

75 Making change representations

- 1) The applicant may make representations (**change representations**) to the assessment manager, during the applicant's appeal period for the development approval, about changing—
 - (a) a matter in the development approval, other than—
 - i. a matter stated because of a referral agency's response; or
 - ii. a development condition imposed under a direction made by the Minister under chapter 3, part 6, division 2; or
 - (b) if the development approval is a deemed approval—the standard conditions taken to be included in the deemed approval under section 64(8)(c).
- 2) If the applicant needs more time to make the change representations, the applicant may, during the applicant's appeal period for the approval, suspend the appeal period by a notice given to the assessment manager.
- 3) Only 1 notice may be given.
- 4) If a notice is given, the appeal period is suspended—
 - (a) if the change representations are not made within a period of 20 business days after the notice is given to the assessment manager—until the end of that period; or
 - (b) if the change representations are made within 20 business days after the notice is given to the assessment manager, until—
 - i. the applicant withdraws the notice, by giving another notice to the assessment manager; or
 - ii. the applicant receives notice that the assessment manager does not agree with the change representations; or
 - iii. the end of 20 business days after the change representations are made, or a longer period agreed in writing between the applicant and the assessment manager.
- 5) (5) However, if the assessment manager gives the applicant a negotiated decision notice, the appeal period starts again on the day after the negotiated decision notice is given.

76 Deciding change representations

- 1) The assessment manager must assess the change representations against and having regard to the matters that must be considered when assessing a development application, to the extent those matters are relevant.
- 2) The assessment manager must, within 5 business days after deciding the change representations, give a decision notice to—
 - (a) the applicant; and
 - (b) if the assessment manager agrees with any of the change representations—
 - i. each principal submitter; and
 - ii. each referral agency; and
 - iii. if the assessment manager is not a local government and the development is in a local government area—the relevant local government; and
 - iv. if the assessment manager is a chosen assessment manager—the prescribed assessment manager; and
 - v. another person prescribed by regulation.
- 3) A decision notice (***a negotiated decision notice***) that states the assessment manager agrees with a change representation must—
 - (a) state the nature of the change agreed to; and
 - (b) comply with section 63(2) and (3).
- 4) A negotiated decision notice replaces the decision notice for the development application.
- 5) Only 1 negotiated decision notice may be given.
- 6) If a negotiated decision notice is given to an applicant, a local government may give a replacement infrastructure charges notice to the applicant.

Attachment 5—Approved plans and specifications

APPENDIX G

Rail Loop MNESMP

APPENDIX H

Protected Matters Search Tool



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 26/10/18 13:21:26

[Summary](#)

[Details](#)

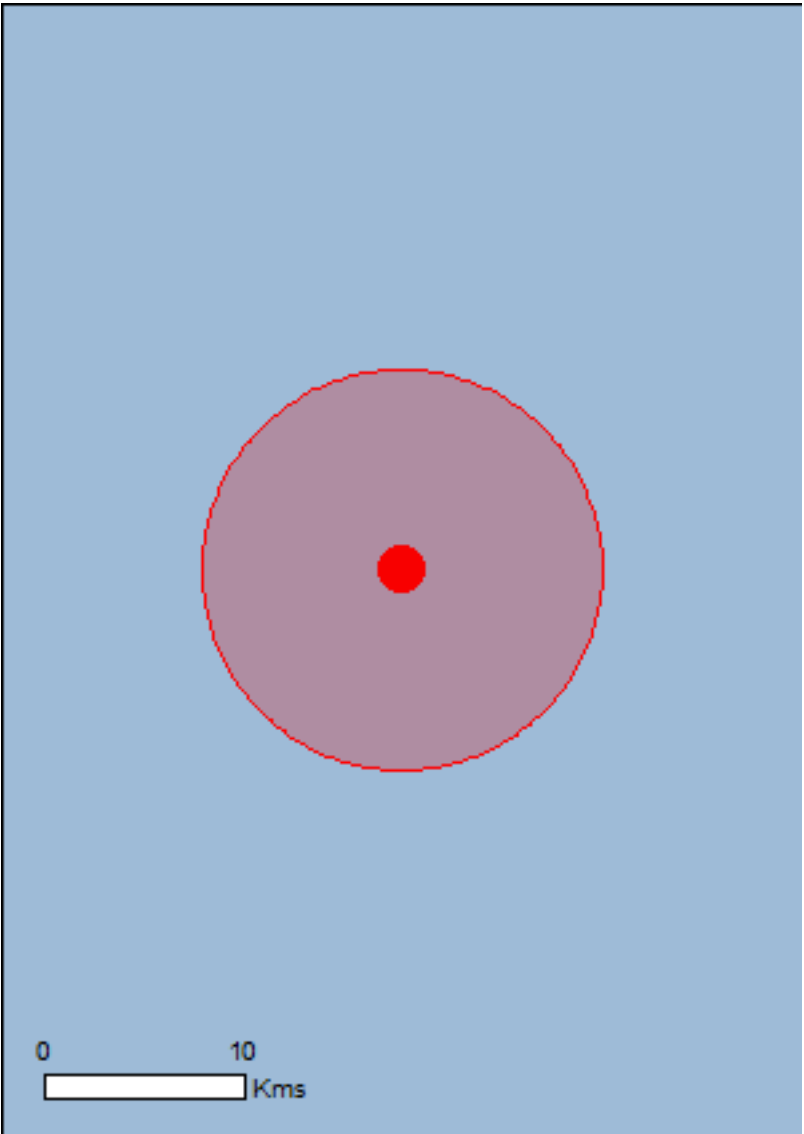
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

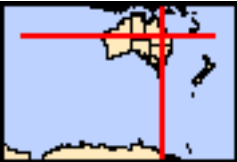
[Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)

Buffer: 10.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	23
Listed Migratory Species:	9

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	15
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	2
Regional Forest Agreements:	None
Invasive Species:	18
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area
Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin	Endangered	Community likely to occur within area
Weeping Myall Woodlands	Endangered	Community may occur within area

Listed Threatened Species

[Resource Information]

Name	Status	Type of Presence
Birds		

Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
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Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
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Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat likely to occur within area
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Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
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Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
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Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species habitat may occur within area
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Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
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Fish

Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area
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Mammals

Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
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Name	Status	Type of Presence
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat may occur within area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat likely to occur within area
Plants		
Aristida annua [17906]	Vulnerable	Species or species habitat likely to occur within area
Cadellia pentastylis Ooline [9828]	Vulnerable	Species or species habitat known to occur within area
Dichanthium queenslandicum King Blue-grass [5481]	Endangered	Species or species habitat likely to occur within area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat known to occur within area
Marsdenia brevifolia [64585]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
Denisonia maculata Ornamental Snake [1193]	Vulnerable	Species or species habitat likely to occur within area
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat likely to occur within area
Elseya albagula Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat likely to occur within area
Rheodytes leukops Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver [1761]	Vulnerable	Species or species habitat likely to occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Albinia	QLD
Albinia 2	QLD

Invasive Species

[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area

Name	Status	Type of Presence
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-24.3726 148.4396

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

APPENDIX I

Wildlife Online Database



Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Specified Point

Species: All

Type: All

Status: All

Records: All

Date: All

Latitude: -24.3753

Longitude: 148.4303

Distance: 30

Email: larissa@northres.com.au

Date submitted: Monday 07 Jan 2019 09:40:06

Date extracted: Monday 07 Jan 2019 09:50:06

The number of records retrieved = 1135

Disclaimer

As the DSITIA is still in a process of collating and vetting data, it is possible the information given is not complete. The information provided should only be used for the project for which it was requested and it should be appropriately acknowledged as being derived from Wildlife Online when it is used.

The State of Queensland does not invite reliance upon, nor accept responsibility for this information. Persons should satisfy themselves through independent means as to the accuracy and completeness of this information.

No statements, representations or warranties are made about the accuracy or completeness of this information. The State of Queensland disclaims all responsibility for this information and all liability (including without limitation, liability in negligence) for all expenses, losses, damages and costs you may incur as a result of the information being inaccurate or incomplete in any way for any reason.

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufonidae	<i>Rhinella marina</i>	cane toad	Y			17
animals	amphibians	Hylidae	<i>Litoria inermis</i>	bumpy rocketfrog		C		3
animals	amphibians	Hylidae	<i>Litoria peronii</i>	emerald spotted treefrog		C		7
animals	amphibians	Hylidae	<i>Litoria rubella</i>	ruddy treefrog		C		6
animals	amphibians	Hylidae	<i>Litoria caerulea</i>	common green treefrog		C		39
animals	amphibians	Hylidae	<i>Cyclorana verrucosa</i>	rough collared frog		C		2/2
animals	amphibians	Hylidae	<i>Cyclorana alboguttata</i>	greenstripe frog		C		12/2
animals	amphibians	Hylidae	<i>Cyclorana novaehollandiae</i>	eastern snapping frog		C		2
animals	amphibians	Hylidae	<i>Litoria fallax</i>	eastern sedgefrog		C		2
animals	amphibians	Hylidae	<i>Litoria latopalmata</i>	broad palmed rocketfrog		C		8
animals	amphibians	Limnodynastidae	<i>Limnodynastes salmini</i>	salmon striped frog		C		30/2
animals	amphibians	Limnodynastidae	<i>Platyplectrum ornatum</i>	ornate burrowing frog		C		11
animals	amphibians	Limnodynastidae	<i>Limnodynastes tasmaniensis</i>	spotted grassfrog		C		26
animals	amphibians	Limnodynastidae	<i>Limnodynastes terraereginae</i>	scarlet sided pobblebonk		C		11
animals	birds	Acanthizidae	<i>Acanthiza pusilla</i>	brown thornbill		C		2
animals	birds	Acanthizidae	<i>Gerygone olivacea</i>	white-throated gerygone		C		27
animals	birds	Acanthizidae	<i>Acanthiza reguloides</i>	buff-rumped thornbill		C		16
animals	birds	Acanthizidae	<i>Sericornis frontalis</i>	white-browed scrubwren		C		2
animals	birds	Acanthizidae	<i>Gerygone fusca</i>	western gerygone		C		1
animals	birds	Acanthizidae	<i>Chthonicola sagittata</i>	speckled warbler		C		4
animals	birds	Acanthizidae	<i>Smicronis brevirostris</i>	weebill		C		47
animals	birds	Acanthizidae	<i>Acanthiza nana</i>	yellow thornbill		C		6
animals	birds	Acanthizidae	<i>Acanthiza chrysorrhoa</i>	yellow-rumped thornbill		C		6
animals	birds	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle		C		18
animals	birds	Accipitridae	<i>Milvus migrans</i>	black kite		C		14
animals	birds	Accipitridae	<i>Circus assimilis</i>	spotted harrier		C		8
animals	birds	Accipitridae	<i>Elanus axillaris</i>	black-shouldered kite		C		13
animals	birds	Accipitridae	<i>Lophoictinia isura</i>	square-tailed kite		C		1
animals	birds	Accipitridae	<i>Accipiter fasciatus</i>	brown goshawk		C		8
animals	birds	Accipitridae	<i>Aviceda subcristata</i>	Pacific baza		C		2
animals	birds	Accipitridae	<i>Haliastur sphenurus</i>	whistling kite		C		34
animals	birds	Accipitridae	<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle		C		2
animals	birds	Accipitridae	<i>Hieraaetus morphnoides</i>	little eagle		C		1
animals	birds	Accipitridae	<i>Accipiter cirrocephalus</i>	collared sparrowhawk		C		2
animals	birds	Acrocephalidae	<i>Acrocephalus australis</i>	Australian reed-warbler		C		3
animals	birds	Aegotheles	<i>Aegotheles cristatus</i>	Australian owl-nightjar		C		36
animals	birds	Alaudidae	<i>Mirafra javanica</i>	Horsfield's bushlark		C		46
animals	birds	Alcedinidae	<i>Ceyx azureus</i>	azure kingfisher		C		1
animals	birds	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck		C		9
animals	birds	Anatidae	<i>Dendrocygna eytoni</i>	plumed whistling-duck		C		6
animals	birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck		C		16
animals	birds	Anatidae	<i>Aythya australis</i>	hardhead		C		6
animals	birds	Anatidae	<i>Cygnus atratus</i>	black swan		C		1
animals	birds	Anatidae	<i>Anas gracilis</i>	grey teal		C		6
animals	birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter		C		7
animals	birds	Apodidae	<i>Apus pacificus</i>	fork-tailed swift		SL		5

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Apodidae	<i>Hirundapus caudacutus</i>	white-throated needletail		SL		1
animals	birds	Ardeidae	<i>Nycticorax caledonicus</i>	nankeen night-heron		C		3
animals	birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron		C		9
animals	birds	Ardeidae	<i>Bubulcus ibis</i>	cattle egret		C		1
animals	birds	Ardeidae	<i>Ardea pacifica</i>	white-necked heron		C		6
animals	birds	Ardeidae	<i>Ardea intermedia</i>	intermediate egret		C		4
animals	birds	Ardeidae	<i>Egretta garzetta</i>	little egret		C		1
animals	birds	Ardeidae	<i>Ardea alba modesta</i>	eastern great egret		C		8
animals	birds	Artamidae	<i>Cracticus nigrogularis</i>	piebald butcherbird		C		69
animals	birds	Artamidae	<i>Strepera graculina graculina</i>	piebald currawong (eastern Australia)		C		4
animals	birds	Artamidae	<i>Artamus minor</i>	little woodswallow		C		11
animals	birds	Artamidae	<i>Artamus superciliosus</i>	white-browed woodswallow		C		6
animals	birds	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow		C		12
animals	birds	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird		C		38
animals	birds	Artamidae	<i>Artamus cyanocephalus</i>	dusky woodswallow		C		4
animals	birds	Artamidae	<i>Strepera graculina</i>	piebald currawong		C		19
animals	birds	Artamidae	<i>Artamus cinereus</i>	black-faced woodswallow		C		23
animals	birds	Artamidae	<i>Cracticus tibicen</i>	Australian magpie		C		93
animals	birds	Artamidae	<i>Artamus personatus</i>	masked woodswallow		C		4
animals	birds	Burhinidae	<i>Burhinus grallarius</i>	bush stone-curlew		C		2
animals	birds	Cacatuidae	<i>Nymphicus hollandicus</i>	cockatiel		C		54
animals	birds	Cacatuidae	<i>Eolophus roseicapilla</i>	galah		C		42
animals	birds	Cacatuidae	<i>Cacatua sanguinea</i>	little corella		C		1
animals	birds	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo		C		55
animals	birds	Cacatuidae	<i>Calyptorhynchus funereus</i>	yellow-tailed black-cockatoo		C		4
animals	birds	Campephagidae	<i>Lalage tricolor</i>	white-winged triller		C		4
animals	birds	Campephagidae	<i>Lalage leucomela</i>	varied triller		C		1
animals	birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike		C		42
animals	birds	Campephagidae	<i>Coracina tenuirostris</i>	citreoline whistler		C		7
animals	birds	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike		C		14
animals	birds	Campephagidae	<i>Coracina maxima</i>	ground cuckoo-shrike		C		1
animals	birds	Caprimulgidae	<i>Caprimulgus macrurus</i>	large-tailed nightjar		C		1
animals	birds	Casuariidae	<i>Dromaius novaehollandiae</i>	emu		C		22
animals	birds	Charadriidae	<i>Vanellus miles novaehollandiae</i>	masked lapwing (southern subspecies)		C		4
animals	birds	Charadriidae	<i>Elseya melanops</i>	black-fronted dotterel		C		1
animals	birds	Charadriidae	<i>Vanellus tricolor</i>	banded lapwing		C		1
animals	birds	Charadriidae	<i>Vanellus miles</i>	masked lapwing		C		8
animals	birds	Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	black-necked stork		C		1
animals	birds	Cisticolidae	<i>Cisticola exilis</i>	golden-headed cisticola		C		48
animals	birds	Climacteridae	<i>Climacteris picumnus</i>	brown treecreeper		C		4
animals	birds	Climacteridae	<i>Cormobates leucophaea metastasis</i>	white-throated treecreeper (southern)		C		5
animals	birds	Climacteridae	<i>Cormobates leucophaea</i>	white-throated treecreeper		C		1
animals	birds	Columbidae	<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)		V	V	8
animals	birds	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon		C		46
animals	birds	Columbidae	<i>Geopelia striata</i>	peaceful dove		C		29
animals	birds	Columbidae	<i>Phaps chalcoptera</i>	common bronzewing		C		6

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Columbidae	<i>Geopelia cuneata</i>	diamond dove		C		5
animals	birds	Columbidae	<i>Columba livia</i>	rock dove	Y			2
animals	birds	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove		C		21
animals	birds	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird		C		9
animals	birds	Corcoracidae	<i>Struthidea cinerea</i>	apostlebird		C		26
animals	birds	Corcoracidae	<i>Corcorax melanorhamphos</i>	white-winged chough		C		5
animals	birds	Corvidae	<i>Corvus coronoides</i>	Australian raven		C		30
animals	birds	Corvidae	<i>Corvus bennetti</i>	little crow		C		7
animals	birds	Corvidae	<i>Corvus sp.</i>					2
animals	birds	Corvidae	<i>Corvus orru</i>	Torresian crow		C		83
animals	birds	Cuculidae	<i>Chalcites minutillus barnardi</i>	Eastern little bronze-cuckoo		C		1
animals	birds	Cuculidae	<i>Chalcites lucidus</i>	shining bronze-cuckoo		C		2
animals	birds	Cuculidae	<i>Cacomantis pallidus</i>	pallid cuckoo		C		8
animals	birds	Cuculidae	<i>Eudynamys orientalis</i>	eastern koel		C		6
animals	birds	Cuculidae	<i>Chalcites basalis</i>	Horsfield's bronze-cuckoo		C		6
animals	birds	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal		C		31
animals	birds	Cuculidae	<i>Cacomantis flabelliformis</i>	fan-tailed cuckoo		C		1
animals	birds	Cuculidae	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo		C		17
animals	birds	Cuculidae	<i>Cacomantis variolosus</i>	brush cuckoo		C		4
animals	birds	Dicruridae	<i>Dicrurus bracteatus</i>	spangled drongo		C		6
animals	birds	Estrildidae	<i>Neochmia modesta</i>	plum-headed finch		C		13
animals	birds	Estrildidae	<i>Lonchura castaneothorax</i>	chestnut-breasted mannikin		C		7
animals	birds	Estrildidae	<i>Taeniopygia bichenovii</i>	double-barred finch		C		48
animals	birds	Estrildidae	<i>Taeniopygia guttata</i>	zebra finch		C		6
animals	birds	Falconidae	<i>Falco berigora</i>	brown falcon		C		26
animals	birds	Falconidae	<i>Falco longipennis</i>	Australian hobby		C		7
animals	birds	Falconidae	<i>Falco cenchroides</i>	nankeen kestrel		C		31
animals	birds	Falconidae	<i>Falco subniger</i>	black falcon		C		3
animals	birds	Glareolidae	<i>Stiltia isabella</i>	Australian pratincole		C		1
animals	birds	Gruidae	<i>Grus rubicunda</i>	brolga		C		11
animals	birds	Halcyonidae	<i>Dacelo leachii</i>	blue-winged kookaburra		C		8
animals	birds	Halcyonidae	<i>Dacelo novaeguineae</i>	laughing kookaburra		C		59
animals	birds	Halcyonidae	<i>Todiramphus sanctus</i>	sacred kingfisher		C		13
animals	birds	Halcyonidae	<i>Todiramphus macleayii</i>	forest kingfisher		C		1
animals	birds	Halcyonidae	<i>Todiramphus pyrrhopygius</i>	red-backed kingfisher		C		3
animals	birds	Hirundinidae	<i>Petrochelidon nigricans</i>	tree martin		C		23
animals	birds	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow		C		5
animals	birds	Hirundinidae	<i>Petrochelidon ariel</i>	fairy martin		C		11
animals	birds	Laridae	<i>Gelochelidon nilotica</i>	gull-billed tern		SL		4
animals	birds	Laridae	<i>Chlidonias hybrida</i>	whiskered tern		C		4
animals	birds	Laridae	<i>Hydroprogne caspia</i>	Caspian tern		SL		3
animals	birds	Maluridae	<i>Malurus cyaneus</i>	superb fairy-wren		C		11
animals	birds	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren		C		81
animals	birds	Maluridae	<i>Malurus lamberti</i>	variegated fairy-wren		C		12
animals	birds	Megaluridae	<i>Cincloramphus cruralis</i>	brown songlark		C		8
animals	birds	Megaluridae	<i>Megalurus timoriensis</i>	tawny grassbird		C		4

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Megapodiidae	<i>Alectura lathamii</i>	Australian brush-turkey		C		1
animals	birds	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird		C		33
animals	birds	Meliphagidae	<i>Melithreptus lunatus</i>	white-naped honeyeater		C		27
animals	birds	Meliphagidae	<i>Nesoptilotis leucotis</i>	white-eared honeyeater		C		12
animals	birds	Meliphagidae	<i>Melithreptus gularis gularis</i>	black-chinned honeyeater (eastern)		C		1
animals	birds	Meliphagidae	<i>Melithreptus brevirostris</i>	brown-headed honeyeater		C		2
animals	birds	Meliphagidae	<i>Plectorhyncha lanceolata</i>	striped honeyeater		C		24
animals	birds	Meliphagidae	<i>Melithreptus albogularis</i>	white-throated honeyeater		C		18
animals	birds	Meliphagidae	<i>Acanthagenys rufogularis</i>	spiny-cheeked honeyeater		C		6
animals	birds	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird		C		23
animals	birds	Meliphagidae	<i>Myzomela sanguinolenta</i>	scarlet honeyeater		C		1
animals	birds	Meliphagidae	<i>Ptilotula fusca</i>	fuscous honeyeater		C		8
animals	birds	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's honeyeater		C		4
animals	birds	Meliphagidae	<i>Caligavis chrysops</i>	yellow-faced honeyeater		C		3
animals	birds	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater		C		30
animals	birds	Meliphagidae	<i>Manorina flavigula</i>	yellow-throated miner		C		61
animals	birds	Meliphagidae	<i>Gavicalis virescens</i>	singing honeyeater		C		14
animals	birds	Meliphagidae	<i>Epthianura albifrons</i>	white-fronted chat		C		1
animals	birds	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater		C		17
animals	birds	Meliphagidae	<i>Melithreptus gularis</i>	black-chinned honeyeater		C		3
animals	birds	Meliphagidae	<i>Ptilotula penicillata</i>	white-plumed honeyeater		C		12
animals	birds	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner		C		48
animals	birds	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater		C		18
animals	birds	Monarchidae	<i>Myiagra inquieta</i>	restless flycatcher		C		8
animals	birds	Monarchidae	<i>Myiagra rubecula</i>	leaden flycatcher		C		15
animals	birds	Monarchidae	<i>Myiagra cyanoleuca</i>	satin flycatcher		SL		1
animals	birds	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark		C		54
animals	birds	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit		C		15
animals	birds	Nectariniidae	<i>Dicaeum hirundinaceum</i>	mistletoebird		C		26
animals	birds	Neosittidae	<i>Daphoenositta chrysoptera</i>	varied sittella		C		9
animals	birds	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole		C		10
animals	birds	Oriolidae	<i>Sphecotheres vieilloti</i>	Australasian figbird		C		9
animals	birds	Otididae	<i>Ardeotis australis</i>	Australian bustard		C		23
animals	birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler		C		47
animals	birds	Pachycephalidae	<i>Falcunculus frontatus</i>	crested shrike-tit		C		1
animals	birds	Pachycephalidae	<i>Colluricincla harmonica</i>	grey shrike-thrush		C		28
animals	birds	Pachycephalidae	<i>Pachycephala pectoralis</i>	golden whistler		C		2
animals	birds	Pardalotidae	<i>Pardalotus rubricatus</i>	red-browed pardalote		C		1
animals	birds	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote		C		89
animals	birds	Passeridae	<i>Passer domesticus</i>	house sparrow	Y			6
animals	birds	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican		C		5
animals	birds	Petroicidae	<i>Petroica goodenovii</i>	red-capped robin		C		3
animals	birds	Petroicidae	<i>Eopsaltria australis</i>	eastern yellow robin		C		4
animals	birds	Petroicidae	<i>Melanodryas cucullata</i>	hooded robin		C		1
animals	birds	Petroicidae	<i>Microeca fascians</i>	jacky winter		C		18
animals	birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant		C		8

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animals	birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant		C		3
animals	birds	Phalacrocoracidae	<i>Phalacrocorax varius</i>	pied cormorant		C		4
animals	birds	Phasianidae	<i>Coturnix ypsilophora</i>	brown quail		C		34
animals	birds	Phasianidae	<i>Coturnix pectoralis</i>	stubble quail		C		1
animals	birds	Podargidae	<i>Podargus strigoides</i>	tawny frogmouth		C		10
animals	birds	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe		C		6
animals	birds	Pomatostomidae	<i>Pomatostomus temporalis</i>	grey-crowned babbler		C		13
animals	birds	Psittacidae	<i>Alisterus scapularis</i>	Australian king-parrot		C		6
animals	birds	Psittacidae	<i>Trichoglossus haematodus moluccanus</i>	rainbow lorikeet		C		76
animals	birds	Psittacidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet		C		4
animals	birds	Psittacidae	<i>Aprosmictus erythropterus</i>	red-winged parrot		C		26
animals	birds	Psittacidae	<i>Melopsittacus undulatus</i>	budgerigar		C		10
animals	birds	Psittacidae	<i>Psephotus pulcherrimus</i>	paradise parrot		PE	EX	1
animals	birds	Psittacidae	<i>Platycercus adscitus</i>	pale-headed rosella		C		60
animals	birds	Psittacidae	<i>Parvipsitta pusilla</i>	little lorikeet		C		6
animals	birds	Ptilonorhynchidae	<i>Ptilonorhynchus maculatus</i>	spotted bowerbird		C		10
animals	birds	Recurvirostridae	<i>Himantopus himantopus</i>	black-winged stilt		C		4
animals	birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail		C		59
animals	birds	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail		C		37
animals	birds	Strigidae	<i>Ninox boobook</i>	southern boobook		C		14
animals	birds	Strigidae	<i>Ninox connivens</i>	barking owl		C		2
animals	birds	Threskiornithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis		C		3
animals	birds	Threskiornithidae	<i>Platalea regia</i>	royal spoonbill		C		3
animals	birds	Threskiornithidae	<i>Platalea flavipes</i>	yellow-billed spoonbill		C		4
animals	birds	Threskiornithidae	<i>Plegadis falcinellus</i>	glossy ibis		SL		1
animals	birds	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis		C		1
animals	birds	Timaliidae	<i>Zosterops lateralis</i>	silveryeye		C		15
animals	birds	Turnicidae	<i>Turnix pyrrhothorax</i>	red-chested button-quail		C		1
animals	birds	Tytonidae	<i>Tyto longimembris</i>	eastern grass owl		C		5
animals	birds	Tytonidae	<i>Tyto delicatula</i>	eastern barn owl		C		13
animals	insects	Nymphalidae	<i>Euploea corinna</i>	common crow				8
animals	mammals	Bovidae	<i>Bos taurus</i>	European cattle	Y			6
animals	mammals	Canidae	<i>Canis sp.</i>		Y			1
animals	mammals	Canidae	<i>Vulpes vulpes</i>	red fox	Y			2
animals	mammals	Canidae	<i>Canis lupus dingo</i>	dingo				6
animals	mammals	Canidae	<i>Canis lupus familiaris</i>	dog	Y			1
animals	mammals	Dasyuridae	<i>Planigale tenuirostris</i>	narrow-nosed planigale		C		13
animals	mammals	Dasyuridae	<i>Sminthopsis macroura</i>	stripe-faced dunnart		C		21
animals	mammals	Dasyuridae	<i>Dasyurus hallucatus</i>	northern quoll		C	E	1
animals	mammals	Dasyuridae	<i>Sminthopsis murina</i>	common dunnart		C		4
animals	mammals	Dasyuridae	<i>Planigale maculata</i>	common planigale		C		4
animals	mammals	Dasyuridae	<i>Planigale ingrami</i>	long-tailed planigale		C		6/1
animals	mammals	Emballonuridae	<i>Taphozous troughtoni</i>	Troughton's sheath-tail bat		C		1
animals	mammals	Emballonuridae	<i>Saccolaimus flaviventris</i>	yellow-bellied sheath-tail bat		C		12
animals	mammals	Felidae	<i>Felis catus</i>	cat	Y			6
animals	mammals	Leporidae	<i>Lepus europaeus</i>	European brown hare	Y			1

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animals	mammals	Leporidae	<i>Oryctolagus cuniculus</i>	rabbit	Y			5
animals	mammals	Macropodidae	<i>Macropus rufogriseus</i>	red-necked wallaby		C		1
animals	mammals	Macropodidae	<i>Lagorchestes conspicillatus</i>	spectacled hare-wallaby		C		13
animals	mammals	Macropodidae	<i>Macropus dorsalis</i>	black-striped wallaby		C		5
animals	mammals	Macropodidae	<i>Wallabia bicolor</i>	swamp wallaby		C		3
animals	mammals	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo		C		31
animals	mammals	Macropodidae	<i>Petrogale sp.</i>			C		1
animals	mammals	Macropodidae	<i>Macropus parryi</i>	whiptail wallaby		C		6
animals	mammals	Megadermatidae	<i>Macroderma gigas</i>	ghost bat		E	V	1
animals	mammals	Miniopteridae	<i>Miniopterus schreibersii oceanensis</i>	eastern bent-wing bat		C		6
animals	mammals	Molossidae	<i>Mormopterus sp.</i>					3
animals	mammals	Molossidae	<i>Mormopterus ridei</i>	eastern free-tailed bat		C		2
animals	mammals	Molossidae	<i>Mormopterus eleryi</i>	bristle-faced free-tailed bat		C		1
animals	mammals	Molossidae	<i>Tadarida australis</i>	white-striped freetail bat		C		2
animals	mammals	Molossidae	<i>Chaerephon jobensis</i>	northern freetail bat		C		2
animals	mammals	Molossidae	<i>Mormopterus lumsdenae</i>	northern free-tailed bat		C		9
animals	mammals	Muridae	<i>Rattus sp. cf. villosissimus/sordidus</i>			C		1
animals	mammals	Muridae	<i>Pseudomys gracilicaudatus</i>	eastern chestnut mouse		C		13
animals	mammals	Muridae	<i>Pseudomys delicatulus</i>	delicate mouse		C		7
animals	mammals	Muridae	<i>Melomys cervinipes</i>	fawn-footed melomys		C		1
animals	mammals	Muridae	<i>Hydromys chrysogaster</i>	water rat		C		2
animals	mammals	Muridae	<i>Mus musculus</i>	house mouse	Y			78/1
animals	mammals	Muridae	<i>Rattus tunneyi</i>	pale field-rat		C		1
animals	mammals	Muridae	<i>Melomys burtoni</i>	grassland melomys		C		6
animals	mammals	Muridae	<i>Rattus sordidus</i>	canefield rat		C		9/6
animals	mammals	Muridae	<i>Leggadina forresti</i>	Forrest's mouse		C		22/2
animals	mammals	Peramelidae	<i>Isoodon macrourus</i>	northern brown bandicoot		C		7
animals	mammals	Peramelidae	<i>Isoodon peninsulae</i>	Cape York brown bandicoot		C		1
animals	mammals	Petauridae	<i>Petaurus breviceps</i>	sugar glider		C		3
animals	mammals	Petauridae	<i>Petaurus norfolcensis</i>	squirrel glider		C		4
animals	mammals	Petauridae	<i>Petaurus australis australis</i>	yellow-bellied glider (southern subspecies)		C		3
animals	mammals	Phalangeridae	<i>Trichosurus vulpecula</i>	common brushtail possum		C		18
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		V	V	15
animals	mammals	Potoroidae	<i>Aepyprymnus rufescens</i>	rufous bettong		C		6
animals	mammals	Pseudocheiridae	<i>Pseudocheirus peregrinus</i>	common ringtail possum		C		1
animals	mammals	Pseudocheiridae	<i>Petauroides volans volans</i>	southern greater glider		V	V	23
animals	mammals	Pteropodidae	<i>Pteropus scapulatus</i>	little red flying-fox		C		9
animals	mammals	Rhinolophidae	<i>Rhinolophus megaphyllus</i>	eastern horseshoe-bat		C		1
animals	mammals	Suidae	<i>Sus scrofa</i>	pig	Y			5
animals	mammals	Tachyglossidae	<i>Tachyglossus aculeatus</i>	short-beaked echidna		SL		12
animals	mammals	Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's wattled bat		C		8
animals	mammals	Vespertilionidae	<i>Chalinolobus picatus</i>	little pied bat		C		11
animals	mammals	Vespertilionidae	<i>Scotorepens balstoni</i>	inland broad-nosed bat		C		6
animals	mammals	Vespertilionidae	<i>Nyctophilus geoffroyi</i>	lesser long-eared bat		C		1
animals	mammals	Vespertilionidae	<i>Chalinolobus morio</i>	chocolate wattled bat		C		1

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animals	mammals	Vespertilionidae	<i>Chalinolobus nigrogriseus</i>	hoary wattled bat		C		3
animals	mammals	Vespertilionidae	<i>Nyctophilus sp.</i>					1
animals	mammals	Vespertilionidae	<i>Vespadelus sp.</i>					2
animals	mammals	Vespertilionidae	<i>Scotorepens greyii</i>	little broad-nosed bat		C		6
animals	mammals	Vespertilionidae	<i>Nyctophilus gouldi</i>	Gould's long-eared bat		C		2
animals	mammals	Vespertilionidae	<i>Vespadelus baverstocki</i>	inland forest bat		C		1
animals	ray-finned fishes	Ambassidae	<i>Ambassis agassizii</i>	Agassiz's glassfish				3/1
animals	ray-finned fishes	Anguillidae	<i>Anguilla reinhardtii</i>	longfin eel				1
animals	ray-finned fishes	Atherinidae	<i>Craterocephalus stercusmuscarum</i>	flyspecked hardyhead				2/1
animals	ray-finned fishes	Clupeidae	<i>Nematalosa erebi</i>	bony bream				2
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris klunzingeri</i>	western carp gudgeon				2
animals	ray-finned fishes	Eleotridae	<i>Philypnodon grandiceps</i>	flathead gudgeon				1
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris species 1</i>	Midgley's carp gudgeon				2
animals	ray-finned fishes	Eleotridae	<i>Mogurnda adspersa</i>	southern purplespotted gudgeon				2
animals	ray-finned fishes	Melanotaeniidae	<i>Melanotaenia splendida splendida</i>	eastern rainbowfish				3/1
animals	ray-finned fishes	Percichthyidae	<i>Macquaria ambigua</i>	golden perch				1
animals	ray-finned fishes	Plotosidae	<i>Tandanus tandanus</i>	freshwater catfish				1
animals	ray-finned fishes	Plotosidae	<i>Neosilurus hyrtlii</i>	Hyrtl's catfish				1
animals	ray-finned fishes	Terapontidae	<i>Scortum hillii</i>	leathery grunter				1
animals	ray-finned fishes	Terapontidae	<i>Leiopotherapon unicolor</i>	spangled perch				7/1
animals	reptiles	Agamidae	<i>Diporiphora australis</i>	tommy roundhead		C		3
animals	reptiles	Agamidae	<i>Pogona barbata</i>	bearded dragon		C		4
animals	reptiles	Agamidae	<i>Amphibolurus burnsi</i>	Burns's dragon		C		6
animals	reptiles	Agamidae	<i>Tympanocryptis sp.</i>					5/5
animals	reptiles	Agamidae	<i>Diporiphora nobbi</i>	nobbi		C		3/1
animals	reptiles	Agamidae	<i>Tympanocryptis lineata</i>	lined earless dragon		C		1/1
animals	reptiles	Agamidae	<i>Intellagama lesueurii</i>	eastern water dragon		C		2
animals	reptiles	Boidae	<i>Aspidites melanocephalus</i>	black-headed python		C		4
animals	reptiles	Boidae	<i>Morelia spilota</i>	carpet python		C		6
animals	reptiles	Boidae	<i>Antaresia maculosa</i>	spotted python		C		5
animals	reptiles	Boidae	<i>Morelia sp.</i>					1
animals	reptiles	Carphodactylidae	<i>Nephrurus asper</i>	spiny knob-tailed gecko		C		1
animals	reptiles	Chelidae	<i>Chelodina longicollis</i>	eastern snake-necked turtle		C		3
animals	reptiles	Chelidae	<i>Wollumbinia latisternum</i>	saw-shelled turtle		C		1
animals	reptiles	Chelidae	<i>Emydura macquarii krefftii</i>	Krefft's river turtle		C		2
animals	reptiles	Colubridae	<i>Dendrelaphis punctulatus</i>	green tree snake		C		4
animals	reptiles	Colubridae	<i>Boiga irregularis</i>	brown tree snake		C		1
animals	reptiles	Colubridae	<i>Tropidonophis mairii</i>	freshwater snake		C		2
animals	reptiles	Diplodactylidae	<i>Diplodactylus vittatus</i>	wood gecko		C		2
animals	reptiles	Diplodactylidae	<i>Strophurus taenicauda</i>	golden-tailed gecko		NT		1
animals	reptiles	Diplodactylidae	<i>Strophurus williamsi</i>	soft-spined gecko		C		4
animals	reptiles	Diplodactylidae	<i>Oedura monillis</i>	ocellated velvet gecko		C		3
animals	reptiles	Diplodactylidae	<i>Oedura tryoni</i>	southern spotted velvet gecko		C		1
animals	reptiles	Diplodactylidae	<i>Lucasium steindachneri</i>	Steindachner's gecko		C		2
animals	reptiles	Elapidae	<i>Hoplocephalus bitorquatus</i>	pale-headed snake		C		2
animals	reptiles	Elapidae	<i>Brachyuropsis australis</i>	coral snake		C		1

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animals	reptiles	Elapidae	<i>Cryptophis nigrescens</i>	eastern small-eyed snake		C		1
animals	reptiles	Elapidae	<i>Vermicella annulata</i>	bandy-bandy		C		1
animals	reptiles	Elapidae	<i>Pseudonaja textilis</i>	eastern brown snake		C		6/1
animals	reptiles	Elapidae	<i>Demansia psammophis</i>	yellow-faced whipsnake		C		3
animals	reptiles	Elapidae	<i>Cryptophis boschmai</i>	Carpentaria whip snake		C		4/1
animals	reptiles	Elapidae	<i>Pseudonaja nuchalis sensu lato</i>	western brown snake		C		1
animals	reptiles	Elapidae	<i>Suta suta</i>	myall snake		C		2
animals	reptiles	Elapidae	<i>Denisonia maculata</i>	ornamental snake		V	V	3
animals	reptiles	Gekkonidae	<i>Gehyra dubia</i>	dubious dtella		C		15
animals	reptiles	Gekkonidae	<i>Gehyra catenata</i>	chain-backed dtella		C		4/1
animals	reptiles	Gekkonidae	<i>Gehyra versicolor</i>			C		3
animals	reptiles	Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's gecko		C		20/1
animals	reptiles	Pygopodidae	<i>Paradelma orientalis</i>	brigalow scaly-foot		C		3
animals	reptiles	Pygopodidae	<i>Delma tincta</i>	excitable delma		C		4
animals	reptiles	Pygopodidae	<i>Lialis burtonis</i>	Burton's legless lizard		C		2
animals	reptiles	Scincidae	<i>Tiliqua scincoides</i>	eastern blue-tongued lizard		C		2
animals	reptiles	Scincidae	<i>Cryptoblepharus sp.</i>					1
animals	reptiles	Scincidae	<i>Lygisaurus foliorum</i>	tree-base litter-skink		C		32/1
animals	reptiles	Scincidae	<i>Morethia boulengeri</i>	south-eastern morethia skink		C		1
animals	reptiles	Scincidae	<i>Ctenotus taeniolatus</i>	copper-tailed skink		C		13
animals	reptiles	Scincidae	<i>Anomalopus verreauxii</i>	three-clawed worm-skink		C		2
animals	reptiles	Scincidae	<i>Lampropholis delicata</i>	dark-flecked garden sunskink		C		1
animals	reptiles	Scincidae	<i>Morethia taeniopleura</i>	fire-tailed skink		C		5
animals	reptiles	Scincidae	<i>Pygmaeascincus timlowi</i>	dwarf litter-skink		C		5
animals	reptiles	Scincidae	<i>Lerista punctatovittata</i>	eastern robust slider		C		1
animals	reptiles	Scincidae	<i>Cryptoblepharus pannosus</i>	ragged snake-eyed skink		C		4
animals	reptiles	Scincidae	<i>Glaphyromorphus punctulatus</i>	fine-spotted mulch-skink		C		2
animals	reptiles	Scincidae	<i>Carlia pectoralis sensu lato</i>			C		27
animals	reptiles	Scincidae	<i>Cryptoblepharus pulcher pulcher</i>	elegant snake-eyed skink		C		19
animals	reptiles	Scincidae	<i>Cryptoblepharus plagiocephalus sensu lato</i>			C		2
animals	reptiles	Scincidae	<i>Carlia munda</i>	shaded-litter rainbow-skink		C		6/1
animals	reptiles	Scincidae	<i>Carlia vivax</i>	tussock rainbow-skink		C		2
animals	reptiles	Scincidae	<i>Eulamprus sp.</i>					1
animals	reptiles	Scincidae	<i>Egernia rugosa</i>	yakka skink		V	V	1
animals	reptiles	Scincidae	<i>Menetia greyii</i>	common dwarf skink		C		17
animals	reptiles	Scincidae	<i>Ctenotus ingrami</i>	unspotted yellow-sided ctenotus		C		1
animals	reptiles	Scincidae	<i>Lerista fragilis</i>	eastern mulch slider		C		8
animals	reptiles	Scincidae	<i>Carlia pectoralis</i>	open-litter rainbow skink		C		1
animals	reptiles	Scincidae	<i>Bellatorias frerei</i>	major skink		C		1
animals	reptiles	Scincidae	<i>Ctenotus spaldingi</i>	straight-browed ctenotus		C		14
animals	reptiles	Typhlopidae	<i>Anilius ligatus</i>	robust blind snake		C		1
animals	reptiles	Varanidae	<i>Varanus varius</i>	lace monitor		C		1
animals	reptiles	Varanidae	<i>Varanus tristis</i>	black-tailed monitor		C		4
fungi	lecanoromycetes	Lecanoraceae	<i>Lecidella</i>			C		1/1
plants	conifers	Cupressaceae	<i>Callitris endlicheri</i>	black cypress pine		C		2
plants	conifers	Cupressaceae	<i>Callitris glaucophylla</i>	white cypress pine		C		5/1

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plants	cycads	Zamiaceae	<i>Macrozamia moorei</i>			C		15/8
plants	ferns	Marsileaceae	<i>Marsilea hirsuta</i>	hairy nardoo		C		2/1
plants	ferns	Marsileaceae	<i>Marsilea drummondii</i>	common nardoo		C		2
plants	ferns	Pteridaceae	<i>Cheilanthes sieberi subsp. sieberi</i>			C		1/1
plants	ferns	Pteridaceae	<i>Cheilanthes distans</i>	bristly cloak fern		C		1
plants	ferns	Salvinaceae	<i>Azolla</i>					1
plants	higher dicots	Acanthaceae	<i>Hypoestes floribunda</i>			C		1
plants	higher dicots	Acanthaceae	<i>Brunoniella australis</i>	blue trumpet		C		8
plants	higher dicots	Acanthaceae	<i>Rostellularia adscendens</i>			C		10
plants	higher dicots	Acanthaceae	<i>Pseuderanthemum variabile</i>	pastel flower		C		6/1
plants	higher dicots	Acanthaceae	<i>Dipteracanthus australasicus</i>			C		2
plants	higher dicots	Aizoaceae	<i>Zaleya galericulata subsp. galericulata</i>			C		1/1
plants	higher dicots	Aizoaceae	<i>Trianthema portulacastrum</i>	black pigweed	Y			3
plants	higher dicots	Aizoaceae	<i>Tetragonia tetragonoides</i>	New Zealand spinach		C		1
plants	higher dicots	Aizoaceae	<i>Trianthema triquetra</i>	red spinach		C		3
plants	higher dicots	Aizoaceae	<i>Zaleya galericulata</i>			C		2/2
plants	higher dicots	Amaranthaceae	<i>Alternanthera denticulata var. denticulata</i>			C		1/1
plants	higher dicots	Amaranthaceae	<i>Nyssanthes erecta</i>			C		2/1
plants	higher dicots	Amaranthaceae	<i>Achyranthes aspera</i>			C		10/1
plants	higher dicots	Amaranthaceae	<i>Alternanthera nana</i>	hairy joyweed		C		2/1
plants	higher dicots	Amaranthaceae	<i>Nyssanthes diffusa</i>	barbed-wire weed		C		2
plants	higher dicots	Amaranthaceae	<i>Alternanthera pungens</i>	khaki weed	Y			1/1
plants	higher dicots	Amaranthaceae	<i>Alternanthera denticulata</i>	lesser joyweed		C		4/3
plants	higher dicots	Amaranthaceae	<i>Alternanthera nodiflora</i>	joyweed		C		5
plants	higher dicots	Amaranthaceae	<i>Amaranthus interruptus</i>			C		1
plants	higher dicots	Amaranthaceae	<i>Gomphrena celosioides</i>	gomphrena weed	Y			3/2
plants	higher dicots	Apiaceae	<i>Cyclospermum leptophyllum</i>		Y			2
plants	higher dicots	Asteraceae	<i>Sphaeromorphaea subintegra</i>			C		1/1
plants	higher dicots	Asteraceae	<i>Apowollastonia spilanthis</i>			C		2/1
plants	higher dicots	Asteraceae	<i>Lactuca serriola forma serriola</i>		Y			1/1
plants	higher dicots	Asteraceae	<i>Vittadinia dissecta var. dissecta</i>			C		1/1
plants	higher dicots	Asteraceae	<i>Peripleura hispidula var. hispidula</i>			C		2/1
plants	higher dicots	Asteraceae	<i>Acmella grandiflora var. brachyglossa</i>			C		4/3
plants	higher dicots	Asteraceae	<i>Pterocaulon serrulatum var. serrulatum</i>			C		1/1
plants	higher dicots	Asteraceae	<i>Verbesina encelioides var. encelioides</i>		Y			5/5
plants	higher dicots	Asteraceae	<i>Brachyscome microcarpa subsp. microcarpa</i>			C		1/1
plants	higher dicots	Asteraceae	<i>Pterocaulon ciliosum</i>			C		1/1
plants	higher dicots	Asteraceae	<i>Pterocaulon redolens</i>			C		2
plants	higher dicots	Asteraceae	<i>Vittadinia pustulata</i>			C		1/1
plants	higher dicots	Asteraceae	<i>Xanthium occidentale</i>		Y			5
plants	higher dicots	Asteraceae	<i>Brachyscome basaltica</i>			C		1/1
plants	higher dicots	Asteraceae	<i>Cyanthillium cinereum</i>			C		15/3
plants	higher dicots	Asteraceae	<i>Trioncinia retroflexa</i>			E		2/2
plants	higher dicots	Asteraceae	<i>Verbesina encelioides</i>	crownbeard	Y			10
plants	higher dicots	Asteraceae	<i>Sigesbeckia orientalis</i>	Indian weed		C		1/1
plants	higher dicots	Asteraceae	<i>Calotis</i>			C		3

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plants	higher dicots	Asteraceae	<i>Cassinia</i>			C		1
plants	higher dicots	Asteraceae	<i>Coreopsis</i>			C		1
plants	higher dicots	Asteraceae	<i>Vittadinia</i>			C		1
plants	higher dicots	Asteraceae	<i>Brachyscome</i>			C		1/1
plants	higher dicots	Asteraceae	<i>Bidens pilosa</i>		Y			8/1
plants	higher dicots	Asteraceae	<i>Calotis dentex</i>	white burr daisy		C		1
plants	higher dicots	Asteraceae	<i>Calotis cuneata</i>			C		9/4
plants	higher dicots	Asteraceae	<i>Cassinia laevis</i>			C		1
plants	higher dicots	Asteraceae	<i>Cirsium vulgare</i>	spear thistle	Y			2
plants	higher dicots	Asteraceae	<i>Centipeda minima</i>			C		1
plants	higher dicots	Asteraceae	<i>Zinnia peruviana</i>	wild zinnia	Y			2
plants	higher dicots	Asteraceae	<i>Calotis hispidula</i>	bogan flea		C		2
plants	higher dicots	Asteraceae	<i>Camptacra barbata</i>			C		5/2
plants	higher dicots	Asteraceae	<i>Helianthus annuus</i>		Y			1/1
plants	higher dicots	Asteraceae	<i>Sigesbeckia fugax</i>			C		1/1
plants	higher dicots	Asteraceae	<i>Sonchus oleraceus</i>	common sowthistle	Y			9/3
plants	higher dicots	Asteraceae	<i>Tridax procumbens</i>	tridax daisy	Y			2/1
plants	higher dicots	Asteraceae	<i>Xanthium spinosum</i>	Bathurst burr	Y			2/2
plants	higher dicots	Asteraceae	<i>Calotis cuneifolia</i>	burr daisy		C		2/1
plants	higher dicots	Asteraceae	<i>Calotis lappulacea</i>	yellow burr daisy		C		3/2
plants	higher dicots	Asteraceae	<i>Hemisteptia lyrata</i>			C		3/2
plants	higher dicots	Asteraceae	<i>Peripleura bicolor</i>			C		1/1
plants	higher dicots	Asteraceae	<i>Peripleura diffusa</i>			C		2/2
plants	higher dicots	Asteraceae	<i>Vittadinia sulcata</i>	native daisy		C		4/2
plants	higher dicots	Asteraceae	<i>Acmella grandiflora</i>			C		1
plants	higher dicots	Asteraceae	<i>Euchiton sphaericus</i>			C		3/2
plants	higher dicots	Asteraceae	<i>Glossocardia bidens</i>	native cobbler's pegs		C		2/1
plants	higher dicots	Asteraceae	<i>Minuria integerrima</i>	smooth minuria		C		3
plants	higher dicots	Asteraceae	<i>Craspedia variabilis</i>			C		1
plants	higher dicots	Asteraceae	<i>Erigeron bonariensis</i>		Y			5/2
plants	higher dicots	Asteraceae	<i>Pterocaulon sphacelatum</i>	applebush		C		1
plants	higher dicots	Asteraceae	<i>Parthenium hysterophorus</i>	parthenium weed	Y			23/4
plants	higher dicots	Asteraceae	<i>Symphyotrichum subulatum</i>		Y			1
plants	higher dicots	Asteraceae	<i>Chrysocephalum apiculatum</i>	yellow buttons		C		3
plants	higher dicots	Asteraceae	<i>Lagenophora queenslandica</i>			C		1/1
plants	higher dicots	Bignoniaceae	<i>Pandorea pandorana</i>	wonga vine		C		5
plants	higher dicots	Brassicaceae	<i>Lepidium</i>			C		1
plants	higher dicots	Brassicaceae	<i>Sisymbrium irio</i>	london rocket	Y			1
plants	higher dicots	Brassicaceae	<i>Rorippa</i>			C		1/1
plants	higher dicots	Brassicaceae	<i>Lepidium africanum</i>	common peppercress	Y			1/1
plants	higher dicots	Brassicaceae	<i>Sisymbrium thellungii</i>	African turnip-weed	Y			1/1
plants	higher dicots	Brassicaceae	<i>Lepidium bonariense</i>	Argentine peppercress	Y			3/1
plants	higher dicots	Byttneriaceae	<i>Waltheria indica</i>			C		1/1
plants	higher dicots	Byttneriaceae	<i>Seringia corollata</i>			C		2/1
plants	higher dicots	Cactaceae	<i>Opuntia</i>		Y			1
plants	higher dicots	Cactaceae	<i>Opuntia stricta</i>		Y			5

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plants	higher dicots	Cactaceae	<i>Opuntia tomentosa</i>	velvety tree pear	Y			11
plants	higher dicots	Caesalpiniaceae	<i>Chamaecrista rotundifolia</i> var. <i>rotundifolia</i>		Y			1/1
plants	higher dicots	Caesalpiniaceae	<i>Chamaecrista absus</i> var. <i>absus</i>			C		1
plants	higher dicots	Caesalpiniaceae	<i>Senna</i>			C		1
plants	higher dicots	Caesalpiniaceae	<i>Lysiphyllum carronii</i>	ebony tree		C		2
plants	higher dicots	Caesalpiniaceae	<i>Senna barclayana</i>			C		6/2
plants	higher dicots	Caesalpiniaceae	<i>Parkinsonia aculeata</i>	parkinsonia	Y			2
plants	higher dicots	Caesalpiniaceae	<i>Haematoxylum campechianum</i>	logwood tree	Y			2/2
plants	higher dicots	Caesalpiniaceae	<i>Senna artemisioides</i>			C		2
plants	higher dicots	Caesalpiniaceae	<i>Lysiphyllum hookeri</i>	Queensland ebony		C		7
plants	higher dicots	Caesalpiniaceae	<i>Cassia brewsteri</i>			C		3/1
plants	higher dicots	Campanulaceae	<i>Wahlenbergia</i>			C		1
plants	higher dicots	Campanulaceae	<i>Isotoma axillaris</i>	australian harebell		C		3/3
plants	higher dicots	Campanulaceae	<i>Wahlenbergia gracilis</i>	sprawling bluebell		C		2/2
plants	higher dicots	Campanulaceae	<i>Wahlenbergia capillaris</i>			C		4/1
plants	higher dicots	Campanulaceae	<i>Wahlenbergia queenslandica</i>			C		1
plants	higher dicots	Campanulaceae	<i>Lobelia concolor</i>			C		1/1
plants	higher dicots	Capparaceae	<i>Capparis arborea</i>	brush caper berry		C		1
plants	higher dicots	Capparaceae	<i>Capparis canescens</i>			C		2
plants	higher dicots	Capparaceae	<i>Capparis lasiantha</i>	nipan		C		5
plants	higher dicots	Capparaceae	<i>Apophyllum anomalum</i>	broom bush		C		1
plants	higher dicots	Capparaceae	<i>Capparis mitchellii</i>			C		2
plants	higher dicots	Capparaceae	<i>Capparis loranthifolia</i>			C		4
plants	higher dicots	Casuarinaceae	<i>Casuarina cristata</i>	belah		C		4
plants	higher dicots	Casuarinaceae	<i>Casuarina cunninghamiana</i>			C		4
plants	higher dicots	Celastraceae	<i>Denhamia cunninghamii</i>			C		3
plants	higher dicots	Celastraceae	<i>Elaeodendron australe</i> var. <i>australe</i>			C		1/1
plants	higher dicots	Celastraceae	<i>Elaeodendron australe</i>			C		1
plants	higher dicots	Celastraceae	<i>Denhamia oleaster</i>			C		9
plants	higher dicots	Chenopodiaceae	<i>Dysphania pumilio</i>			C		2/1
plants	higher dicots	Chenopodiaceae	<i>Sclerolaena muricata</i> var. <i>muricata</i>			C		1/1
plants	higher dicots	Chenopodiaceae	<i>Atriplex muelleri</i>	lagoon saltbush		C		1
plants	higher dicots	Chenopodiaceae	<i>Einadia hastata</i>			C		2
plants	higher dicots	Chenopodiaceae	<i>Sclerolaena anisacanthoides</i>	yellow burr		C		1/1
plants	higher dicots	Chenopodiaceae	<i>Sclerolaena muricata</i> var. <i>villosa</i>			C		1/1
plants	higher dicots	Chenopodiaceae	<i>Einadia nutans</i> subsp. <i>linifolia</i>			C		3/3
plants	higher dicots	Chenopodiaceae	<i>Einadia nutans</i> subsp. <i>nutans</i>			C		2/1
plants	higher dicots	Chenopodiaceae	<i>Salsola australis</i>			C		8
plants	higher dicots	Chenopodiaceae	<i>Dysphania carinata</i>			C		2/2
plants	higher dicots	Chenopodiaceae	<i>Einadia nutans</i>			C		5
plants	higher dicots	Chenopodiaceae	<i>Maireana</i>			C		1
plants	higher dicots	Chenopodiaceae	<i>Atriplex</i>			C		1
plants	higher dicots	Chenopodiaceae	<i>Rhagodia parabolica</i>			C		1/1
plants	higher dicots	Chenopodiaceae	<i>Sclerolaena birchii</i>	galvanised burr		C		1
plants	higher dicots	Chenopodiaceae	<i>Chenopodium auricomiforme</i>			C		1/1
plants	higher dicots	Chenopodiaceae	<i>Sclerolaena lanicuspis</i>			C		1

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plants	higher dicots	Chenopodiaceae	<i>Sclerolaena muricata</i>			C		4/1
plants	higher dicots	Chenopodiaceae	<i>Maireana microphylla</i>			C		5/2
plants	higher dicots	Chenopodiaceae	<i>Enchylaena tomentosa</i>			C		3
plants	higher dicots	Chenopodiaceae	<i>Atriplex semibaccata</i>	creeping saltbush		C		1
plants	higher dicots	Cleomaceae	<i>Cleome tetrandra</i>			C		1
plants	higher dicots	Cleomaceae	<i>Cleome viscosa</i>	tick-weed		C		1
plants	higher dicots	Combretaceae	<i>Terminalia oblongata</i> subsp. <i>oblongata</i>			C		3/3
plants	higher dicots	Combretaceae	<i>Terminalia oblongata</i>			C		7
plants	higher dicots	Combretaceae	<i>Macropteranthes leichhardtii</i>	bonewood		C		3/2
plants	higher dicots	Crassulaceae	<i>Bryophyllum delagoense</i>		Y			1
plants	higher dicots	Crassulaceae	<i>Crassula tetramera</i>			C		1/1
plants	higher dicots	Cucurbitaceae	<i>Diplocyclos palmatus</i>			C		1
plants	higher dicots	Cucurbitaceae	<i>Cucurbitaceae</i>			C		1
plants	higher dicots	Cucurbitaceae	<i>Cucumis myriocarpus</i> subsp. <i>myriocarpus</i>	prickly pademelon	Y			1
plants	higher dicots	Cucurbitaceae	<i>Cucumis melo</i>			C		1
plants	higher dicots	Dilleniaceae	<i>Hibbertia cistoidea</i>			C		1/1
plants	higher dicots	Dilleniaceae	<i>Hibbertia linearis</i> var. <i>obtusifolia</i>			C		1
plants	higher dicots	Dilleniaceae	<i>Hibbertia oligodonta</i>			C		1/1
plants	higher dicots	Dilleniaceae	<i>Hibbertia acicularis</i>			C		1/1
plants	higher dicots	Ebenaceae	<i>Diospyros humilis</i>	small-leaved ebony		C		2/1
plants	higher dicots	Erythroxylaceae	<i>Erythroxylum australe</i>	cocaine tree		C		5
plants	higher dicots	Euphorbiaceae	<i>Acalypha eremorum</i>	soft acalypha		C		2
plants	higher dicots	Euphorbiaceae	<i>Croton pheballoides</i>	narrow-leaved croton		C		2/1
plants	higher dicots	Euphorbiaceae	<i>Euphorbia coghlanii</i>			C		2/2
plants	higher dicots	Euphorbiaceae	<i>Euphorbia papillifolia</i> var. <i>papillifolia</i>			C		3/3
plants	higher dicots	Euphorbiaceae	<i>Euphorbia laciniloba</i>			C		1/1
plants	higher dicots	Euphorbiaceae	<i>Euphorbia dallachyana</i>			C		1/1
plants	higher dicots	Euphorbiaceae	<i>Euphorbia hyssopifolia</i>		Y			1/1
plants	higher dicots	Euphorbiaceae	<i>Ricinocarpos linearifolius</i>			C		1/1
plants	higher dicots	Euphorbiaceae	<i>Adriana tomentosa</i> var. <i>tomentosa</i>			C		2/2
plants	higher dicots	Euphorbiaceae	<i>Bertya lapicola</i> subsp. <i>brevifolia</i>			C		3/3
plants	higher dicots	Euphorbiaceae	<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			C		3/1
plants	higher dicots	Euphorbiaceae	<i>Euphorbia hirta</i>		Y			2/2
plants	higher dicots	Euphorbiaceae	<i>Acalypha</i>			C		1
plants	higher dicots	Euphorbiaceae	<i>Euphorbia drummondii</i>			C		4/1
plants	higher dicots	Fabaceae	<i>Glycine</i>			C		2
plants	higher dicots	Fabaceae	<i>Fabaceae</i>			C		1
plants	higher dicots	Fabaceae	<i>Tephrosia</i>			C		1
plants	higher dicots	Fabaceae	<i>Cullen tenax</i>	emu-foot		C		3/3
plants	higher dicots	Fabaceae	<i>Hovea lorata</i>			C		1
plants	higher dicots	Fabaceae	<i>Vigna radiata</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Hovea longipes</i>	brush hovea		C		2/1
plants	higher dicots	Fabaceae	<i>Glycine falcata</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Lotus australis</i>	Australian trefoil		C		1/1
plants	higher dicots	Fabaceae	<i>Vigna suberecta</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Glycine tabacina</i>	glycine pea		C		6

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plants	higher dicots	Fabaceae	<i>Hovea parvicalyx</i>			C		3/3
plants	higher dicots	Fabaceae	<i>Hovea planifolia</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Lablab purpureus</i>	lablab	Y			1/1
plants	higher dicots	Fabaceae	<i>Tephrosia juncea</i>			C		2/2
plants	higher dicots	Fabaceae	<i>Vigna lanceolata</i>			C		1
plants	higher dicots	Fabaceae	<i>Clitoria ternatea</i>	butterfly pea	Y			2/2
plants	higher dicots	Fabaceae	<i>Crotalaria incana</i>		Y			3
plants	higher dicots	Fabaceae	<i>Crotalaria juncea</i>	sunhemp	Y			5/2
plants	higher dicots	Fabaceae	<i>Desmodium varians</i>	slender tick trefoil		C		2/1
plants	higher dicots	Fabaceae	<i>Glycine latifolia</i>			C		5/2
plants	higher dicots	Fabaceae	<i>Hovea tholiformis</i>			C		1
plants	higher dicots	Fabaceae	<i>Rhynchosia minima</i>			C		10
plants	higher dicots	Fabaceae	<i>Crotalaria pallida</i>		Y			1
plants	higher dicots	Fabaceae	<i>Glycine tomentella</i>	woolly glycine		C		6/2
plants	higher dicots	Fabaceae	<i>Indigofera colutea</i>	sticky indigo		C		1
plants	higher dicots	Fabaceae	<i>Indigofera hirsuta</i>	hairy indigo		C		2
plants	higher dicots	Fabaceae	<i>Indigofera linnaei</i>	Birdsville indigo		C		7/2
plants	higher dicots	Fabaceae	<i>Jacksonia scoparia</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Sesbania cannabina</i>			C		6/1
plants	higher dicots	Fabaceae	<i>Zornia dyctiocarpa</i>			C		1
plants	higher dicots	Fabaceae	<i>Aeschynomene indica</i>	budda pea		C		3/1
plants	higher dicots	Fabaceae	<i>Cajanus acutifolius</i>			C		2/2
plants	higher dicots	Fabaceae	<i>Galactia tenuiflora</i>			C		6/3
plants	higher dicots	Fabaceae	<i>Leptosema chapmanii</i>			C		5/5
plants	higher dicots	Fabaceae	<i>Medicago polymorpha</i>	burr medic	Y			1/1
plants	higher dicots	Fabaceae	<i>Medicago scutellata</i>	snail medic	Y			1/1
plants	higher dicots	Fabaceae	<i>Tephrosia barbata</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Alysicarpus muelleri</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Glycine pescadrensis</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Indigofera australis</i>			C		1
plants	higher dicots	Fabaceae	<i>Indigofera brevidens</i>			C		2/1
plants	higher dicots	Fabaceae	<i>Indigofera ewartiana</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Indigofera linifolia</i>			C		3
plants	higher dicots	Fabaceae	<i>Indigofera pratensis</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Pultenaea petiolaris</i>			C		2/1
plants	higher dicots	Fabaceae	<i>Tephrosia brachyodon</i>			C		2
plants	higher dicots	Fabaceae	<i>Crotalaria mitchellii</i>			C		2
plants	higher dicots	Fabaceae	<i>Desmodium brachypodium</i>	large ticktrefoil		C		6/1
plants	higher dicots	Fabaceae	<i>Desmodium macrocarpum</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Erythrina vespertilio</i>			C		1
plants	higher dicots	Fabaceae	<i>Hardenbergia violacea</i>			C		2
plants	higher dicots	Fabaceae	<i>Indigofera glandulosa</i>			C		1
plants	higher dicots	Fabaceae	<i>Swainsona galegifolia</i>	smooth Darling pea		C		3/1
plants	higher dicots	Fabaceae	<i>Tephrosia dietrichiae</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Cajanus confertiflorus</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Aeschynomene brevifolia</i>			C		1/1

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plants	higher dicots	Fabaceae	<i>Crotalaria dissitiflora</i>			C		2
plants	higher dicots	Fabaceae	<i>Desmodium campylocaulon</i>			C		5/4
plants	higher dicots	Fabaceae	<i>Tephrosia astragaloides</i>			C		2/2
plants	higher dicots	Fabaceae	<i>Tephrosia gaudium-solis</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Desmodium rhytidophyllum</i>			C		3/1
plants	higher dicots	Fabaceae	<i>Macroptilium lathyroides</i>		Y			2
plants	higher dicots	Fabaceae	<i>Macroptilium atropurpureum</i>	siratro	Y			1
plants	higher dicots	Fabaceae	<i>Vigna radiata</i> var. <i>sublobata</i>			C		1
plants	higher dicots	Fabaceae	<i>Rhynchosia minima</i> var. <i>minima</i>			C		4/4
plants	higher dicots	Fabaceae	<i>Daviesia filipes</i> subsp. <i>filipes</i>			C		2/2
plants	higher dicots	Fabaceae	<i>Galactia tenuiflora</i> var. <i>lucida</i>			C		2/2
plants	higher dicots	Fabaceae	<i>Lespedeza juncea</i> subsp. <i>sericea</i>	perennial lespedeza		C		2
plants	higher dicots	Fabaceae	<i>Vigna lanceolata</i> var. <i>lanceolata</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Sesbania cannabina</i> var. <i>cannabina</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Zornia dyctiocarpa</i> var. <i>filifolia</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Zornia muriculata</i> subsp. <i>muriculata</i>			C		1/1
plants	higher dicots	Fabaceae	<i>Glycine</i> sp. (Mackay S.B.Andrews+ 43)			C		1/1
plants	higher dicots	Fabaceae	<i>Daviesia ulicifolia</i> subsp. <i>ulicifolia</i>			C		2
plants	higher dicots	Fabaceae	<i>Zornia muelleriana</i> subsp. <i>muelleriana</i>			C		1
plants	higher dicots	Fabaceae	<i>Crotalaria dissitiflora</i> subsp. <i>dissitiflora</i>			C		2/1
plants	higher dicots	Fabaceae	<i>Desmodium</i> sp. (Mt Pleasant E.R.Anderson 3953)			C		1/1
plants	higher dicots	Fabaceae	<i>Tephrosia filipes</i> var. (Mt Blackjack A.R.Bean+ 7332)			C		2/2
plants	higher dicots	Goodeniaceae	<i>Scaevola humilis</i>			C		4/4
plants	higher dicots	Goodeniaceae	<i>Goodenia glabra</i>			C		2/2
plants	higher dicots	Goodeniaceae	<i>Goodenia rotundifolia</i>			C		3/1
plants	higher dicots	Goodeniaceae	<i>Brunonia australis</i>	blue pincushion		C		3
plants	higher dicots	Goodeniaceae	<i>Goodenia grandiflora</i>			C		3/3
plants	higher dicots	Gyrostemonaceae	<i>Codonocarpus attenuatus</i>			C		1/1
plants	higher dicots	Haloragaceae	<i>Haloragis aspera</i>	raspweed		C		5/4
plants	higher dicots	Haloragaceae	<i>Haloragis glauca</i>			C		1
plants	higher dicots	Haloragaceae	<i>Haloragis glauca</i> forma <i>glauca</i>			C		2/2
plants	higher dicots	Haloragaceae	<i>Haloragis heterophylla</i>	rough raspweed		C		3/2
plants	higher dicots	Haloragaceae	<i>Haloragis stricta</i>			C		3/1
plants	higher dicots	Loranthaceae	<i>Lysiana</i>			C		1
plants	higher dicots	Loranthaceae	<i>Amyema miquelii</i>			C		2/2
plants	higher dicots	Loranthaceae	<i>Amyema quandang</i>			C		2
plants	higher dicots	Loranthaceae	<i>Amyema congener</i> subsp. <i>rotundifolia</i>			C		1/1
plants	higher dicots	Loranthaceae	<i>Lysiana linearifolia</i>			C		1
plants	higher dicots	Loranthaceae	<i>Dendrophthoe glabrescens</i>			C		1/1
plants	higher dicots	Loranthaceae	<i>Amyema pendula</i> subsp. <i>longifolia</i>			C		1
plants	higher dicots	Loranthaceae	<i>Lysiana subfalcata</i>			C		3/2
plants	higher dicots	Malvaceae	<i>Malva</i>			C		1
plants	higher dicots	Malvaceae	<i>Hibiscus</i> sp. (Emerald S.L.Everist 2124)			C		1/1
plants	higher dicots	Malvaceae	<i>Malvaceae</i>			C		1
plants	higher dicots	Malvaceae	<i>Sida laevis</i>			C		2/2

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plants	higher dicots	Malvaceae	<i>Sida spinosa</i>	spiny sida	Y			3/2
plants	higher dicots	Malvaceae	<i>Sida rohlenae</i>			C		2
plants	higher dicots	Malvaceae	<i>Sida corrugata</i>			C		2
plants	higher dicots	Malvaceae	<i>Sida pleiantha</i>			C		2/2
plants	higher dicots	Malvaceae	<i>Sida cordifolia</i>		Y			4
plants	higher dicots	Malvaceae	<i>Sida fibulifera</i>			C		2/1
plants	higher dicots	Malvaceae	<i>Sida platycalyx</i>	lifesaver burr		C		2
plants	higher dicots	Malvaceae	<i>Sida trichopoda</i>			C		2
plants	higher dicots	Malvaceae	<i>Hibiscus sturtii</i>			C		4
plants	higher dicots	Malvaceae	<i>Sida atherophora</i>			C		7/1
plants	higher dicots	Malvaceae	<i>Sida hackettiana</i>			C		9/1
plants	higher dicots	Malvaceae	<i>Sida rhombifolia</i>		Y			10
plants	higher dicots	Malvaceae	<i>Abutilon oxycarpum</i>			C		4
plants	higher dicots	Malvaceae	<i>Hibiscus verdcourtii</i>			C		3/3
plants	higher dicots	Malvaceae	<i>Abelmoschus ficulneus</i>	native rosella		C		2/2
plants	higher dicots	Malvaceae	<i>Abutilon calliphyllum</i>	velvet lanternflower		C		1/1
plants	higher dicots	Malvaceae	<i>Malvastrum americanum</i>		Y			9
plants	higher dicots	Malvaceae	<i>Hibiscus tridactylites</i>			C		3
plants	higher dicots	Malvaceae	<i>Sida rohlenae</i> subsp. <i>rohlenae</i>			C		1/1
plants	higher dicots	Malvaceae	<i>Abutilon oxycarpum</i> var. <i>incanum</i>			C		2/2
plants	higher dicots	Malvaceae	<i>Malvastrum americanum</i> var. <i>stellatum</i>			C		1/1
plants	higher dicots	Malvaceae	<i>Malvastrum americanum</i> var. <i>americanum</i>		Y			8/1
plants	higher dicots	Malvaceae	<i>Sida</i>			C		2
plants	higher dicots	Meliaceae	<i>Owenia acidula</i>	emu apple		C		1
plants	higher dicots	Meliaceae	<i>Owenia venosa</i>	crow's apple		C		3
plants	higher dicots	Meliaceae	<i>Melia azedarach</i>	white cedar		C		2
plants	higher dicots	Meliaceae	<i>Turraea pubescens</i>	native honeysuckle		C		1
plants	higher dicots	Mimosaceae	<i>Acacia crassa</i> subsp. <i>crassa</i>			C		10/1
plants	higher dicots	Mimosaceae	<i>Prosopis pallida</i>		Y			1
plants	higher dicots	Mimosaceae	<i>Acacia leiocalyx</i>			C		1
plants	higher dicots	Mimosaceae	<i>Acacia juncifolia</i>			C		2/2
plants	higher dicots	Mimosaceae	<i>Acacia neriifolia</i>	pechey wattle		C		1
plants	higher dicots	Mimosaceae	<i>Acacia glaucocarpa</i>	hickory wattle		C		2
plants	higher dicots	Mimosaceae	<i>Acacia harpophylla</i>	brigalow		C		7
plants	higher dicots	Mimosaceae	<i>Acacia melanoxylon</i>	blackwood		C		1
plants	higher dicots	Mimosaceae	<i>Acacia dietrichiana</i>			C		2/2
plants	higher dicots	Mimosaceae	<i>Acacia leptostachya</i>	Townsville wattle		C		1/1
plants	higher dicots	Mimosaceae	<i>Acacia longispicata</i>			C		3/1
plants	higher dicots	Mimosaceae	<i>Vachellia bidwillii</i>			C		1/1
plants	higher dicots	Mimosaceae	<i>Acacia bancroftiorum</i>			C		1
plants	higher dicots	Mimosaceae	<i>Vachellia farnesiana</i>		Y			4/1
plants	higher dicots	Mimosaceae	<i>Archidendropsis basaltica</i>	red lancewood		C		2
plants	higher dicots	Mimosaceae	<i>Acacia complanata</i>	flatstem wattle		C		1
plants	higher dicots	Mimosaceae	<i>Neptunia gracilis</i> forma <i>gracilis</i>			C		7/3
plants	higher dicots	Mimosaceae	<i>Acacia leiocalyx</i> subsp. <i>leiocalyx</i>			C		1/1
plants	higher dicots	Mimosaceae	<i>Acacia crassa</i>			C		4

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plants	higher dicots	Mimosaceae	<i>Acacia decora</i>	pretty wattle		C		4/1
plants	higher dicots	Mimosaceae	<i>Acacia angusta</i>			C		1/1
plants	higher dicots	Mimosaceae	<i>Acacia pendula</i>	myall		C		1/1
plants	higher dicots	Mimosaceae	<i>Acacia conferta</i>			C		2
plants	higher dicots	Mimosaceae	<i>Acacia oswaldii</i>	miljee		C		1
plants	higher dicots	Mimosaceae	<i>Acacia salicina</i>	doolan		C		13/1
plants	higher dicots	Mimosaceae	<i>Acacia amblygona</i>	fan-leaf wattle		C		2/2
plants	higher dicots	Moraceae	<i>Ficus opposita</i>			C		1
plants	higher dicots	Moraceae	<i>Ficus coronata</i>	creek sandpaper fig		C		2
plants	higher dicots	Myrsinaceae	<i>Myrsine variabilis</i>			C		2/2
plants	higher dicots	Myrtaceae	<i>Eucalyptus bakeri</i>	Baker's mallee		C		2/2
plants	higher dicots	Myrtaceae	<i>Eucalyptus crebra</i>	narrow-leaved red ironbark		C		3/2
plants	higher dicots	Myrtaceae	<i>Corymbia bloxsomei</i>			C		1
plants	higher dicots	Myrtaceae	<i>Eucalyptus exserta</i>	Queensland peppermint		C		1/1
plants	higher dicots	Myrtaceae	<i>Corymbia intermedia</i>	pink bloodwood		C		2
plants	higher dicots	Myrtaceae	<i>Eucalyptus coolabah</i>	coolabah		C		13/1
plants	higher dicots	Myrtaceae	<i>Eucalyptus populnea</i>	poplar box		C		4
plants	higher dicots	Myrtaceae	<i>Eucalyptus tenuipes</i>	narrow-leaved white mahogany		C		4/2
plants	higher dicots	Myrtaceae	<i>Melaleuca bracteata</i>			C		11/2
plants	higher dicots	Myrtaceae	<i>Melaleuca viminalis</i>			C		3/1
plants	higher dicots	Myrtaceae	<i>Angophora floribunda</i>	rough-barked apple		C		6
plants	higher dicots	Myrtaceae	<i>Corymbia dallachiana</i>			C		1/1
plants	higher dicots	Myrtaceae	<i>Corymbia hendersonii</i>			C		1/1
plants	higher dicots	Myrtaceae	<i>Corymbia tessellaris</i>	Moreton Bay ash		C		24
plants	higher dicots	Myrtaceae	<i>Eucalyptus cloeziana</i>	Gympie messmate		C		6/1
plants	higher dicots	Myrtaceae	<i>Eucalyptus granitica</i>	granite ironbark		C		1
plants	higher dicots	Myrtaceae	<i>Corymbia clarksoniana</i>			C		18/2
plants	higher dicots	Myrtaceae	<i>Corymbia leichhardtii</i>	rustyjacket		C		1/1
plants	higher dicots	Myrtaceae	<i>Eucalyptus cambageana</i>	Dawson gum		C		4
plants	higher dicots	Myrtaceae	<i>Eucalyptus suffulgens</i>			C		3/2
plants	higher dicots	Myrtaceae	<i>Corymbia erythrophloia</i>	variable-barked bloodwood		C		22/3
plants	higher dicots	Myrtaceae	<i>Eucalyptus chloroclada</i>	Baradine red gum		C		3
plants	higher dicots	Myrtaceae	<i>Eucalyptus decorticans</i>			C		10
plants	higher dicots	Myrtaceae	<i>Eucalyptus orgadophila</i>	mountain coolibah		C		8/3
plants	higher dicots	Myrtaceae	<i>Eucalyptus tholiformis</i>			C		1/1
plants	higher dicots	Myrtaceae	<i>Lophostemon suaveolens</i>	swamp box		C		5
plants	higher dicots	Myrtaceae	<i>Melaleuca linariifolia</i>	snow-in summer		C		3
plants	higher dicots	Myrtaceae	<i>Eucalyptus melanophloia</i>			C		158
plants	higher dicots	Myrtaceae	<i>Eucalyptus tereticornis</i>			C		8
plants	higher dicots	Myrtaceae	<i>Leptospermum lamellatum</i>			C		18/1
plants	higher dicots	Myrtaceae	<i>Melaleuca trichostachya</i>			C		2/2
plants	higher dicots	Myrtaceae	<i>Eucalyptus camaldulensis</i>			C		1
plants	higher dicots	Myrtaceae	<i>Eucalyptus drepanophylla</i>			C		1
plants	higher dicots	Myrtaceae	<i>Lysicarpus angustifolius</i>	budgeroo		C		40/1
plants	higher dicots	Myrtaceae	<i>Eucalyptus cloeziana</i> x <i>E.portuensis</i>			C		1
plants	higher dicots	Myrtaceae	<i>Corymbia citriodora</i> subsp. <i>variegata</i>			C		11

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plants	higher dicots	Myrtaceae	<i>Corymbia watsoniana</i> subsp. <i>capillata</i>			C		6/4
plants	higher dicots	Myrtaceae	<i>Corymbia citriodora</i> subsp. <i>citriodora</i>			C		172
plants	higher dicots	Myrtaceae	<i>Corymbia watsoniana</i> subsp. <i>watsoniana</i>			C		16
plants	higher dicots	Myrtaceae	<i>Eucalyptus camaldulensis</i> subsp. <i>acuta</i>			C		1/1
plants	higher dicots	Myrtaceae	<i>Corymbia</i> sp. (Springsure M.I.Brooker 9786)			C		1/1
plants	higher dicots	Myrtaceae	<i>Eucalyptus tereticornis</i> subsp. <i>tereticornis</i>			C		25/1
plants	higher dicots	Nyctaginaceae	<i>Boerhavia dominii</i>			C		7
plants	higher dicots	Nyctaginaceae	<i>Boerhavia</i>			C		5/1
plants	higher dicots	Oleaceae	<i>Jasminum didymum</i>			C		4
plants	higher dicots	Oleaceae	<i>Notelaea microcarpa</i>			C		2
plants	higher dicots	Oleaceae	<i>Jasminum simplicifolium</i>			C		4
plants	higher dicots	Oleaceae	<i>Jasminum didymum</i> subsp. <i>lineare</i>			C		3
plants	higher dicots	Oleaceae	<i>Notelaea</i> sp. (Barakula A.R.Bean 7553)			C		3/2
plants	higher dicots	Oleaceae	<i>Jasminum simplicifolium</i> subsp. <i>australiense</i>			C		2/2
plants	higher dicots	Onagraceae	<i>Ludwigia octovalvis</i>	willow primrose		C		1
plants	higher dicots	Oxalidaceae	<i>Oxalis exilis</i>			C		1/1
plants	higher dicots	Oxalidaceae	<i>Oxalis perennans</i>			C		1/1
plants	higher dicots	Oxalidaceae	<i>Oxalis corniculata</i>		Y			7/1
plants	higher dicots	Passifloraceae	<i>Passiflora aurantia</i>			C		1
plants	higher dicots	Pedaliaceae	<i>Josephinia eugeniae</i>	josephinia burr		C		1/1
plants	higher dicots	Pentapetaceae	<i>Melhania oblongifolia</i>			C		3
plants	higher dicots	Phyllanthaceae	<i>Phyllanthus simplex</i>			C		1/1
plants	higher dicots	Phyllanthaceae	<i>Phyllanthus</i> sp. (Pentland R.J.Cumming 9742)			C		1/1
plants	higher dicots	Phyllanthaceae	<i>Phyllanthus maderaspatensis</i>			C		4/1
plants	higher dicots	Phyllanthaceae	<i>Poranthera microphylla</i>	small poranthera		C		1/1
plants	higher dicots	Phyllanthaceae	<i>Phyllanthus</i>			C		3
plants	higher dicots	Phyllanthaceae	<i>Phyllanthus gunnii</i>			C		1
plants	higher dicots	Phyllanthaceae	<i>Breynia oblongifolia</i>			C		6
plants	higher dicots	Phyllanthaceae	<i>Phyllanthus virgatus</i>			C		8/3
plants	higher dicots	Phyllanthaceae	<i>Bridelia leichhardtii</i>			C		1
plants	higher dicots	Phyllanthaceae	<i>Sauropus ramosissimus</i>			C		1/1
plants	higher dicots	Phyllanthaceae	<i>Phyllanthus lacunarius</i>			C		2/1
plants	higher dicots	Picrodendraceae	<i>Petalostigma pubescens</i>	quinine tree		C		17
plants	higher dicots	Pittosporaceae	<i>Bursaria incana</i>			C		1
plants	higher dicots	Pittosporaceae	<i>Pittosporum angustifolium</i>			C		2/1
plants	higher dicots	Pittosporaceae	<i>Pittosporum spinescens</i>			C		3
plants	higher dicots	Plantaginaceae	<i>Callitriche sonderi</i>			C		1/1
plants	higher dicots	Plantaginaceae	<i>Stemodia florulenta</i>			C		1
plants	higher dicots	Plantaginaceae	<i>Scoparia dulcis</i>	scoparia	Y			1
plants	higher dicots	Plumbaginaceae	<i>Plumbago zeylanica</i>	native plumbago		C		1
plants	higher dicots	Polygalaceae	<i>Polygala triflora</i>			C		2/2
plants	higher dicots	Polygonaceae	<i>Rumex brownii</i>	swamp dock		C		1/1
plants	higher dicots	Polygonaceae	<i>Duma florulenta</i>			C		6/2
plants	higher dicots	Portulacaceae	<i>Portulaca australis</i>			C		1/1
plants	higher dicots	Portulacaceae	<i>Portulaca pilosa</i>		Y			1
plants	higher dicots	Portulacaceae	<i>Portulaca oleracea</i>	pigweed	Y			4

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plants	higher dicots	Portulacaceae	<i>Calandrinia pickeringii</i>			C		1
plants	higher dicots	Proteaceae	<i>Grevillea floribunda</i> subsp. <i>floribunda</i>			C		2/1
plants	higher dicots	Proteaceae	<i>Grevillea cyranostigma</i>			C		1/1
plants	higher dicots	Proteaceae	<i>Grevillea longistyla</i>			C		1/1
plants	higher dicots	Proteaceae	<i>Grevillea parallela</i>			C		1/1
plants	higher dicots	Proteaceae	<i>Grevillea striata</i>	beefwood		C		2
plants	higher dicots	Proteaceae	<i>Hakea lorea</i> subsp. <i>lorea</i>			C		3/1
plants	higher dicots	Rhamnaceae	<i>Ventilago viminalis</i>	supplejack		C		3/1
plants	higher dicots	Rhamnaceae	<i>Alphitonia excelsa</i>	soap tree		C		13
plants	higher dicots	Rubiaceae	<i>Psydrax odorata</i>			C		2
plants	higher dicots	Rubiaceae	<i>Psydrax odorata</i> forma <i>subnitida</i>			C		2/2
plants	higher dicots	Rubiaceae	<i>Oldenlandia coerulescens</i>			C		2/2
plants	higher dicots	Rubiaceae	<i>Everistia vacciniifolia</i>			C		2
plants	higher dicots	Rubiaceae	<i>Spermacoce multicaulis</i>			C		3/1
plants	higher dicots	Rubiaceae	<i>Spermacoce brachystema</i>			C		2/2
plants	higher dicots	Rubiaceae	<i>Richardia brasiliensis</i>	white eye	Y			2/1
plants	higher dicots	Rubiaceae	<i>Opercularia diphylla</i>			C		1
plants	higher dicots	Rubiaceae	<i>Spermacoce</i>			C		2
plants	higher dicots	Rubiaceae	<i>Spermacoce</i> sp. (Dislyn A.R.Bean 14098)			C		2/2
plants	higher dicots	Rubiaceae	<i>Asperula conferta</i>			C		1/1
plants	higher dicots	Rubiaceae	<i>Psydrax johnsonii</i>			C		2
plants	higher dicots	Rubiaceae	<i>Psydrax oleifolia</i>			C		1
plants	higher dicots	Rutaceae	<i>Zieria aspalathoides</i> subsp. <i>aspalathoides</i>			C		2/1
plants	higher dicots	Rutaceae	<i>Citrus glauca</i>			C		4
plants	higher dicots	Rutaceae	<i>Flindersia dissosperma</i>			C		3/1
plants	higher dicots	Rutaceae	<i>Geijera salicifolia</i>	brush wilga		C		1
plants	higher dicots	Rutaceae	<i>Geijera parviflora</i>	wilga		C		13
plants	higher dicots	Rutaceae	<i>Boronia duiganiae</i>			C		14/13
plants	higher dicots	Rutaceae	<i>Phebalium nottii</i>	pink phebalium		C		2/2
plants	higher dicots	Rutaceae	<i>Boronia obovata</i>			C		2/2
plants	higher dicots	Santalaceae	<i>Santalum acuminatum</i>	sweet quandong		C		2
plants	higher dicots	Santalaceae	<i>Exocarpos latifolius</i>			C		1
plants	higher dicots	Santalaceae	<i>Santalum lanceolatum</i>			C		5/1
plants	higher dicots	Sapindaceae	<i>Atalaya hemiglauca</i>			C		6
plants	higher dicots	Sapindaceae	<i>Dodonaea viscosa</i> subsp. <i>spatulata</i>			C		1
plants	higher dicots	Sapindaceae	<i>Cardiospermum halicacabum</i>		Y			1
plants	higher dicots	Sapindaceae	<i>Dodonaea stenophylla</i>			C		2/1
plants	higher dicots	Sapindaceae	<i>Dodonaea viscosa</i>			C		4
plants	higher dicots	Sapindaceae	<i>Alectryon diversifolius</i>	scrub boonaree		C		7
plants	higher dicots	Sapindaceae	<i>Dodonaea triangularis</i>			C		3
plants	higher dicots	Sapindaceae	<i>Dodonaea vestita</i>			C		1
plants	higher dicots	Sapotaceae	<i>Planchonella cotinifolia</i>			C		2
plants	higher dicots	Scrophulariaceae	<i>Eremophila debilis</i>	winter apple		C		6
plants	higher dicots	Scrophulariaceae	<i>Eremophila longifolia</i>	berrigan		C		1
plants	higher dicots	Scrophulariaceae	<i>Eremophila mitchellii</i>			C		6
plants	higher dicots	Scrophulariaceae	<i>Myoporum</i>			C		1

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plants	higher dicots	Scrophulariaceae	<i>Eremophila deserti</i>			C		1
plants	higher dicots	Scrophulariaceae	<i>Eremophila maculata</i>			C		4
plants	higher dicots	Sparrmanniaceae	<i>Grewia latifolia</i>	dysentery plant		C		14
plants	higher dicots	Sparrmanniaceae	<i>Corchorus tomentellus</i>			C		1/1
plants	higher dicots	Sparrmanniaceae	<i>Corchorus trilocularis</i>			C		6/4
plants	higher dicots	Sterculiaceae	<i>Brachychiton rupestris</i>			C		3
plants	higher dicots	Sterculiaceae	<i>Brachychiton populneus</i>			C		6
plants	higher dicots	Sterculiaceae	<i>Brachychiton bidwillii</i>	little kurrajong		C		1
plants	higher dicots	Sterculiaceae	<i>Brachychiton australis</i>	broad-leaved bottle tree		C		4
plants	higher dicots	Sterculiaceae	<i>Sterculia quadrifida</i>	peanut tree		C		1
plants	higher dicots	Stylidiaceae	<i>Stylidium eglandulosum</i>			C		1/1
plants	higher dicots	Stylidiaceae	<i>Stylidium eriorhizum</i>			C		1/1
plants	higher dicots	Surianaceae	<i>Cadellia pentastylis</i>	ooline		V	V	1/1
plants	higher dicots	Thymelaeaceae	<i>Pimelea decora</i>			C		2
plants	higher dicots	Thymelaeaceae	<i>Pimelea haematostachya</i>			C		5/3
plants	higher dicots	Thymelaeaceae	<i>Pimelea linifolia</i>			C		1/1
plants	higher dicots	Thymelaeaceae	<i>Pimelea strigosa</i>			C		1/1
plants	higher dicots	Ulmaceae	<i>Celtis sinensis</i>	Chinese elm	Y			1
plants	higher dicots	Violaceae	<i>Afrohybanthus enneaspermus</i>			C		3/2
plants	higher dicots	Violaceae	<i>Afrohybanthus stellarioides</i>			C		1
plants	higher dicots	Viscaceae	<i>Viscum articulatum</i>	flat mistletoe		C		1/1
plants	higher dicots	Viscaceae	<i>Notothixos incanus</i>			C		2/2
plants	higher dicots	Vitaceae	<i>Clematicissus opaca</i>			C		3
plants	higher dicots	Vitaceae	<i>Cissus oblonga</i>			C		1/1
plants	higher dicots	Zygophyllaceae	<i>Tribulus micrococcus</i>	yellow vine		C		2/2
plants	higher dicots	Zygophyllaceae	<i>Tribulus terrestris</i>	caltrop		C		1
plants	lower dicots	Apocynaceae	<i>Parsonsia</i>			C		1
plants	lower dicots	Apocynaceae	<i>Carissa ovata</i>	currantbush		C		7
plants	lower dicots	Apocynaceae	<i>Tylophora erecta</i>			C		1/1
plants	lower dicots	Apocynaceae	<i>Secamone elliptica</i>			C		1
plants	lower dicots	Apocynaceae	<i>Alstonia constricta</i>	bitterbark		C		10/1
plants	lower dicots	Apocynaceae	<i>Parsonsia straminea</i>	monkey rope		C		1
plants	lower dicots	Apocynaceae	<i>Cynanchum viminalis subsp. brunonianum</i>			C		1/1
plants	lower dicots	Apocynaceae	<i>Marsdenia microlepis</i>			C		1
plants	lower dicots	Apocynaceae	<i>Parsonsia lanceolata</i>	northern silkpod		C		2
plants	lower dicots	Apocynaceae	<i>Cynanchum floribundum</i>			C		1
plants	lower dicots	Apocynaceae	<i>Marsdenia viridiflora</i>			C		1
plants	lower dicots	Apocynaceae	<i>Cryptostegia grandiflora</i>	rubber vine	Y			1/1
plants	lower dicots	Apocynaceae	<i>Parsonsia eucalyptophylla</i>	gargaloo		C		1
plants	lower dicots	Apocynaceae	<i>Marsdenia brevifolia</i>			V	V	3/3
plants	lower dicots	Aristolochiaceae	<i>Aristolochia meridionalis subsp. centralis</i>			C		1/1
plants	lower dicots	Boraginaceae	<i>Ehretia membranifolia</i>	weeping koda		C		5
plants	lower dicots	Boraginaceae	<i>Trichodesma zeylanicum</i>			C		2
plants	lower dicots	Boraginaceae	<i>Heliotropium brachygyne</i>			C		2/1
plants	lower dicots	Boraginaceae	<i>Heliotropium amplexicaule</i>	blue heliotrope	Y			1/1
plants	lower dicots	Boraginaceae	<i>Trichodesma zeylanicum var. zeylanicum</i>			C		5/5

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plants	lower dicots	Convolvulaceae	<i>Ipomoea polymorpha</i>			C		1
plants	lower dicots	Convolvulaceae	<i>Polymeria</i>			C		1/1
plants	lower dicots	Convolvulaceae	<i>Ipomoea plebeia</i>	bellvine		C		2/1
plants	lower dicots	Convolvulaceae	<i>Polymeria pusilla</i>			C		3
plants	lower dicots	Convolvulaceae	<i>Polymeria calycina</i>	pink bindweed		C		1
plants	lower dicots	Convolvulaceae	<i>Evolvulus alsinoides</i> var. <i>decumbens</i>			C		1/1
plants	lower dicots	Convolvulaceae	<i>Convolvulus graminetinus</i>			C		3/3
plants	lower dicots	Convolvulaceae	<i>Convolvulus erubescens</i>	Australian bindweed		C		5
plants	lower dicots	Convolvulaceae	<i>Polymeria longifolia</i>	polymeria		C		1/1
plants	lower dicots	Convolvulaceae	<i>Ipomoea lonchophylla</i>			C		5/2
plants	lower dicots	Convolvulaceae	<i>Evolvulus alsinoides</i>			C		6
plants	lower dicots	Convolvulaceae	<i>Polymeria marginata</i>			C		1/1
plants	lower dicots	Convolvulaceae	<i>Ipomoea argillicola</i>			C		1
plants	lower dicots	Gentianaceae	<i>Schenkia australis</i>			C		1/1
plants	lower dicots	Lamiaceae	<i>Prostanthera cryptandroides</i> subsp. <i>euphrasioides</i>			C		1/1
plants	lower dicots	Lamiaceae	<i>Plectranthus parviflorus</i>			C		3/2
plants	lower dicots	Lamiaceae	<i>Clerodendrum floribundum</i>			C		3
plants	lower dicots	Lamiaceae	<i>Teucrium integrifolium</i>			C		3/1
plants	lower dicots	Lamiaceae	<i>Basilicum polystachyon</i>			C		7/3
plants	lower dicots	Lamiaceae	<i>Chloanthes parviflora</i>			C		2/2
plants	lower dicots	Lamiaceae	<i>Teucrium daucoides</i>			C		1
plants	lower dicots	Lamiaceae	<i>Teucrium junceum</i>			C		2
plants	lower dicots	Lamiaceae	<i>Ajuga australis</i>	Australian bugle		C		5/4
plants	lower dicots	Lamiaceae	<i>Plectranthus</i>			C		1
plants	lower dicots	Lamiaceae	<i>Salvia reflexa</i>		Y			1/1
plants	lower dicots	Linderniaceae	<i>Lindernia</i>			C		1/1
plants	lower dicots	Papaveraceae	<i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	Mexican poppy	Y			3
plants	lower dicots	Papaveraceae	<i>Argemone ochroleuca</i>		Y			1
plants	lower dicots	Phrymaceae	<i>Glossostigma diandrum</i>			C		1/1
plants	lower dicots	Solanaceae	<i>Solanum seaforthianum</i>	Brazilian nightshade	Y			1
plants	lower dicots	Solanaceae	<i>Solanum</i>			C		1
plants	lower dicots	Solanaceae	<i>Solanum esuriale</i>	quena		C		1/1
plants	lower dicots	Solanaceae	<i>Physalis angulata</i>		Y			1/1
plants	lower dicots	Solanaceae	<i>Physalis peruviana</i>		Y			1
plants	lower dicots	Solanaceae	<i>Nicotiana megalosiphon</i> subsp. <i>megalosiphon</i>			C		1/1
plants	lower dicots	Solanaceae	<i>Nicotiana megalosiphon</i>			C		1
plants	lower dicots	Solanaceae	<i>Solanum mitchellianum</i>			C		1/1
plants	lower dicots	Solanaceae	<i>Physalis lanceifolia</i>		Y			4/4
plants	lower dicots	Solanaceae	<i>Datura leichhardtii</i>	native thornapple	Y			1/1
plants	lower dicots	Solanaceae	<i>Solanum ellipticum</i>	potato bush		C		5/2
plants	lower dicots	Verbenaceae	<i>Verbena macrostachya</i>			C		1/1
plants	lower dicots	Verbenaceae	<i>Glandularia aristigera</i>		Y			2
plants	lower dicots	Verbenaceae	<i>Verbena gaudichaudii</i>			C		1/1
plants	lower dicots	Verbenaceae	<i>Verbena bonariensis</i>	purpletop	Y			3
plants	lower dicots	Verbenaceae	<i>Verbena africana</i>			C		5/5
plants	monocots	Agavaceae	<i>Agave vivipara</i> var. <i>vivipara</i>		Y			1/1

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plants	monocots	Amaryllidaceae	<i>Crinum flaccidum</i>	Murray lily		C		2
plants	monocots	Amaryllidaceae	<i>Crinum</i>			C		2
plants	monocots	Asphodelaceae	<i>Bulbine bulbosa</i>	golden lily		C		1/1
plants	monocots	Commelinaceae	<i>Commelina lanceolata</i>			C		2/2
plants	monocots	Commelinaceae	<i>Commelina diffusa</i>	wandering jew		C		3
plants	monocots	Commelinaceae	<i>Commelina ensifolia</i>	scurvy grass		C		3/1
plants	monocots	Cyperaceae	<i>Cyperus exaltatus</i>	tall flatsedge		C		2/1
plants	monocots	Cyperaceae	<i>Cyperus rotundus</i>	nutgrass	Y			5
plants	monocots	Cyperaceae	<i>Eleocharis plana</i>	ribbed spikerush		C		2/2
plants	monocots	Cyperaceae	<i>Cyperus betchei</i> subsp. <i>betchei</i>			C		1/1
plants	monocots	Cyperaceae	<i>Cyperus dactylotes</i>			C		1/1
plants	monocots	Cyperaceae	<i>Cyperus esculentus</i>	yellow nutgrass	Y			1
plants	monocots	Cyperaceae	<i>Cyperus squarrosus</i>	bearded flatsedge		C		1
plants	monocots	Cyperaceae	<i>Eleocharis atricha</i>	tuber spikerush		C		1/1
plants	monocots	Cyperaceae	<i>Eleocharis pallens</i>	pale spikerush		C		2/2
plants	monocots	Cyperaceae	<i>Scleria sphacelata</i>			C		5
plants	monocots	Cyperaceae	<i>Cyperus victoriensis</i>			C		1/1
plants	monocots	Cyperaceae	<i>Scleria mackaviensis</i>			C		2
plants	monocots	Cyperaceae	<i>Eleocharis equisetina</i>			C		1
plants	monocots	Cyperaceae	<i>Eleocharis sphacelata</i>	tall spikerush		C		2/1
plants	monocots	Cyperaceae	<i>Eleocharis tetraquetra</i>			C		1/1
plants	monocots	Cyperaceae	<i>Fimbristylis dichotoma</i>	common fringe-rush		C		5/1
plants	monocots	Cyperaceae	<i>Fimbristylis microcarya</i>			C		1/1
plants	monocots	Cyperaceae	<i>Eleocharis cylindrostachys</i>			C		1
plants	monocots	Cyperaceae	<i>Eleocharis dulcis</i>			C		3/1
plants	monocots	Cyperaceae	<i>Cyperus javanicus</i>			C		1/1
plants	monocots	Cyperaceae	<i>Cyperus</i>			C		2
plants	monocots	Cyperaceae	<i>Eleocharis</i>			C		1
plants	monocots	Cyperaceae	<i>Carex inversa</i>	knob sedge		C		2/1
plants	monocots	Cyperaceae	<i>Cyperus bifax</i>	western nutgrass		C		7/6
plants	monocots	Cyperaceae	<i>Cyperus clarus</i>			V		2/2
plants	monocots	Cyperaceae	<i>Cyperus fulvus</i>			C		6/1
plants	monocots	Cyperaceae	<i>Cyperus gilesii</i>			C		3/1
plants	monocots	Cyperaceae	<i>Cyperus flavidus</i>			C		1
plants	monocots	Cyperaceae	<i>Cyperus gracilis</i>			C		13/2
plants	monocots	Cyperaceae	<i>Cyperus difformis</i>	rice sedge		C		3/2
plants	monocots	Hemerocallidaceae	<i>Dianella brevipedunculata</i>			C		2
plants	monocots	Hemerocallidaceae	<i>Dianella longifolia</i>			C		5/2
plants	monocots	Hemerocallidaceae	<i>Dianella caerulea</i>			C		3/2
plants	monocots	Hemerocallidaceae	<i>Dianella revoluta</i>			C		1/1
plants	monocots	Hemerocallidaceae	<i>Dianella</i>			C		1
plants	monocots	Hydrocharitaceae	<i>Vallisneria nana</i>			C		1/1
plants	monocots	Hypoxidaceae	<i>Hypoxis arillacea</i>			C		3/2
plants	monocots	Johnsoniaceae	<i>Caesia parviflora</i>			C		1/1
plants	monocots	Johnsoniaceae	<i>Tricoryne elatior</i>	yellow autumn lily		C		1
plants	monocots	Juncaceae	<i>Juncus flavidus</i>			C		1

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plants	monocots	Juncaceae	<i>Juncus usitatus</i>			C		1/1
plants	monocots	Juncaginaceae	<i>Cycnogeton procerus</i>			C		1/1
plants	monocots	Juncaginaceae	<i>Cycnogeton dubius</i>			C		1/1
plants	monocots	Laxmanniaceae	<i>Lomandra multiflora subsp. multiflora</i>			C		6/1
plants	monocots	Laxmanniaceae	<i>Lomandra leucocephala</i>			C		3
plants	monocots	Laxmanniaceae	<i>Lomandra confertifolia subsp. pallida</i>			C		3
plants	monocots	Laxmanniaceae	<i>Lomandra filiformis subsp. filiformis</i>			C		1/1
plants	monocots	Laxmanniaceae	<i>Eustrephus latifolius</i>	wombat berry		C		3
plants	monocots	Laxmanniaceae	<i>Lomandra</i>			C		1
plants	monocots	Laxmanniaceae	<i>Lomandra glauca</i>	pale matrush		C		1/1
plants	monocots	Laxmanniaceae	<i>Laxmannia gracilis</i>	slender wire lily		C		2/2
plants	monocots	Laxmanniaceae	<i>Lomandra filiformis</i>			C		2
plants	monocots	Laxmanniaceae	<i>Lomandra longifolia</i>			C		6
plants	monocots	Laxmanniaceae	<i>Lomandra multiflora</i>			C		4
plants	monocots	Maundiaceae	<i>Maundia triglochoides</i>			V		2
plants	monocots	Orchidaceae	<i>Cymbidium canaliculatum</i>			C		4
plants	monocots	Poaceae	<i>Capillipedium spicigerum</i>	spicytop		C		2
plants	monocots	Poaceae	<i>Sporobolus australasicus</i>			C		1
plants	monocots	Poaceae	<i>Bothriochloa erianthoides</i>	satintop grass		C		11/5
plants	monocots	Poaceae	<i>Digitaria divaricatissima</i>	spreading umbrella grass		C		10/5
plants	monocots	Poaceae	<i>Dichanthium queenslandicum</i>			V	E	13/12
plants	monocots	Poaceae	<i>Eriochloa pseudoacrotricha</i>			C		11/4
plants	monocots	Poaceae	<i>Hyparrhenia rufa subsp. rufa</i>		Y			1/1
plants	monocots	Poaceae	<i>Cynodon dactylon var. dactylon</i>		Y			1/1
plants	monocots	Poaceae	<i>Aristida calycina var. calycina</i>			C		3
plants	monocots	Poaceae	<i>Dinebra decipiens var. asthenes</i>			C		4/3
plants	monocots	Poaceae	<i>Aristida holathera var. holathera</i>			C		3/1
plants	monocots	Poaceae	<i>Chloris divaricata var. divaricata</i>	slender chloris		C		14/4
plants	monocots	Poaceae	<i>Bothriochloa bladhii subsp. bladhii</i>			C		2/2
plants	monocots	Poaceae	<i>Megathyrsus maximus var. pubiglumis</i>		Y			1
plants	monocots	Poaceae	<i>Urochloa panicoides var. panicoides</i>		Y			3/3
plants	monocots	Poaceae	<i>Dichanthium sericeum subsp. humilium</i>			C		1/1
plants	monocots	Poaceae	<i>Dichanthium sericeum subsp. sericeum</i>			C		11/5
plants	monocots	Poaceae	<i>Bothriochloa decipiens var. decipiens</i>			C		5
plants	monocots	Poaceae	<i>Aristida queenslandica var. dissimilis</i>			C		3/1
plants	monocots	Poaceae	<i>Panicum decompositum var. decompositum</i>			C		8/3
plants	monocots	Poaceae	<i>Panicum queenslandicum var. acuminatum</i>			C		1/1
plants	monocots	Poaceae	<i>Aristida jerichoensis var. jerichoensis</i>			C		3/1
plants	monocots	Poaceae	<i>Aristida queenslandica var. queenslandica</i>			C		2
plants	monocots	Poaceae	<i>Panicum queenslandicum var. queenslandicum</i>			C		5
plants	monocots	Poaceae	<i>Digitaria divaricatissima var. divaricatissima</i>			C		5/5
plants	monocots	Poaceae	<i>Enneapogon gracilis</i>	slender nineawn		C		4
plants	monocots	Poaceae	<i>Enteropogon minutus</i>			C		1/1
plants	monocots	Poaceae	<i>Enteropogon ramosus</i>			C		2/2
plants	monocots	Poaceae	<i>Eragrostis elongata</i>			C		3
plants	monocots	Poaceae	<i>Eriochloa fatmensis</i>			C		2/1

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plants	monocots	Poaceae	<i>Imperata cylindrica</i>	blady grass		C		2
plants	monocots	Poaceae	<i>Leptochloa digitata</i>			C		9/5
plants	monocots	Poaceae	<i>Megathyrsus maximus</i>		Y			7
plants	monocots	Poaceae	<i>Panicum larcomianum</i>			C		2/1
plants	monocots	Poaceae	<i>Paspalidium distans</i>	shotgrass		C		1/1
plants	monocots	Poaceae	<i>Paspalidium gracile</i>	slender panic		C		6
plants	monocots	Poaceae	<i>Tragus australianus</i>	small burr grass		C		7/1
plants	monocots	Poaceae	<i>Urochloa panicoides</i>		Y			1
plants	monocots	Poaceae	<i>Bothriochloa bladhii</i>			C		5
plants	monocots	Poaceae	<i>Brachyachne ciliaris</i>	hairy native couch		C		5
plants	monocots	Poaceae	<i>Cymbopogon refractus</i>	barbed-wire grass		C		14/1
plants	monocots	Poaceae	<i>Dichanthium fecundum</i>	curly bluegrass		C		1/1
plants	monocots	Poaceae	<i>Dichanthium sericeum</i>			C		3
plants	monocots	Poaceae	<i>Enneapogon truncatus</i>			C		4/1
plants	monocots	Poaceae	<i>Eragrostis lacunaria</i>	purple lovegrass		C		1
plants	monocots	Poaceae	<i>Iseilema macratherum</i>			C		1/1
plants	monocots	Poaceae	<i>Sporobolus elongatus</i>			C		2
plants	monocots	Poaceae	<i>Sporobolus scabridus</i>			C		2
plants	monocots	Poaceae	<i>Themeda quadrivalvis</i>	grader grass	Y			1
plants	monocots	Poaceae	<i>Tripogon loliiformis</i>	five minute grass		C		3/1
plants	monocots	Poaceae	<i>Alloteropsis cimicina</i>			C		2/1
plants	monocots	Poaceae	<i>Cymbopogon bombycinus</i>	silky oilgrass		C		2/1
plants	monocots	Poaceae	<i>Dichanthium annulatum</i>	sheda grass	Y			2/1
plants	monocots	Poaceae	<i>Dichanthium aristatum</i>	angleton grass	Y			3/2
plants	monocots	Poaceae	<i>Digitaria breviglumis</i>			C		3
plants	monocots	Poaceae	<i>Eragrostis leptocarpa</i>	drooping lovegrass		C		1
plants	monocots	Poaceae	<i>Eragrostis parviflora</i>	weeping lovegrass		C		1/1
plants	monocots	Poaceae	<i>Eremochloa bimaculata</i>	poverty grass		C		2
plants	monocots	Poaceae	<i>Heteropogon contortus</i>	black speargrass		C		27/2
plants	monocots	Poaceae	<i>Iseilema membranaceum</i>	small flinders grass		C		1/1
plants	monocots	Poaceae	<i>Iseilema vaginiflorum</i>	red flinders grass		C		10/1
plants	monocots	Poaceae	<i>Setaria australiensis</i>	scrub pigeon grass		C		2/2
plants	monocots	Poaceae	<i>Sporobolus mitchellii</i>	rat's tail couch		C		6/2
plants	monocots	Poaceae	<i>Aristida caput-medusae</i>			C		4
plants	monocots	Poaceae	<i>Aristida queenslandica</i>			C		3
plants	monocots	Poaceae	<i>Arundinella nepalensis</i>	reedgrass		C		5
plants	monocots	Poaceae	<i>Bothriochloa decipiens</i>			C		4
plants	monocots	Poaceae	<i>Bothriochloa ewartiana</i>	desert bluegrass		C		4/2
plants	monocots	Poaceae	<i>Brachyachne convergens</i>	common native couch		C		3/2
plants	monocots	Poaceae	<i>Cleistochloa subjuncea</i>			C		3/1
plants	monocots	Poaceae	<i>Enneapogon cylindricus</i>	jointed nineawn		C		4
plants	monocots	Poaceae	<i>Enneapogon lindleyanus</i>			C		7/1
plants	monocots	Poaceae	<i>Enneapogon polyphyllus</i>	leafy nineawn		C		2/2
plants	monocots	Poaceae	<i>Enteropogon acicularis</i>	curly windmill grass		C		3
plants	monocots	Poaceae	<i>Enteropogon unispiceus</i>			C		1
plants	monocots	Poaceae	<i>Eragrostis cilianensis</i>		Y			5/1

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plants	monocots	Poaceae	<i>Eragrostis trichophora</i>		Y			2/2
plants	monocots	Poaceae	<i>Moorochloa eruciformis</i>		Y			4/4
plants	monocots	Poaceae	<i>Panicum queenslandicum</i>			C		7
plants	monocots	Poaceae	<i>Paspalidium criniforme</i>			C		6/5
plants	monocots	Poaceae	<i>Paspalidium globoideum</i>	sago grass		C		9/1
plants	monocots	Poaceae	<i>Paspalidium jubiflorum</i>	warrego grass		C		2/2
plants	monocots	Poaceae	<i>Anthosachne plurinervis</i>			C		2/2
plants	monocots	Poaceae	<i>Dactyloctenium australe</i>	sweet smother grass	Y			1
plants	monocots	Poaceae	<i>Dactyloctenium radulans</i>	button grass		C		2
plants	monocots	Poaceae	<i>Enneapogon purpurascens</i>			C		2
plants	monocots	Poaceae	<i>Eragrostis leptostachya</i>			C		5/1
plants	monocots	Poaceae	<i>Paspalidium caespitosum</i>	brigalow grass		C		3
plants	monocots	Poaceae	<i>Austrostipa verticillata</i>	slender bamboo grass		C		1
plants	monocots	Poaceae	<i>Panicum decompositum</i>			C		4
plants	monocots	Poaceae	<i>Aristida</i>			C		2
plants	monocots	Poaceae	<i>Paspalum</i>			C		2
plants	monocots	Poaceae	<i>Eriochloa</i>			C		1
plants	monocots	Poaceae	<i>Paspalidium</i>			C		5
plants	monocots	Poaceae	<i>Bothriochloa</i>			C		1
plants	monocots	Poaceae	<i>Perotis rara</i>	comet grass		C		4/1
plants	monocots	Poaceae	<i>Eriachne rara</i>			C		1
plants	monocots	Poaceae	<i>Eulalia aurea</i>	silky browntop		C		10/1
plants	monocots	Poaceae	<i>Aristida annua</i>			V	V	1/1
plants	monocots	Poaceae	<i>Melinis repens</i>	red natal grass	Y			14/1
plants	monocots	Poaceae	<i>Aristida ramosa</i>	purple wiregrass		C		7/1
plants	monocots	Poaceae	<i>Aristida vagans</i>			C		2
plants	monocots	Poaceae	<i>Chloris inflata</i>	purpletop chloris	Y			1
plants	monocots	Poaceae	<i>Chloris virgata</i>	feathertop rhodes grass	Y			2/1
plants	monocots	Poaceae	<i>Panicum effusum</i>			C		8
plants	monocots	Poaceae	<i>Setaria surgens</i>			C		3/1
plants	monocots	Poaceae	<i>Sorghum bicolor</i>	forage sorghum	Y			2/1
plants	monocots	Poaceae	<i>Sorghum nitidum</i>			C		1
plants	monocots	Poaceae	<i>Sorghum x alnum</i>		Y			2/2
plants	monocots	Poaceae	<i>Cynodon dactylon</i>		Y			6
plants	monocots	Poaceae	<i>Eriochloa crebra</i>	spring grass		C		5/3
plants	monocots	Poaceae	<i>Sarga leiocladum</i>			C		2/2
plants	monocots	Poaceae	<i>Themeda avenacea</i>			C		2/1
plants	monocots	Poaceae	<i>Themeda triandra</i>	kangaroo grass		C		4
plants	monocots	Poaceae	<i>Urochloa gilesii</i>			C		2
plants	monocots	Poaceae	<i>Aristida contorta</i>	bunched kerosene grass		C		2
plants	monocots	Poaceae	<i>Aristida echinata</i>			C		1/1
plants	monocots	Poaceae	<i>Cenchrus ciliaris</i>		Y			15/1
plants	monocots	Poaceae	<i>Dichanthium tenue</i>	small bluegrass		C		1
plants	monocots	Poaceae	<i>Digitaria brownii</i>			C		3/1
plants	monocots	Poaceae	<i>Digitaria diffusa</i>			C		1
plants	monocots	Poaceae	<i>Dinebra decipiens</i>			C		4

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	monocots	Poaceae	<i>Eriochloa procera</i>	slender cupgrass		C		4/3
plants	monocots	Poaceae	<i>Sorghum halepense</i>	Johnson grass	Y			4/1
plants	monocots	Poaceae	<i>Sporobolus caroli</i>	fairy grass		C		6
plants	monocots	Poaceae	<i>Sporobolus creber</i>			C		8/3
plants	monocots	Poaceae	<i>Thellungia advena</i>	coolibah grass		C		6/3
plants	monocots	Poaceae	<i>Urochloa piligera</i>			C		1
plants	monocots	Poaceae	<i>Aristida latifolia</i>	feathertop wiregrass		C		12/3
plants	monocots	Poaceae	<i>Aristida lazaridis</i>			C		2/2
plants	monocots	Poaceae	<i>Aristida leptopoda</i>	white speargrass		C		11/3
plants	monocots	Poaceae	<i>Aristida personata</i>			C		6/2
plants	monocots	Poaceae	<i>Astrebula squarrosa</i>	bull mitchell grass		C		2/1
plants	monocots	Poaceae	<i>Cenchrus echinatus</i>	Mossman River grass	Y			1
plants	monocots	Poaceae	<i>Chloris ventricosa</i>	tall chloris		C		6/1
plants	monocots	Poaceae	<i>Chrysopogon fallax</i>			C		5
plants	monocots	Poaceae	<i>Digitaria ciliaris</i>	summer grass	Y			1
plants	monocots	Poaceae	<i>Digitaria eriantha</i>		Y			1/1
plants	monocots	Poaceae	<i>Digitaria porrecta</i>				NT	10/10
plants	monocots	Poaceae	<i>Echinochloa colona</i>	awnless barnyard grass	Y			5/2
plants	monocots	Poaceae	<i>Eragrostis brownii</i>	Brown's lovegrass		C		9/1
plants	monocots	Poaceae	<i>Eragrostis dielsii</i>	mallee lovegrass		C		1
plants	monocots	Poaceae	<i>Eragrostis sororia</i>			C		3/2
plants	monocots	Poaceae	<i>Eriachne mucronata</i>			C		4
plants	monocots	Poaceae	<i>Setaria incrassata</i>		Y			2/2
plants	monocots	Poaceae	<i>Triodia mitchellii</i>	buck spinifex		C		3/2
plants	monocots	Poaceae	<i>Aristida gracilipes</i>			C		5
plants	monocots	Poaceae	<i>Brachyachne tenella</i>			C		1/1
plants	monocots	Poaceae	<i>Chrysopogon filipes</i>			C		2
plants	monocots	Poaceae	<i>Cymbopogon obtectus</i>			C		1
plants	monocots	Poaceae	<i>Dichanthium setosum</i>			C	V	6/6
plants	monocots	Poaceae	<i>Digitaria ramularis</i>			C		1
plants	monocots	Pontederiaceae	<i>Monochoria cyanea</i>			C		1/1
plants	monocots	Xanthorrhoeaceae	<i>Xanthorrhoea johnsonii</i>			C		1
plants	mosses	Pottiaceae	<i>Barbula calycina</i>			C		1/1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*. The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ().

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999*. The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).

This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.

This number is output as 999 if it equals or exceeds this value.

APPENDIX J

Cultural Survey Report

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CULTURAL HERITAGE SURVEY AND SALVAGE

METEOR DOWNS SOUTH RAIL AND TRAIN LOADING PROJECT

CENTRAL QUEENSLAND

by
Susan Davies

for
Spinifex Pty Ltd

May 2019

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1.0 INTRODUCTION

This report details the results of Cultural Heritage Survey and Salvage undertaken within two defined Work Areas within Meteor Downs South Rail and Train Loading Project for U & D Mining. The Terms of Reference for the Cultural Heritage Survey and Salvage are described in the Work Program issued on the 30th April, 2019 to the Karingbal.

2.0 DESCRIPTION OF THE WORK AREAS

As noted in Section 1.0, the Survey and Salvage was undertaken with two defined Work Areas within Lot 2 SP187945 and Lot 56 DSN808. The Work Areas comprise:

1. Proposed Boundary; and
2. Infrastructure.

These two Work Areas are highlighted on **Figure 1** and described in Sub-sections 2.1 and 2.2.

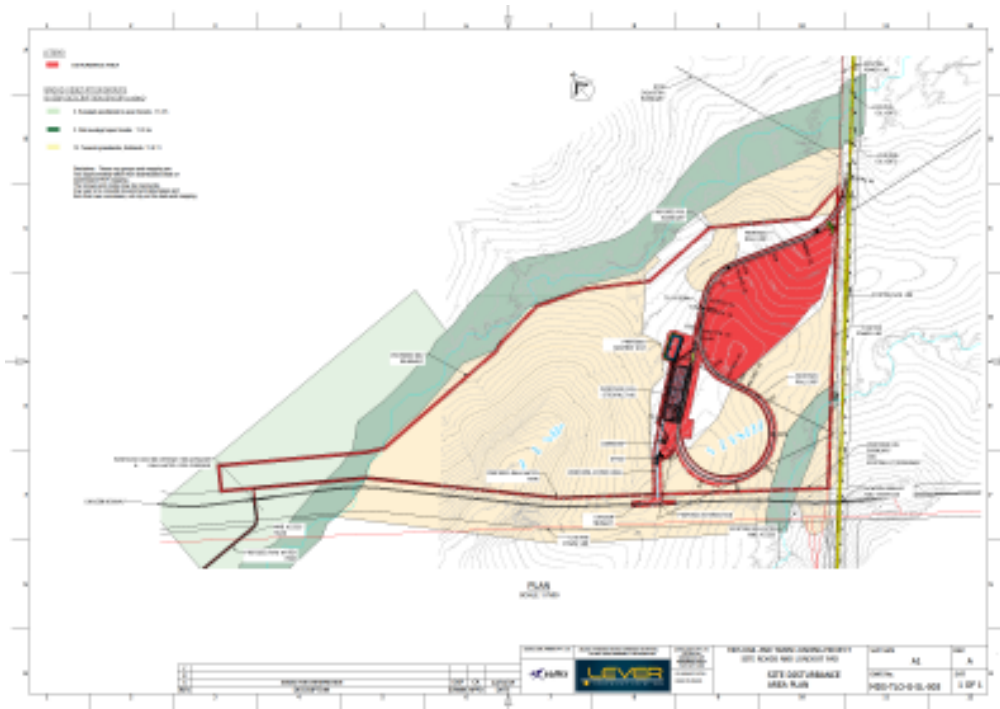


Figure 1. Plan of Work Areas

2.1 Proposed Boundary

Total length of Proposed Boundary (Work Area 1) is around 10.1kms and width is 20m. The position of the Proposed Boundary is highlighted in **Figure 2** and the coordinates and length of sections along the Proposed Boundary is provided in **Table 1**.

Table 1. Proposed Boundary

PROPOSED BOUNDARY	START	END	LENGTH (kms)
Eastern	647554 / 7303902	646299 / 7302506	1.88
Southwestern	646299 / 7302506	643375 / 7304939	3.82
Western	643375 / 7304939	643464 / 7305065	0.15
Northern	643464 / 7305065	647554 / 7303902	4.23
TOTAL			10.08



Figure 2. Work Areas

2.2 Infrastructure

The Infrastructure Work Area (Work Area 2) includes a Rail Loop, Sediment Dam, Stockpile Pad, Workshop, Office and Access Road in Intersection with the Dawson Highway (see **Figure 2**). The Infrastructure Work Area is an irregular shape extending from 647696 / 7303985 in the northeast (where the rail loop connects to an existing rail line) to the south west at 645409 / 7303106 where the Access Road intersects with the Dawson Highway, a distance of around 2.45kms. The width is variable; in the south the width is around 230m, while in the north the width is around 750m. The southern portion of the rail loop is around 1.25kms long and approximately 60m wide.

2.3 Survey Areas

These two Work Areas form two Survey Areas with Survey Area 1 comprising the majority of the Proposed Boundary and Survey Area 2 incorporating part of the Proposed Boundary with the Infrastructure Area. The two Survey Areas are described below in Sub-sections 2.3.1 and 2.3.2.

2.3.1 Survey Area 1 (SA1)

Survey Area 1 comprises part of the Proposed Boundary commencing at 647105 / 7303371 in the southeast to 647046 / 7304059 in the northeast, a distance of around nine kilometers. A buffer 10m either side of the Proposed Boundary was included in the Survey and Salvage resulting in a total width of 40m and area of around 36ha (see **Figure 3**).



Figure 3. Survey Area 1

2.3.2 Survey Area 2 (SA2)

Survey Area 2 comprises the Infrastructure Area as well as the northeastern portion of the Proposed Boundary. A buffer from 10m to 20m around Survey Area 2 was included in the Survey and Salvage resulting in a total area of around 104ha (see **Figure 4**).



Figure 4. Survey Area 2

2.3.3 Environment of Survey Areas

The terrain within the Survey Areas is typically flat to very gently undulating with two ephemeral drainage lines. It is unlikely that either of these drainage lines holds water after heavy rains. Soils are primarily black soils. Some of the soils are gravel free while other soils have gravel / stone and cobbles of variable sizes. Vegetation which has been subjected to initial and ongoing clearance is now typically grasses and isolated regrowth

trees and shrubs. A large portion of Survey Area 2 has been cultivated with cattle fodder and contour banks are present in this area (see **Figure 4**). The Proposed Boundary abuts an existing rail line and to the immediate west of the rail line an overhead power line has been installed. The top layers of the ground surface along the majority of this area have been removed (see Sub-section 4.3).

2.3.4 Previously Recorded Cultural Heritage

A Search Request of the Cultural Heritage Sites Database submitted to the Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP) by Spinifex Pty Ltd revealed that no previously recorded sites are located specifically within the two Survey Areas.

2.4 Summary

In summary, the total size of the Work Areas / Survey Areas is approximately 104ha. The terrain has been subjected to considerable ground surface disturbance from initial and ongoing vegetation clearance, cultivation, establishment of contour banks and installation of an overhead power line. No previously recorded Cultural Heritage Sites are present within the Survey Areas.

3.0 CH SURVEY AND SALVAGE BACKGROUND

This Section of the report provides information in relation to Aboriginal Cultural Heritage (ACH) Sites, ACH Site Definition and ACH Site Recording and Collection.

3.1 CH Sites

Aboriginal Cultural Heritage Sites (ACH Sites) can be divided into two broad categories; archaeological and cultural (which includes resources). Although Aboriginal people may have exploited all parts of the terrain present within the two Work Areas which is the subject of the CH Works, their activities will only be reflected in the **archaeological** record if there are physical remains (Archaeological Cultural Heritage Sites – ACH Sites). However, many sites of significance to Aboriginal people do not contain such remains (cultural sites). During the survey period the Karingbal will advise if such sites are present within the two Work Areas (see Sub-section 5.2).

3.2 ACH Site Definition

Within the study region stone artefacts occur not only as concentrations of material but also in places as an almost continuous scatter across the landscape. This continuous scatter is generally referred to as “background scatter”. For the purpose of the CH Clearance Survey and Salvage an **archaeological** “stone artefact scatter” was defined as a concentration of stone artefactual material which was high, relative to the background density of similar types of artefactual material at that (or similar) points across the landscape (Hiscock 1985:30). Hence, “stone artefact scatters” were only defined when all the following criteria applied (Hiscock 1985:30):

1. more than 5 stone artefacts occurring as a cluster
2. 2/m² or more in area
3. average stone artefact density is more than 4x the average density of the background scatter
4. average density is more than 0.5/m²

Where this criterion was not met the stone artefact material was referred to as background scatter. All other site types were recorded as sites (e.g. scarred trees, raw material source areas [quarries], etc.). It must be noted that the above archaeological criteria used to define a “stone artefact scatter” is often irrelevant to the Traditional Owners as their understanding of ‘background scatter’ and ‘stone artefact scatter’ do not often coincide with the archaeological definition.

Discreteness of stone artefact scatters, raw material source areas and areas of background scatter (for example) was determined by defining a site as being spaced a distance of more than 25m from the nearest other location exhibiting evidence of past Aboriginal activity. If, however, cultural material (less than 25m apart) was separated by a creek or gully, then this was regarded as two sites.

The identification of stone artefacts in the field was based on the presence of one or more diagnostic features such as a bulb of percussion, erillure scar, striking platform, negative flake scar/s and a range of other features which distinguish pieces of stone as

being humanly modified. Pieces of stone that lacked one or all of the above diagnostic features but were believed to be artefactual (i.e. a manuport transported to the site) would also be classified. Such pieces are relatively rare and are generally identified after detailed research of the site area. An example of a manuport would be a stone of a particular type of lithic material that was not locally available.

It was considered that caution should be applied when identifying scars on trees as being of past Aboriginal activities. There are non-cultural reasons that a tree can be scarred (e.g. lightning strike, fire, branch throw, machinery impact, damage from flood debris, impact from falling branches or other trees, etc). However, a number of criteria can be used to distinguish culturally derived scarring. Such criteria include (see Aboriginal Heritage Unit n.d.):

- maturity of tree, particularly for pre-contact scarring;
- generally regularly shaped, elongated, oval scar;
- the termination of the scar before the ground level;
- the exposed heartwood does not exhibit major irregularities;
- there is no evidence that a branch was present at the top of the scar; and
- axe marks should be present at the top or base of the scar. The axe marks may be either from stone axes or metal axes (post-contact site).

3.3 ACH Site Recording and Collection

All ACH Sites located during the CH Clearance Survey and Salvage were recorded. Information recorded included northing and easting of location, ACH Site type, site description, site area, environmental setting and site integrity. For ACH Sites comprising stone artefacts, lithic raw material and artefact types and measurement of artefacts are documented. If scarred trees are present, the tree height and girth will be recorded as well as the shape, size, etc. of the scar.

Site location was recorded with a Garmin GPSmap 78s hand held GPS unit using GDA. For each Survey Area site numbering commenced at “1” and was preceded by the initials of the project (“MDS”; Meteor Downs South) followed by the Survey Area reference (e.g. SA1). Hence, for example, the first ACH Site within Survey Area 1 was numbered MDS/SA1-1.

After each ACH Site was recorded, the stone artefacts were collected and placed in a labeled sealable bag with the date, project name and ACH site number clearly marked on the bag. At the completion of the field component of each work day, the artefacts were described and measured and the collected information logged in a database (see **Appendix 1**). At the completion of the CH Clearance Survey and Salvage and as required by the Karingbal, the collected artefacts were deposited in a nominated “No Go Area” which is outside of Lot 2 SP187945 and Lot 56 DSN808 but within EPC1517 (see Sub-section 6.2).

4.0 CH SURVEY AND SALVAGE METHODOLOGY

This Section of the report documents the conduct of the CH Survey and Salvage, the Survey Methodology and Survey Conditions.

4.1 Conduct of CH Survey and Salvage

The CH Survey and Salvage was undertaken over two and a half work days (14th, 16th and 17th May, 2019). The CH Survey and Salvage team comprised three Karingbal Traditional Owner Representatives (TOR), two Spinifex Pty Ltd Field Representative (Ellis White and Tom Forde) and Archaeologist (Su Davies). The Karingbal TOR's present during the CH Clearance Survey and Salvage were:

- Susan Albury;
- Darren McLeod; and
- Sandra Sigbart.

4.2 Survey Methodology

Two survey methods were utilized; for Survey Area 1 the two Spinifex Representatives walked the outside margin of the typically 40m-wide Proposed Boundary and the Archaeologist and TORs spread out in a straight line between the Spinifex Representatives.

The survey method for Survey Area 2 was straight line transects spaced 75m apart. The Spinifex Field Representative walked the centerline (determined by GPS coordinates) of each transect and the survey team was equally spaced out from the centerline to cover the 75m-wide transect width.

For the survey within Survey Area 1 and 2, the Archaeologist and TOR's zigzagged across the Transect width so more effective survey coverage was achieved. The TORs communicated with the archaeologist regarding ACH Sites and when ACH Sites were located or identified they were recorded and the artefacts collected as described in Sub-section 3.3.

Survey Area 1 was completed on the 15th May and the survey of Survey Area 2 was undertaken on the 15th, 16th and 17th May, 2019.

4.3 Survey Conditions

Variable ground surface visibility conditions were present throughout the two Survey Areas. Primarily poor to medium ground surface visibility was present; with minimal areas having good ground surface visibility (see **Plates 1 to 4**). Within some areas, particularly the eastern portion of the Proposed Boundary, the ground surface had been removed down to the B soil horizon.



Plate 1. Area where Surface Layer of Soil had been Removed



Plate 2. Medium Ground Surface Visibility



Plate 3. Medium Ground Surface Visibility in Area of Cultivation



Plate 4. Patches of Good Ground Surface Visibility

5.0 CH SURVEY AND SALVAGE RESULTS

This Section of the report documents the results of the CH Clearance Survey and Salvage including transects walked and ACH Sites recorded and collected.

5.1 Transects

An overall total of 31 transects were surveyed with a total distance of 25.270kms. The transects within Survey Area 1 (1 transect) and Survey Area 2 (30 transects) are discussed separately below in Sub-sections 5.1.1 and 5.1.2.

The northeastern extent of Survey Area 2 incorporated terrain within the existing rail line corridor (see **Figures 1 and 2**). However, transects were not walked within the existing rail line corridor as the terrain in this corridor has been excavated to a depth of (at least) more than one metre.

5.1.1 Survey Area 1

One 9km (approximately) long transect was surveyed in Survey Area 1 (see **Figure 5** and **Table 2**).

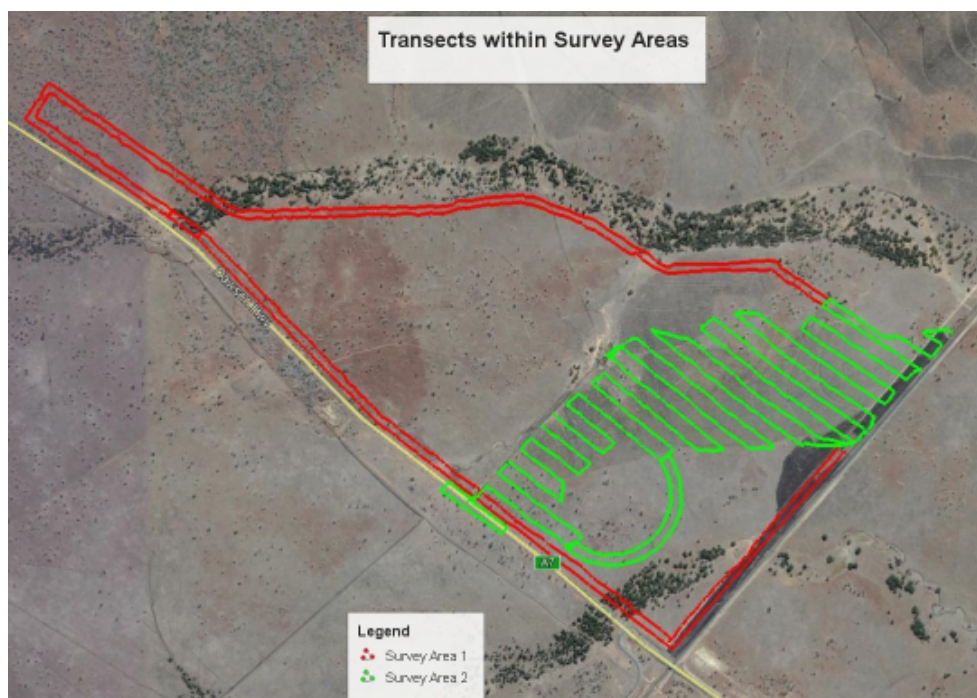


Figure 5. Transects within Survey Areas

5.1.2 Survey Area 2

A total of 30 transects with a total approximate distance of 16.270kms were surveyed within Survey Area 2 (see **Table 2** and **Figure 6**). The coordinates provided below in **Table 2** mark the start and end from the center point of each Transect. Transects 27 and 28 were not straight with Transect 27 curving slightly to the north and Transect 28 forming an angle (see **Figure 5**).

Table 2. Transect Details

DATE	WORK AREA	TRANSECT No.	TRANSECT START	TRANSECT FINISH	DISTANCE (m)		
15/5/2019	SA1	1	647105 / 7303371	647046 / 7304059	9000		
	SA2	1	645244 / 7303213	645520 / 7303010	340		
		2	645286 / 7303257	645554 / 7303048	340		
		3	645456 / 7303228	645833 / 7302943	470		
		4	645895 / 7302995	645509 / 7303288	480		
		5	645562 / 7303342	645802 / 7303157	300		
		6	645809 / 7303247	645611 / 7303396	250		
		7	645660 / 7303447	645878 / 7303282	270		
	8	645931 / 7303328	645712 / 7303501	280			
16/5/2019	SA2	9	645767 / 7303553	645994 / 7303376	290		
		10	646045 / 7303419	645827 / 7303600	280		
		11	645886 / 7303646	646262 / 7303339	490		
		12	646317 / 7303387	645944 / 7303694	480		
		13	646004 / 7303742	646433 / 7303383	570		
		14	646551 / 7303387	646012 / 7303821	700		
		15	646080 / 7303858	646673 / 7303389	760		
		16	646785 / 7303395	646154 / 7303839	820		
		17	646895 / 7303411	646218 / 7303936	880		
		18	646376 / 7303897	646995 / 7303431	890		
		19	647150 / 7303413	646446 / 7303945	890		
		20	646510 / 7303985	647200 / 7303469	880		
		21	647244 / 7303519	646606 / 7304005	810		
		22	646724 / 7304003	647297 / 7303584	710		
		23	647345 / 7303640	646913 / 7303934	530		
		24	646962 / 7303984	647398 / 7303695	530		
		25	647465 / 7303741	647012 / 7304035	540		
		26	647044 / 7304066	647516 / 7303797	550		
		27	647565 / 7303853	647476 / 7303909	100		
		28	647565 / 7303853 to 647612 / 7303906	647476 / 7303909	140		
		17/5/2019	SA2	Loop Transect 1	645817 / 7302945	646297 / 7303368	930
				Loop Transect 2	646261 / 7303341	645866 / 7302968	770
		TOTALS		31			25.270

5.2 ACH Sites

A total of 23 ACH Sites were recorded during the survey (see **Table 3** and **Figure 6**). A total of eight were recorded and collected from Survey Area 1 and 15 were recorded and collected from Survey Area 2. The sites comprised 23 isolated stone artefacts. A record of each artefact collected from the 23 ACH Sites is contained within **Appendix 1** and photos of the artefacts within each ACH site are contained in **Appendix 2**.

During the survey the Karingbal did not advise the presence of any Cultural Sites within the two Survey Areas (see Sub-section 3.1).

Table 3. ACH Sites

ACH SITE	SITE TYPE	LOCATION COORDINATES
MDS/SA1-1	Isolated Stone Artefact	646480 / 7302716
MDS/SA1-2	Isolated Stone Artefact	645815 / 7302856
MDS/SA1-3	Isolated Stone Artefact	645264 / 7303310
MDS/SA1-4	Isolated Stone Artefact	645098 / 7303426
MDS/SA1-5	Isolated Stone Artefact	644864 / 7303636
MDS/SA1-6	Isolated Stone Artefact	644587 / 7303936
MDS/SA1-7	Isolated Stone Artefact	644579 / 7304475
MDS/SA1-8	Isolated Stone Artefact	645272 / 7304499
MDS/SA2-1	Isolated Stone Artefact	645786 / 7303168
MDS/SA2-2	Isolated Stone Artefact	645915 / 7303422
MDS/SA2-3	Isolated Stone Artefact	646025 / 7303436
MDS/SA2-4	Isolated Stone Artefact	645926 / 7303515
MDS/SA2-5	Isolated Stone Artefact	645971 / 7303579
MDS/SA2-6	Isolated Stone Artefact	646286 / 7303413
MDS/SA2-7	Isolated Stone Artefact	646485 / 7303621
MDS/SA2-8	Isolated Stone Artefact	646311 / 7303796
MDS/SA2-9	Isolated Stone Artefact	646495 / 7303793
MDS/SA2-10	Isolated Stone Artefact	646776 / 7303701
MDS/SA2-11	Isolated Stone Artefact	647205 / 7303556
MDS/SA2-12	Isolated Stone Artefact	646677 / 7303947
MDS/SA2-13	Isolated Stone Artefact	646997 / 7303865
MDS/SA2-14	Isolated Stone Artefact	647050 / 7304065
MDS/SA2-15	Isolated Stone Artefact	645984 / 7302856

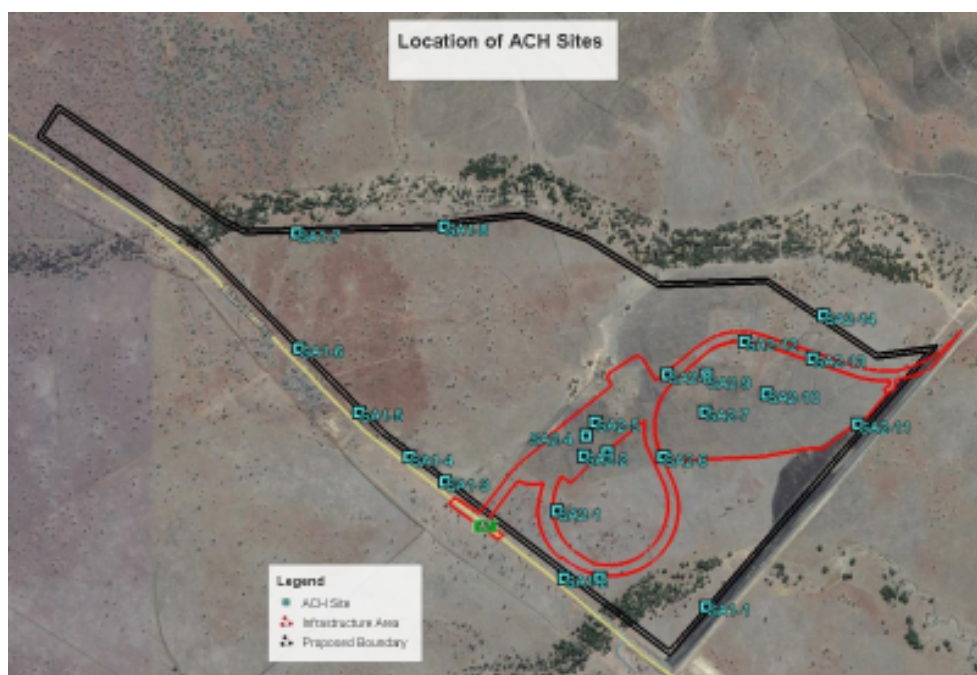


Figure 6. ACH Site Location

6.0 DISCUSSION OF RESULTS

Following is a discussion of the results of the CH Survey and Salvage undertaken within Lot 2 SP187945 and Lot 56 DSN808.

6.1 ACH Sites

Relevant site variables of the recorded and salvaged 23 ACH Sites are discussed below. Given the context within which a percentage of the artefacts were located (i.e. terrain that has been impacted by several episodes of ground surface disturbance by machinery) there is a potential that the negative scars on several of the artefacts are the result of impact by machinery.

6.1.1 Site Types

Only one archaeological site type was recorded during the CH Survey and Salvage: isolated stone artefacts (n=23; 100.0%).

It would seem that the dominant archaeological expression is isolated stone artefacts. A description of this site type recorded during the CH Survey and Salvage follows.

6.1.1.1 Isolated Stone Artefacts

The 23 isolated artefacts comprised 13 (56.6%) flakes, eight (34.8%) cores, one (4.3%) scraper and one (4.3%) blade (see **Table 4**). The cores comprised six (75.0%) single platform cores and two (25.0%) multi-platform cores. This is considered to be an extremely restricted range of stone artefact types.

Four different types of lithic material were present. Silcretes were the dominant lithic type (n=13; 56.6%) followed by chert (n=8; 34.8%), chalcedony (n=1; 4.3%) and volcanic material (n=1; 4.3%) (see **Table 5**).

Table 4. Isolated Artefact Types

ACH SITE No	FLAKE	SCRAPER	BLADE	CORES		TOTAL
				S	M	
MDS/SA1-1				1		
MDS/SA1-2			1			
MDS/SA1-3				1		
MDS/SA1-4				1		
MDS/SA1-5					1	
MDS/SA1-6					1	
MDS/SA1-7	1					
MDS/SA1-8	1					
MDS/SA2-1		1				
MDS/SA2-2	1					
MDS/SA2-3	1					
MDS/SA2-4				1		
MDS/SA2-5	1					
MDS/SA2-6	1					
MDS/SA2-7	1					
MDS/SA2-8	1					
MDS/SA2-9	1					
MDS/SA2-10	1					
MDS/SA2-11	1					
MDS/SA2-12				1		
MDS/SA2-13	1					
MDS/SA2-14	1					
MDS/SA2-15				1		
	13 56.6%	1 4.3%	1 4.3%	6 26.1%	2 8.7%	23

S=Single Platform; M=Multi-platform

Table 5. Isolated Artefact Lithic Types

ACH Site No	SILCRETE	CHERT	CHALCEDONY	VOLCANIC	TOTAL
MDS/SA1-1	1				
MDS/SA1-2	1				
MDS/SA1-3	1				
MDS/SA1-4	1				
MDS/SA1-5	1				
MDS/SA1-6			1		
MDS/SA1-7	1				
MDS/SA1-8	1				
MDS/SA2-1	1				
MDS/SA2-2		1			
MDS/SA2-3		1			
MDS/SA2-4	1				
MDS/SA2-5		1			
MDS/SA2-6		1			
MDS/SA2-7	1				
MDS/SA2-8		1			
MDS/SA2-9	1				
MDS/SA2-10		1			
MDS/SA2-11	1				
MDS/SA2-12		1			
MDS/SA2-13		1			
MDS/SA2-14	1				
MDS/SA2-15				1	
	13 56.6%	8 34.8%	1 4.3%	1 4.3%	23

Retouch (n=3; 13.0%) and platform preparation (n=4; 17.4%) and were evident on seven (30.4%) of the collected artefacts. It is calculated that 73.9% (n=17) of the artefacts exhibited cortex on one or more surfaces, one artefact (MDS/SA2-2) was a primary flake (see **Table 6**). Overall 21 (91.3%) of the collected artefacts exhibited retouch, platform preparation or (primarily) cortex.

Table 6. Artefact Features

ACH Site No	RETOUCH	PP	CORTEX	TOTAL
MDS/SA1-1			1	1
MDS/SA1-2	1	1		1
MDS/SA1-3			1	1
MDS/SA1-4			1	1
MDS/SA1-5			1	1
MDS/SA1-6			1	1
MDS/SA1-7	1		1	1
MDS/SA1-8			1	1
MDS/SA2-1	1	1		1
MDS/SA2-2			1	1
MDS/SA2-3			1	1
MDS/SA2-4			1	1
MDS/SA2-5			1	1
MDS/SA2-6			1	1
MDS/SA2-7			1	1
MDS/SA2-9		1		1
MDS/SA2-10		1		1
MDS/SA2-11			1	1
MDS/SA2-12			1	1
MDS/SA2-14			1	1
MDS/SA2-15			1	1
	3 13.0%	4 17.4%	17 73.9%	21 91.3%

PP=Platform Preparation

6.1.1.2 General Discussion

A limited variety of artefact types, lithic raw material and manufacturing techniques was observed on stone artefacts collected from the Survey Areas. The primary artefact type was flakes (n=13; 56.6%) followed by cores (n=8; 34.8%) with a much lower frequency of blades (n=1; 4.3%) and scrapers (n=1; 4.3%). Other than the blade and scraper, no other formal artefact types were collected. Blades are flakes that are twice as long as they are wide and typically with a ridge down the spine of the dorsal surface indicating that they are from a prepared core. Core preparation involves the systematic lateral preparation of the knapping face of the core. The collected blade did have a distinctive ridge on the dorsal surface and it is likely it was flaked off a prepared core.

A scraper is a flake or core with one or more margins of continuous retouch. Scrapers can be round-edged, steep-edged, flat-edged and concave and nosed (and include types such as thumbnail scrapers). Steep-edged scrapers are generally manufactured from thick flake blanks (or cores) with short, robust edges that are both steep and stepped. Edge angles are high, usually greater than 80° (Holdaway and Stern 2004:230). These artefacts were generally used for chiselling, cutting, gouging or planing wood. One thumbnail scraper was collected as an isolate within Survey Area 2.

The most prevalent lithic material utilized was silcretes (n=13; 90.0%) followed by chert (n=8; 5.8%), volcanic material (n=1; 1.1%) and chalcedony (n=1; 1.1%).

It is considered that these artefacts are indicative of an infrequent and narrow range of subsistence activities being undertaken; possibly restricted to the maintenance of material culture items and possibly resource exploitation. In particular, the large size of the artefacts in general, but particularly the cores suggest that cobbles on the surface were used as a lithic source. However, it would seem that cobbles were being broken open to assess the quality of material and then removed from the area for further reduction with the result that flakes with a high percentage of cortex on the dorsal surface remained (73.9% of the collected artefact exhibited cortex on one or more surfaces). There was no evidence of further reduction of the cores within the area where the cobbles were available (i.e. a high percentage of secondary flakes and flaked pieces).

This assumption is also supported by the manufacturing techniques observed on the artefacts. Manufacturing techniques could include platform preparation, retouch, bipolar flaking, heat treatment, hafting and core preparation. However, observations only detected three manufacturing techniques being utilised. The observed techniques were platform preparation, retouch and core preparation.

Platform preparation refers to the preparation of the platform on a core by removing the rim of the platform (overhang removal) before the flake is struck off the core. The use of this technique is often regarded as indicating that precise control of the flaking process was required (see Holdaway and Stern 2004:145). The overall parentage of artefacts exhibiting platform preparation was only 17.4% (n=4).

Retouch is a technique which is used to sharpen an edge, create a steep angle on an edge or to alter the shape of the flake. Retouch occurs when an artefact is reflaked after initial removal from a core. It is usually identified by small negative flake scars along the lateral or distal margins of a flake or the presence of negative scars on the ventral surface of the flake. Initiation of the retouch can be described as unifacial, bifacial and backing and the shape of the retouch can be described as stepped, scalar, invasive, notched and serrated. The angle of the retouched edge is also relevant (e.g. flat or steep). Holdaway and Stern (2004:165) note that descriptions of retouched edges may provide information about the extent of tool reuse, which in turn may be used to assess the intensity of site occupation. As only 13.0% (n=3) of the total number of artefacts collected from the Survey Areas exhibited retouch, it could therefore be assumed that there was a low intensity of occupation.

Core preparation involves the systematic lateral preparation on the knapping face of the core.

In summary, it is considered that there is an extremely restricted range of manufacturing techniques evident from the stone artefacts collected from the Survey Areas.

None of the recorded sites contained a non-stone component (e.g. bone, fresh water shell fragments or charcoal [from hearths]).

6.1.2 Site Distribution

The ACH Sites were located on relatively flat featureless terrain. As noted in Sub-section 2.3.3, there was a lack of permanent or even reliable water courses within the Survey Areas. Hence, the distribution pattern was not related to this feature. However, in parts of Survey Areas, cobbles were present on the ground surface; ACH Site density was primarily in such areas.

6.1.3 Site Size

This variable is not applicable for the 23 isolated stone artefacts.

6.1.4 Site Integrity

Site integrity is a property of the archaeological record concerned with the degree of preservation represented by a given deposit (site) (Dancey 1981:20). Site preservation is affected by both cultural and non-cultural processes, for example post-colonisation development and/or erosion. Sites least affected by such processes may contain significant information regarding the occupation of that site. Where disturbance is extensive there is a greater likelihood that information has been destroyed. Hence, the research potential of such disturbed sites is reduced.

It is considered that all archaeological material recorded and collected within the Survey Areas were located in an environment with varying degrees ground surface disturbance from both natural (sheet wash; flooding episodes, erosion, etc) and cultural (initial and ongoing vegetation clearance, cultivation, formation of contour banks, installation of overhead power line which the removal of topsoil in some areas, borrow pits and other prior land use practices); all CH Sites were in areas disturbed by one or more of these processes. Hence, it is considered that all CH Sites recorded would not have any degree of integrity.

6.1.5 Site Structure

Site structure refers to factors such as stratification, size and patterning of archaeological material within a site. As artefacts and soils accumulate at a given place the resulting deposit may attain a layered appearance. Where layering (stratification) occurs the bottom layer is generally older than the top layer. Thus, stratified sites offer the possibility of detecting changes in the cultural deposit through time. Larger sites may indicate major campsites which may have been occupied over generations, or intensively by larger groups. Internal site patterning may indicate distinctive activities undertaken at a site, or other preferences of site use or organisation.

Given the size and lack of integrity of the archaeological material (see Sub-section 6.1.4), it is unlikely that site structure would be present. It is also highly unlikely that stratification would be present.

6.1.6 Contents Variability

Contents variability refers to the range of materials observed within the site areas. This includes raw material, artefact form and manufacturing technique evidenced by the stone artefacts, as well as any non-stone component (e.g. bone, shell, and charcoal). However, as contents variability is not applicable for isolated stone artefacts this variable is not discussed further.

6.1.7 Potential Archaeological Deposits (PAD)

No definitive areas where this potential could be present were identified within the Survey Areas. Nevertheless, due to natural processes some artefacts may be covered by soils (which at a later date may be exposed by natural processes). However, given the results of the CH Survey and Salvage, if such sub-surface material were present they would most likely be isolated or low density background scatters and locating this type of archaeological material would be fortuitous.

6.1.8 Chronology

The archaeological material recorded during the survey does not have the potential to provide datable material.

6.1.9 Scientific (Archaeological) Significance

Based on the information provided in the above Sub-sections, the 23 isolated stone artefacts recorded during the CH Survey and Salvage appear to be of low research potential (i.e. they do not exhibit site integrity, site structure [including internal patterning] or a diversity of remains) and hence would have negligible scientific (archaeological) significance values. The recording of the location and type of stone artefact undertaken during the CH Survey and Salvage at present constitutes the knowledge likely to be gained from these sites.

6.2 Synopsis

The 23 ACH Sites recorded during the CH Survey and Salvage within the Survey Areas are considered to have low scientific (archaeological) values; it is considered the recording of these sites (i.e. site location and site contents) undertaken during the CH Survey and Salvage would be adequate to ensure that information regarding site placement and site content is available. The collected artefacts (see **Appendix 1** and **2**) provide a relevant source of data for further archaeological analysis and research if required by the Aboriginal Party.

The ACH Sites present and the density of these sites confirm that the terrain within the Survey Areas was traversed in the past by Aboriginal people. Resources may have been exploited and site content and artefact density suggests that this visitation pattern would have been typically short term and intermittent. The types of stone artefacts suggest that

site use was not intensive with indication that some lithic procurement and possibly artefact maintenance occurred. It is also considered that suitable lithic material from the Survey Areas was transported to another location (outside of the Survey Areas) for further reduction. It is considered that the effective coverage of the CH Survey and Salvage was adequate and provided satisfactory data on which such an assumption can be based.

Although only 23 ACH Sites were recorded within the Survey Areas, there is still a low potential that further ACH Sites may be present (undetected during the CH Survey and Salvage as a result of factors such as poor ground surface visibility and effective coverage). However, if surface cultural heritage material is present it would most likely be isolated in nature (i.e. isolated stone artefacts of bounded areas of background scatter). That is, survey coverage would have identified areas where extensive sites are present.. There is also a negligible potential for the presence of archaeological deposits (PADs).

If cultural heritage is uncovered within the Survey Areas at a latter date, this eventuality should be addressed by reference to the Meteor Downs South Project CHMP.

All stone artefacts collected from the ACH Sites within the Survey Areas were deposited within the nominated “No Go Area” (see Sub-section 3.3; **Figure 7**) at 642225 / 7305120. At the request of the Karingbal representatives, the artefacts were removed from the collection bags before being deposited at this location. The “No Go Area” is a nominated 30m diameter area centered on 642225 / 7305116 and within EPC1517 (see **Figure 7**).



Figure 7. Location of “No Go Area” (yellow shading covers area of ML70452)

7.0 MONITOR AREAS

Monitor Areas are an area (based on the results of the CH Survey and Salvage) where there is a high probability that items of Cultural Heritage will be revealed in the course of Project Activities.

Based on the results of the CH Survey and Salvage, it is considered that there are no Monitor Areas present within the Survey Areas as described in Section 2.3.

8.0 CONCLUSION

It is considered that the CH Survey and Salvage has been completed within the Survey Areas as defined in Section 2.3. A total of 23 ACH Sites have been recorded and 23 stone artefacts have been collected and placed in the nominated “No Go Area” within EPC1517. Monitor Areas were not identified during the CH Survey and Salvage.

The main recommendation of the report, therefore, is:

- Should Aboriginal Cultural Heritage be found within the Survey Areas during Project Activities, the management and mitigation of such Cultural Heritage must be dealt with by reference to the Meteor Downs South Project CHMP.

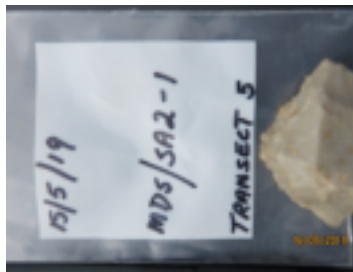
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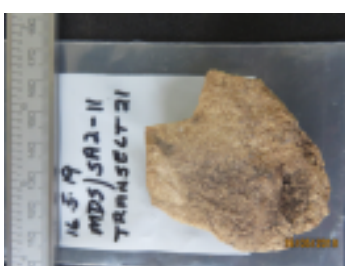
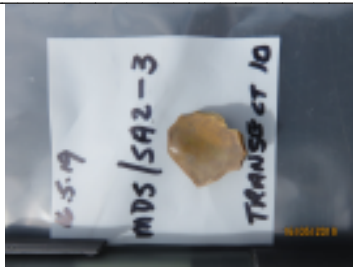
10.0 APPENDICES

10.1 Appendix 1: Stone Artefact Database

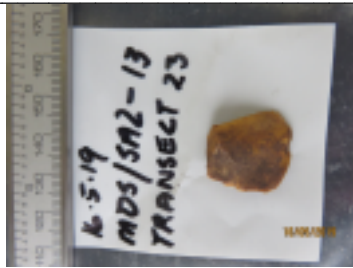
10.2 Appendix 2: Photo Record



CH Survey and Salvage – Meteor Downs South Rail and Train Loading Project



CH Survey and Salvage – Meteor Downs South Rail and Train Loading Project



APPENDIX K

Meteor Downs South Rehabilitation Management Plan



*Meteor Downs South Joint Venture
Managed by Sojitz MDS Mining Pty Ltd
A Sojitz Group Company*

Meteor Downs South Mine

Rehabilitation Management Plan

Version: 2.0 (10 December 2018)

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1 Introduction

Purpose

- 1 The purpose of this Rehabilitation Management Plan (RMP) is to describe the standard for planning, management and monitoring of progressive rehabilitation at the Meteor Downs South Mine (MDS) to meet the requirements of **Environmental Authority EPML00559513 - Meteor Downs South Coal Mine (EA EPML00559513)**.
- 2 Schedule 2 - Table H1 of **EA EPML00559513** specifies the content of a Rehabilitation Management Plan (RMP).
- 3 *Table H1 Rehabilitation Goals, Indicators and Completion Criteria* from Schedule 2 of **EA EPML00559513** is reproduced in Appendix 1.

Scope

- 4 This RMP describes rehabilitation of project related disturbances authorised by **EA EPML00559513** on land within ML70452.
- 5 This RMP does not address in detail waste rock management, water management and monitoring, erosion and sediment control, topsoil management (stripping, stockpiling and/or placement) or decommissioning of regulated structures, as these are addressed in other plans required by **EA EPML00559513**.

2 Regulatory Requirements

- 1 **EA EPML00559513** Condition H1 states that: "Land disturbed by mining must be rehabilitated in accordance with Schedule 2 - Table H1: Rehabilitation Goals, Indicators and Completion Criteria, attached to this environmental authority."
- 2 **EA EPML00559513** Condition H2 states that: "Rehabilitation must commence progressively in accordance with the Plan of Operations."
- 3 Schedule 2 - Table H1 of **EA EPML00559513** specifies that the following must be included in the RMP:
 - a Design requirements for final landform construction for elevated landforms (including overburden dumps, quarry and sections of ROM/crushing and screening areas);
 - b Revegetation works for elevated landforms;
 - c Mine infrastructure areas (MIA) and infrastructure areas rehabilitation completion criteria; and
 - d Revegetation methods to be used on MIA and infrastructure areas.
- 4 A Plan of Operations for all relevant activities within ML70452 must be submitted to the administering authority describing (a) an action program for complying with the conditions of EA EPML00559513, (b) a rehabilitation program for land disturbed or proposed to be disturbed within ML70452, and (c) plans of proposed disturbance and rehabilitation within ML70452. The plan period can be no more than five years. The Plan of Operations sets out the amount of disturbance and rehabilitation to be undertaken in the Plan period.
- 5 In accordance with the *Environmental Protection Act 1994*, an Environmental Authority surrender application must be accompanied by a final rehabilitation report (FRR). An FRR must include enough information to allow the administering authority to decide whether the land on which each relevant activity for the environmental authority has been carried out has been satisfactorily rehabilitated. The FRR must also describe any ongoing environmental management needs for the land, state details of

the monitoring program, and the results of monitoring rehabilitation indicators required under any condition of the environmental authority. Any consultation with affected owners and occupiers, members of the public, community groups and government agencies must also be described in the FRR. In deciding a surrender application, the administering authority must consider the FRR and any monitoring results relating to the rehabilitated area that is the subject of the application. If a progressive certification has been given for a relevant tenure for the Environmental Authority the administering authority must confirm that the certified rehabilitated area still meets the criteria against which it was certified and if the confirmation is made, give full effect to the certification. Any certified rehabilitated areas at MDS will need to be considered at the time of the Environmental Authority surrender.

- 6 The completion criteria referred to in the Schedule 2 - Table H1 of [EA EPML00559513](#) refer to matters to be included in a Rehabilitation Report (which is taken to mean an FRR under the *Environmental Protection Act 1994*). The Rehabilitation Report is required to be completed by an appropriate and qualified person at the end of the mine life, in accordance with relevant guidelines and Australian Standards, to ensure successful rehabilitation of the final void and other landforms. Completion criteria in the Schedule 2 - Table H1 of [EA EPML00559513](#) require the Rehabilitation Report to include evidence of the following:
- a The final void water levels have remained similar to modelled scenarios and the risk of void overflow have been maintained as minimal where appropriate.
 - b Required waste management measures have been implemented (for Final Void domain).
 - c Rock lined drains on elevated landforms have remained stable.
 - d Reshaping of elevated sections of the landform have complied with the site's final landform design criteria.
 - e For elevated landforms:
 - i A benchmark erosion study has been conducted based on rainfall and sediment run-off rates in undisturbed region (to be conducted by qualified entity);
 - ii Drainage points have been established approximately every 50m on exposed slopes;
 - iii Spray-on barriers (mulch) have been applied if required;
 - iv Erosion rates similar to the surrounding undisturbed region have been achieved within 3 years of cessation of mining; and
 - v Results have shown that significant active erosion features are not present and that any initial erosion has been stabilised by vegetation cover.
 - f Revegetation techniques that have been utilised for elevated landforms.
 - g Decommissioning of mine infrastructure areas (MIA) and infrastructure areas.
 - h Erosion rates for MIA and infrastructure areas are compatible with the surrounding undisturbed region within 5 years of cessation of mining.
 - i Measured erosion rates for MIA and infrastructure areas have shown to be comparable to unmined land in the same locality.
 - j Significant active erosion features are not present and that any initial erosion has been stabilised by vegetation cover.
 - k Revegetation work with species forming the vegetation communities referenced in Table 5 of *Flora, Fauna and Freshwater Ecology Assessment of the Meteor Downs South Project, near Rolleston, Central Queensland* (Wormington, Tucker, Black and Campbell 2012).

3 Post Mining Land Use and Rehabilitation Objectives

- 1 The landform domains, long term final land use and rehabilitation objectives stated in Schedule 2 - Table H1 of [EA EPML00559513](#) are described in this section.

Landform Domains

- 2 Initial overburden material stripped during the mining process will be directed to out-of-pit dumps. Progressive backfilling of pits from which coal has been mined will commence once sufficient room becomes available to maintain safe in-pit mining operations. At the cessation of mining a final void shall remain as a significant feature of the post-mining landform.
- 3 The final landform will consist of the following landform domains:
 - a Final voids;
 - b Elevated landforms including overburden dumps, quarry site, sections of ROM/crushing and screening areas; and
 - c Mine infrastructure areas, including roads, and other infrastructure areas at the approximate original contour. The MIA will be located approximately 3km north of the pit, on an area of approximately 240m x 300m. An explosives storage magazine will be constructed to the east of the MIA area on a hardstand area of approximately 30m x 40m. A crushing and screening plant and ROM stockpile will be constructed adjacent to the MIA.
- 4 To support the construction of the roads and hardstand areas on site, a small quarry will be constructed and operated north-east of the MIA area. The quarry will cover approximately 47ha and will operate primarily during the construction phase of the MDS Project and then on an "as needs" basis throughout the life of the mine.

Post-Mining Land Use

- 5 Schedule 2 - Table H1 of [EA EPML00559513](#) describes the post mining land uses as:
 - a Self-sustaining native ecosystem (on elevated landforms);
 - b Low-intensity cattle grazing at the same standard as the pre-mining grazing activity (on MIA and infrastructure areas);
 - c Water storage (for residual voids); and
 - d Vegetation establishment that excludes cattle (areas between final void crest and safety bund walls).

Rehabilitation Goals and Objectives

- 6 The Queensland government's policy objectives for rehabilitation are described as "general rehabilitation goals" to distinguish them from the rehabilitation objectives selected by mining companies in their rehabilitation strategies for a particular mine. The rehabilitation program for a mine site must address the general rehabilitation goals and any relevant site-specific goals (DEHP 2014).
- 7 Schedule 2 - Table H1 of [EA EPML00559513](#) describes rehabilitation goals which are consistent with the Queensland government's general rehabilitation goals (DEHP 2014). These goals are that the rehabilitation of areas disturbed by mining will result in sites that are:
 - a safe to humans and wildlife;
 - b non-polluting;
 - c stable; and
 - d able to sustain an agreed post-mining land use.
- 8 Rehabilitation objectives for each landform domain and each rehabilitation goal are described in Schedule 2 - Table H1 of [EA EPML00559513](#) and presented in Table 1.

Table 1 Rehabilitation Goals and Objectives

Domain	Rehabilitation Goals	Rehabilitation Objectives
Final Void	Long-term safety	<ul style="list-style-type: none"> Site is safe for humans and animals now and in the foreseeable future.
	Non-polluting	<ul style="list-style-type: none"> Polluted water contained on site. Hazardous and toxic materials are not buried within the mine area.
	Stable	<ul style="list-style-type: none"> Very low probability of subsidence, slope slippage or degradation of the high wall. Landform design achieves appropriate erosion rates. Rates of soil loss will reduce over a three-year period post-closure to acceptable levels. Vegetation cover established on the low wall. Establish specified self-sustaining natural vegetation and habitats.
	Sustainable land use	<ul style="list-style-type: none"> Post-mine land use for the residual voids is water storage. Post-mine land use for areas between final void crest and safety bund walls is vegetation establishment, which excludes cattle.
Elevated Landforms	Long-term safety	<ul style="list-style-type: none"> Site is safe for humans and animals now and in the foreseeable future.
	Non-polluting	<ul style="list-style-type: none"> Hazardous overburden materials adequately handled. Tailings and rejects: Hazardous overburden materials adequately handled. Elimination of all permanent water storages on the site outside the final void.
	Stable	<ul style="list-style-type: none"> Very low probability of subsidence or slope slippage. Landform design achieves appropriate erosion rates. Vegetation cover to minimise erosion. Resilience to disturbance. A perennial, self-sustaining ground cover is maintained that is resilient to environmental stresses such as fire, drought and pest species is extensive enough to control erosion; and contributes to the integrity of constructed covers.
	Sustainable land use	<ul style="list-style-type: none"> Soil properties to support the final land use proposed to be a self-sustaining native ecosystem comprising of local native vegetation assemblages. Established specified self-sustaining natural vegetation and habitats. Establish land use with comparable management requirements to similarly used non-mined land.
MIA and Infrastructure areas	Long-term safety	<ul style="list-style-type: none"> Site is safe for humans and animals now and in the foreseeable future.
	Non-polluting	<ul style="list-style-type: none"> Hazardous material adequately handled. Polluted water contained on site.
	Stable	<ul style="list-style-type: none"> Very low probability of subsidence or slope failure. Landform design achieves appropriate erosion rates. Vegetation cover to minimise erosion and to re-establish the pre-mine agricultural capability.
	Sustainable land use	<ul style="list-style-type: none"> All infrastructure to be removed or retained where applicable. Soil properties to support eventual use as grazing land. Establish specified self-sustaining natural vegetation and habitats. Establish land use with comparable management requirements to similarly used non-mined land.

4 Rehabilitation Approach

- 1 Risk mitigation for post-mining landforms and final land uses recognise that completed areas of the waste dump are formed from unconsolidated sediments that carry a higher risk for erosion than the original undulating terrain formed on consolidated materials such as basalt flows. The dumping plan for non-basalt and basalt waste rock aims to dump sufficient basalt on the outer margins of dump batters such that only basalt is exposed after recontouring. In circumstances where sufficient basalt is unable to be dumped on the outer margins of dump batters prior to recontouring, basalt rock will be placed on final batter slopes to a minimum depth of about 0.5m.
- 2 The use of rock mulch in rehabilitation of waste dump batters offers an effective means of stabilizing steep slopes, particularly in conjunction with pastures and native trees/shrubs. The basalt rock will create a mulch layer and mimic steeper natural slope areas west of the mine lease that are underlain by a rock scree. Operations to the end of the mine life will encounter significant volumes of weathered and competent basalt strata. Salvage of competent basalt strata will allow the mine to apply competent rock mulch over final batters.
- 3 Application of this rock mulch methodology is enhanced via operational integration of excavation/dumping schedules for the selection and placement of basalt rock for final batter slopes thus greatly reducing the possible end of mine life liability to rock armour final batter slopes.
- 4 Topsoil will be applied to the rock mulch layer to a minimum depth of approximately 0.1m and deep ripped, to incorporate the topsoil with the underlying basalt. The basalt and topsoil mix will be seeded to a mix of shrub and tree species, including *Eucalyptus*, *Corymbia* and *Acacia* species that reflect Regional Ecosystems in the area with similar slope attributes. The seed mix will be applied to batter areas at a rate of about 15kg/ha. The aim of the rock mulch and topsoil mix is to create an inoculation and germination resource that reduces grass seed populations and associated competitive moisture impacts on tree seed.
- 5 Rock mulching operations will not be undertaken waste dump plateau areas and berms, and MIA and infrastructure areas with slopes of less than 5 %, as erosion risks are minimal. Topsoil will be applied at higher rates (to a minimum depth of approximately 0.4m) on these flatter areas.
- 6 Rehabilitation monitoring undertaken at other rock mulched batters in the Bowen Basin that are underlain by dispersive and erodible tertiary sediments have exhibited stem counts of up to 5,000 stems/ha for a range of *Eucalyptus*, *Corymbia* and *Acacia* species. As such, a dense ground cover comprising a mosaic of grass and tree species has been established. In addition, the surface integrity of these sites has remained intact as related to the extreme rainfall events of 2008, 2010, 2011 and 2012. This rehabilitation practice has been undertaken at Saraji, Callide, German Creek and Millenium mine sites.

5 Environmental Characteristics

- 1 This section describes environmental characteristics that influence rehabilitation design, planning, implementation and monitoring at MDS.

Geology

- 2 The geology within ML70452 consists of Quaternary alluvium and Tertiary basalt overlying Permian sedimentary rocks, which have the potential to contain economic coal seams. Alluvium primarily occurs along major drainage features (McCollum Environmental Management Services 2013). The general stratigraphy of the MDS deposit is detailed in Table 2.

Table 2 General Stratigraphy

Age	Formation	Lithology
Quaternary		Unconsolidated silt, clay, sand, gravel.
Tertiary		Generally unconsolidated sands and gravels. Fine grained basalt, andesites and vesicular basalt.
Triassic	Rewan Group	Fine grained sandstone and non-marine mudstone.
Upper Permian	Blackwater Group	Sandstone, carbonaceous siltstone, mudstone and shale, coal and interbedded sediment. Contains coal resources.
Upper Permian	Black Alley Shale	Distinctive hard black shale and siltstone. Useful marker horizon.

Source: McCollum Environmental Management Services 2013

Spoil Characteristics

- 3 Coal will be mined from one open-cut pit, located in the south-eastern corner of the mining lease, and accessed by a single central ramp. Open-cut strip mining using standard truck and excavator methods will be utilised to access coal reserves. These methods will typically require some blasting of overburden, with thickness of overburden to mineable coal generally 30-60m. Maximum overburden thickness is approximately 80m in the south eastern corner of the mining lease (McCollum Environmental Management Services 2013).
- 4 Overburden will initially be directed to the out-of-pit dumps until sufficient room becomes available to commence backfilling of mined pit areas. The out-of-pit dumps will remain active during pit backfilling to accommodate extra material that is unable to be dumped in-pit due to the volume constraints, particularly during early backfilling of shallow pit areas (McCollum Environmental Management Services 2013).
- 5 GSSE (2013) undertook preliminary acid base accounting of 87 overburden and coal/interburden samples. Other attributes assessed included electrical conductivity, ESP (Exchangeable Sodium Percentage) and CEC (Cation Exchange Capacity). The analysis results presented in GSSE (2013) were reviewed by Emmerton (2017) who recommended additional sampling and analysis. In January 2018 Alan Irving & Associates were commissioned to coordinate the recommended additional geochemical assessment. In March and April 2018, geochemical testing was carried out on a total of 32 samples representing the full range of waste rock to be encountered during mining.
- 6 Results of the analyses show that overburden materials that were not floor or roof material had a total S content less than 0.1% and were classified as non-acid forming (NAF). Generally the only materials with any propensity for acid generation were samples representing reject coal material or coal floor material. For all materials analysed, 1:5 salinity levels were classified as low (DME 1995a), with salinity generally in the range of 100 to 200µS/cm, with a maximum of 388µS/cm).
- 7 Exchangeable sodium percentage (ESP) levels in most samples were less than 12% and classified as low to medium sodicity (DME 1995a). An ESP of less than 12% is considered relatively low for waste rock and spoil in Central Queensland (Emmerton 2017). The ESP values for all materials analysed (except coal floor samples) are within the range considered suitable for secondary growth media, the lower layer of material placed directly below the topsoil (primary growth layer) but not directly used for establishment of vegetation (DME 1995b).
- 8 The calcium to magnesium ratios of the samples analysed are favourable to the maintenance of structure in the basaltic materials, while they are variable and generally low (ratio less than 2) in the Tertiary and Permian materials (Emmerton 2017). Cation exchange capacity (CEC) levels are generally high in the basaltic materials, while they are slightly lower (but still at good levels) in the Tertiary and Permian materials (Emmerton 2017).
- 9 Results of multi-element analysis of solids and leachates indicate that materials represented by the samples (including the potentially acid forming materials) are not enriched in key elements of

environmental concern, and it is unlikely that these materials will leach elevated concentrations of metals or metalloids.

- 10 The geochemical analysis results confirm basalt materials provide the most resilient surface cladding to prevent rill, sheet wash and gully development on waste rock dump slopes.
- 11 A Waste Rock Management Plan (WRMP) (Meteor Downs South Joint Venture 2018) was developed based on the results of the analyses, which are included in the WRMP. The WRMP was developed and implemented to provide an understanding of the characteristics of the materials disturbed by mining and identify management requirements, to meet the requirements of EA EMPL00559513. The aim of waste rock management at MDS is to assess and manage waste rock materials to minimise contamination of water and land such that waste rock emplacements are able to be rehabilitated to a stable landform that is non-polluting and safe to humans and animals.

Soils

- 12 GSSE conducted a soil and land study for the MDS Project (GSSE 2013) assessing pre-mining Agricultural Land Classes and land suitability.
- 13 ML 70452 covers an area of 1,606 ha. A soil survey of the area within ML 70452 found soil types ranged from shallow to deep uniform and gradational cracking clay soils on gently undulating to undulating plains. Soils have developed from Tertiary age basalt (GSSE 2013).
- 14 Most soil types were found to be suitable for salvage and re-use in rehabilitation works. Recommended maximum soil stripping depths generally ranged from 0.0 to 0.2 m for primary media (683,000 m³), and 0.1 to 0.6 m for secondary media (2,469,000 m³).
- 15 Approximately 80% of the disturbance footprint was assessed as having a moderate erosion hazard rating with the major factor influencing the severity of this hazard being soil erodibility.
- 16 Topsoil stripping, stockpiling and use in rehabilitation shall be managed in accordance with the *Meteor Downs South Topsoil Management Plan*.

Climate

- 17 The MDS site has a subtropical climate with moderately dry winters and wetter summers. Annual average rainfall is 638 millimetres with the majority of this rainfall falling in the summer months of December to February (Rolleston BOM station No. 035059, 2012). Mean maximum temperatures range from 22 degrees Celsius in July to 34.4 degrees in January (Rolleston BOM station No. 035059, 2012 and Springsure BOM station No. 035065). The seasonal cycle can be divided into two equal segments:
 - a A hot summer period from November to April during which the major part of the annual rainfall occurs; and
 - b A cool, marginally wet to dry winter period from May to October (GSSE 2013).

Pre-Mining Landform and Land Use

- 18 Topography over ML 70452 is relatively flat to gently undulating, with approximately 50m of relief across the area. Steeper topography occurs to the west of the site (McCollum Environmental Management Services 2013).
- 19 Pre-mining vegetation was defined as open savannah woodland predominantly covered with grasses. Most of the native vegetation had been cleared for agriculture and pasture grasses such as *Dichanthium sericeum* (Queensland Blue Grass) and *Heteropogon contortus* (Black Spear Grass) predominate (GSSE 2013).
- 20 The primary agricultural land use was identified as grazing native vegetation with relatively minor areas of secondary cropping (GSSE 2013).

- 21 Land within ML70452 was historically used for cattle breeding, with the land owned by AACo until November 2011, when it was purchased by Xstrata. With the exception of the Rolleston Coal Mine to the south, the properties adjoining the MDS site are predominantly large rural holdings used for grazing cattle on freehold or leasehold land (McCollum Environmental Management Services 2013).

Surface Water

- 22 WRM Water & Environment Pty Ltd (WRM) undertook a surface water impact assessment for the MDS Project (WRM 2013). The study describes the proposed surface water management controls for the MDS Project to mitigate potential impacts of the activities.
- 23 The MDS Project is located within the Fitzroy Basin. The watercourses in the area form part of the Comet River catchment, a major tributary of the Fitzroy River. Several small drainage paths located on the mining lease flow to Spring Creek in the south and Aldebaran Creek in the north, both of which drain into Meteor Creek (Spring Creek via Bootes Creek) which flows to the Comet River approximately 35km downstream of the MDS site. Current water quality information is limited (McCollum Environmental Management Services 2013).
- 24 Naroo Dam is located on the eastern side of the MDS site, approximately 1.5km north of Spring Creek. It is a man-made water storage with a capacity of approximately 930ML. Naroo Dam is currently being utilised for stock watering and is not identified as a wetland by DEHP mapping. The Rolleston Mine currently holds a licence to extract water from Naroo Dam.
- 25 A mine water management system has been designed to minimise the potential impacts on the water quality downstream of the MDS Project. The mine water management system will manage water in three types of catchments based on water quality:
- a 'Clean' – surface runoff from areas of the MDS Project Site where water quality is unaffected by mining operations. Clean water includes runoff from undisturbed areas;
 - b 'Dirty' – surface runoff water and seepage from the MDS Project Site areas that are disturbed by mining operations such as out of pit dump areas, workshop areas and roads. This runoff may contain silt and sediment however does not contain contaminated material or high salt concentrations. This runoff must be managed to ensure that downstream water quality is within the adopted water quality compliance criteria; and
 - c 'Contaminated' – surface water from areas affected by mining operations and potentially containing chemicals of various types used in the mining operations. There are restrictions on the use and release of this water. Contaminated water areas include sumps, stockpile areas, service bays and fuel storage areas. Rainfall and resulting runoff from these areas are also potentially contaminated and therefore must be managed to avoid discharge of potentially contaminated water into the natural water courses (McCollum Environmental Management Services 2013).
- 26 Establishing a revegetated cover on the overburden will be a key factor in controlling site drainage and managing runoff quality from the overburden dump.
- 27 EA Condition F22 requires a receiving environment monitoring program (REMP) to be developed and implemented to monitor, identify and describe any adverse impacts to surface water environmental values, quality and flows due to mining activities.
- 28 EA Condition F22 requires a Water Management Plan to be developed and implemented prior to the commencement of project stage 2. The Water Management Plan must include a water management system for the site, and measures to manage and prevent saline drainage and acid rock drainage.
- 29 EA Condition F37 requires an Erosion and Sediment Control Plan to be developed and implemented on the site to minimise erosion and the release of sediment to receiving waters and the contamination of stormwater.

Groundwater

- 30 Coffey Environments Australia Pty Ltd (Coffey) undertook a groundwater impact assessment for the MDS Project (Coffey 2012). The study described the groundwater regime of the MDS Project area and surrounding region and assessed the potential impacts of the MDS Project on the groundwater regime, associated environmental values and groundwater users in the area.
- 31 Three primary hydrogeological units have been identified in the area of the MDS Project:
 - a Tertiary basalt aquifers;
 - b Permian sandstone (coal bearing Bandana Formation) aquifers; and
 - c Black Alley Shale Bedrock aquifers (Coffey 2012).
- 32 Alluvium has been identified in the vicinity of the MDS Project site, primarily associated with major drainage features.
- 33 Coffey (2012) found any seepage from out-of-pit waste dumps would be expected to migrate to the pit as the dumps are located up-gradient of the active pit. As the pit and subsequent final void will act as a sink for groundwater, resulting from aquifer depressurisation, any potential contamination would be contained within the pit / final void area. This sink scenario would preclude migration from the pit and final void into the regional aquifer system (Coffey 2012).
- 34 EA Condition E2 requires a groundwater monitoring program to be developed and implemented. The monitoring program must be able to detect a change in groundwater quality values.

Final Void

- 35 The strategy for final void decommissioning is expected to evolve as the mining process advances and knowledge develops regarding site-specific conditions. A void management strategy will be developed throughout the operations. The objectives of the void management strategy will be to:
 - a ensure that no long-term harm to land occurs, other than the presence of the voids;
 - b ensure the long-term protection of surface and groundwater quality; and
 - c minimise the surface area of land affected by final voids;
- 36 Surface water and groundwater inflows to the pits during operations will be managed within the mine water system. Following the cessation of mining, the pits are expected to gradually fill with water from direct rainfall and groundwater inflows. Surface water will be directed away from the pit crests. Void water quality is expected to become progressively more saline as groundwater reports to the void sinks, salts are mobilised from in pit overburden dumps and evaporation concentrates salts. Due to the limited data available for groundwater in the MDS Project area, the water level of the final void post mining cannot be accurately determined at this time. However, MDS will undertake modelling to determine this once further groundwater data has been collected after commencement of operations (McCollum Environmental Management Services 2013).

Flora and Fauna

- 37 A flora, fauna and aquatic ecology assessment has been undertaken by Central Queensland University (Wormington *et al.* 2012).
- 38 Ground-truthed Regional Ecosystems within the MDS project area include:
 - a 11.3.3a - Riverine wetland or fringing riverine wetland. *Melaleuca bracteata* woodland. On alluvial plains.
 - b 11.8.5 - *Eucalyptus orgadophila* grassy open-woodland. With sub-dominant species of *Corymbia erythrophloia* and *E. melanophloia*. Sparse shrubs with a moderately dense to dense ground layer dominated by *Themeda triandra*, *Dichanthium sericeum* and *Heteropogon*.

- c 11.8.11 - Grassland dominated by *Dichanthium sericeum*, *Heteropogon contortus* and *Aristida* spp. With occasional emergent *Eucalyptus orgadophila*.
 - d 11.8.11a - *Melaleuca bracteata* woodland associated with drainage depressions, over grasslands dominated by *Chloris divaricata* and containing *Dichanthium sericeum*, *Iseilema vaginiflorum* and *Heteropogon contortus*.
 - e 11.8.15 - *Eucalyptus populnea* with occasional small *Acacia harpophylla* (seen in t2 layer) over a grassy ground cover of *Paspalidium caespitosum* and *Chloris divaricata*.
 - f Non-remnant - Grassland with or without emergent *Eucalyptus* spp. saplings
- 39 The mining operation and infrastructure development will require clearing of remnant vegetation.
- 40 EA Condition H7 requires an environmental offset to be undertaken.

6 Final Landform Planning Program

- 1 MDS aims to align planning, design and scheduling of excavation/spoil placement with a mine closure plan so that cost effective practices can be implemented during the operational phase of mining and risks associated with meeting completion criteria at closure are minimised. The following operational controls will be implemented to efficiently align mine planning, design and scheduling with the mine closure plan and completion criteria:
 - a Optimisation of in-pit dumping to reduce void volume by closure;
 - b Planning excavation/dumping schedules to ensure any carbonaceous material or coal partings (including floor materials) excavated during mining are placed in an in-pit location;
 - c Pre-mining identification and salvage of basalt materials to enable the final batter faces to be composed of competent basalt rock;
 - d Re-grading of final batter surfaces during operations;
 - e Aim to dump sufficient basalt on the outer margins of dump batters such that only basalt is exposed after recontouring. In circumstances where the optimal dumping plan is unable to be achieved, basalt rock will be placed on final batter slopes to a minimum depth of about 0.5m; and
 - f Embedding closure/final landform requirements into the responsibilities and accountabilities of all senior personnel.

7 Rehabilitation Design and Treatment Practice

- 1 The key aspects of the rehabilitation process are:
 - a Ongoing geological assessments and strata modelling;
 - b Spoil placement (waste dumps and voids);
 - c Drainage (waste dumps);
 - d Topsoil placement;
 - e Vegetation establishment; and
 - f Assessing performance of rehabilitation.
- 2 The objectives and completion criteria for each rehabilitation aspect and each domain (as stated in [EA EPML00559513](#) Schedule 2 - Table H1), as well as operational controls that are relevant to progressive rehabilitation design and treatment, are described in this section.
- 3 Completion criteria that are not directly related to rehabilitation, including completion criteria relevant to surface water and groundwater monitoring and management, are addressed in other management plans required by [EA EPML00559513](#).

Spoil Characterisation

- 4 Rehabilitation goals and objectives in [EA EPML00559513](#) Schedule 2 - Table H1 relevant to spoil characterisation are presented in Table 4.

Table 4 Spoil Characterisation Rehabilitation Goals and Objectives

Rehabilitation Goal	Rehabilitation Objectives
Non-polluting	<ul style="list-style-type: none"> Hazardous overburden materials adequately handled. Hazardous and toxic materials are not buried within the mine area.

- 5 Completion criteria in [EA EPML00559513](#) Schedule 2 - Table H1 relevant to spoil characterisation are presented below.
- Potentially hazardous materials have been identified during mine life and removed or selected capping material has been applied with cover thickness appropriate to the contaminant.
 - Evidence has been included in Rehabilitation Report that required waste management measures have been implemented.
- 6 Operational controls to achieve completion criteria relevant to spoil characterisation are summarized below:
- A WRMP was developed by a suitably qualified and experienced person and implemented prior to the commencement of mining activities, in accordance with Condition C3 of [EA EPML00559513](#), and has been implemented.
 - Ongoing geological assessments and strata modelling are included in the mine planning process to identify carbonaceous material or coal partings (including floor materials) that require selective handling, and to determine volumes of basalt available for the final batters of dumps.
 - The WRMP will be reviewed every two years.

Spoil Placement

- 7 Spoil should be placed according to mine plans and designs which meet key closure requirements for cost-effective stable landform and rehabilitation outcomes.
- 8 Rehabilitation goals and objectives in [EA EPML00559513](#) Schedule 2 - Table H1 for elevated landforms that are relevant to progressive spoil placement and regrading during operations are presented in Table 5.

Table 5 Spoil Placement Rehabilitation Goals and Objectives

Rehabilitation Goals	Rehabilitation Objectives
Long-term safety	<ul style="list-style-type: none"> Site is safe for humans and animals now and in the foreseeable future.
Non-polluting	<ul style="list-style-type: none"> Hazardous overburden materials adequately handled.
Stable	<ul style="list-style-type: none"> Very low probability of subsidence or slope slippage. Landform design achieves appropriate erosion rates. Resilience to disturbance.

- 9 Completion criteria in **EA EPML00559513** Schedule 2 - Table H1 relevant to spoil placement and regrading are presented below:
- a Potentially hazardous materials have been identified during mine life and removed, or selected capping material has been applied with cover thickness appropriate to the contaminant.
 - b If required, an appropriate “barrier layer” has been selected and implemented beneath the top capping suitable to the level of sulphides or other contaminants not removed.
 - c Evidence has been included in decommissioning records of elimination of any exposed carboniferous material that may present a spontaneous combustion risk.
 - d Evidence in decommissioning records that carboniferous material has been encapsulated within an inert cover.
 - e All elevated sections of the landform have been graded to 12 degrees (approximately 20%).
 - f Greater than 12 degree slopes have been subject to a geotechnical assessment and drainage plan.
 - g Vertical intervals between slope breaks are 10m so that the length of slope will be approximately 50m.
 - h Spray-on barriers (mulch) have been applied if required.
 - i Slopes on elevated sections of the landform are geotechnically stable enough to maintain covers constructed for containment of hazardous material and for ecosystem support.
 - j A benchmark erosion study has been conducted based on rainfall and sediment run-off rates in undisturbed region (to be conducted by qualified entity).
 - k Erosion rates from disturbed areas and rehabilitated areas are comparable with reference (undisturbed) areas.
 - l Erosion rates similar to the surrounding undisturbed region have been achieved within 3 years of cessation of mining.
- 10 Operational controls to achieve completion criteria relevant to elevated landforms are summarized below:
- a Life-of-Mine detailed spoil balance analysis to optimise in-pit dumping operations.
 - b Any carbonaceous material or coal partings (including floor materials) excavated during mining will be placed in an in-pit location.
 - c The dumping plan for non-basalt and basalt waste rock aims to dump sufficient basalt on the outer margins of dump batters such that only basalt is exposed after recontouring. Ongoing geological assessments and strata modelling will be undertaken regularly to determine the volumes of basalt available, the excavation schedule, and dumping plan for placement of basalt on the batters of dumps. In circumstances where sufficient basalt is unable to be placed on the outer margins of dump batters, basalt rock will be placed on final batter slopes to a minimum depth of about 0.5m.
 - d Spoil will be selectively placed or reshaped to create terraced landforms which will allow the return to a useful, stable capability:
 - i Outside and final faces on waste dumps will be regraded down to a 12 degree slope.
 - ii Slopes will be re-graded as soon as practicable after waste-dumping where possible.
 - iii Benches between lifts on final slopes will be at least 4m wide (i.e. from inside toe of drainage berm to upslope batter toe) to allow for inspection and other access (including equipment to import topsoil onto batter surfaces). To achieve this the angle of repose basalt toe of each lift must be at least 37m from the previous crest prior to regrading.
 - iv Vertical intervals between slope breaks are 10m so that the length of slope will be approximately 50m.
 - v Rock mulching operations will not be instigated for flatter plateau areas with slopes of less than 5 % as erosion risks are minimal.

Waste Dump Drainage

- 11 The key rehabilitation objectives in [EA EPML00559513](#) Schedule 2 - Table H1 that are relevant to managing drainage on waste dumps are presented in Table 6.

Table 6 Waste Dump Drainage Rehabilitation Goals and Objectives

Rehabilitation Goal	Rehabilitation Objectives
Stable	<ul style="list-style-type: none"> Landform design achieves appropriate erosion rates.

- 12 Completion criteria in [EA EPML00559513](#) Schedule 2 - Table H1 relevant to managing drainage on elevated landforms are:
- Evidence provided in the Rehabilitation Report that the reshaping of elevated sections of the landform have complied with the site's final landform design criteria.
 - Erosion rates from disturbed areas and rehabilitated areas are comparable with reference (undisturbed) areas.
 - Evidence that the reshaping of the upper surface of the elevated landforms has been a stable gradient to direct runoff to the rock-lined waterway and prevent gully erosion.
 - Slope breaks include a waterway and a graded bank constructed at a slope of less than 2%.
 - Drainage points have been established approximately every 50m on exposed slopes.
- 13 Operational controls to achieve completion criteria relevant to waste dump drainage are summarised below:
- Strategies for landform stability are based on self-sustaining vegetative cover and use of durable rock mulching rather than relying on artificial structures, such as graded banks and drop structures with ongoing maintenance requirements. Landforms are designed to facilitate the establishment and maintenance of stable vegetation cover by adequate infiltration and control of erosion from runoff.
 - Bench and plateau bunding shall be installed to contain a potential maximum rainfall event from batter surface areas.

Waste Dump Topsoil Placement and Revegetation

- 14 Rehabilitation goals and objectives in [Environmental Authority EPML00559513](#) Schedule 2 - Table H1 that are relevant to progressive topsoil placement and revegetation of waste dumps are presented in Table 7.

Table 7 Waste Dump Topsoil Placement and Revegetation Goals and Objectives

Rehabilitation Goals	Rehabilitation Objectives
Stable	<ul style="list-style-type: none"> Vegetation cover to minimise erosion. A perennial, self-sustaining ground cover is maintained that is resilient to environmental stresses such as fire, drought and pest species is extensive enough to control erosion; and contributes to the integrity of constructed covers.
Sustainable land use	<ul style="list-style-type: none"> Soil properties to support the final land use proposed to be a self-sustaining native ecosystem comprising of local native vegetation assemblages. Established specified self-sustaining natural vegetation and habitats. Establish land use with comparable management requirements to similarly used non-mined land.

- 15 Completion Criteria in **Environmental Authority EPML00559513** Schedule 2 - Table H1 relevant to progressive topsoil placement and revegetation of waste dumps are:
- a Local program of fire control and proscribed weeds and woody weed control have been conducted.
 - b Cattle are excluded.
 - c Selective burial of hazardous materials and covering of landforms with benign materials including topsoil has been conducted.
 - d Compliance with the site's Topsoil Management Plan;
 - e Average broad range topsoil pH range has been achieved of 6.0 to 9.0 and an Electrical Conductivity of less than 1dS/cm with reference to the MDS Soils, Land, Overburden and Process Waste Study.
 - f Testing to confirm achievement of pH in range 6.0 to 9.0.
 - g Testing to confirm achievement of Electrical Conductivity of less than 1dS/cm.
 - h Spray-on barriers (mulch) have been applied if required.
 - i Scarification with direct seeding and fertilizer (primary grasses and legumes) has been completed.
 - j Revegetation works have been implemented in accordance with the Rehabilitation Management Plan and standard establishment techniques have included contour deep ripping; and:
 - i shrub species have been established; and
 - ii tree species have established.
 - k Desirable grass species comprise at least 60% of total grass cover. Tree density and height of >25 stems per 5ha each being >2m in height have been established.
 - l Evidence of the revegetation techniques used has been included in the Rehabilitation Report.
 - m The following species forming the vegetation communities referenced in Table 5 of *Flora, Fauna and Freshwater Ecology Assessment of the Meteor Downs South Project, near Rolleston, Central Queensland* (Wormington *et al.* 2012) have been introduced into the revegetation seed mix and establishment has been attempted:
 - i *Melaleuca bracteata*;
 - ii *Eucalyptus orgadophila*;
 - iii *Corymbia erythrophloia*;
 - iv *Eucalyptus melanophloia*;
 - v *Themeda triandra*;
 - vi *Heteropogon contortus*;
 - vii *Aristida spp*;
 - viii *Chloris divaricata*;
 - ix *Iseilema vaginiflorum*;
 - x *Eucalyptus populnea*; and
 - xi *Paspalidium caespitosum*.
 - n Baseline Land Suitability Class has been determined in accordance with *Technical Guidelines for Environment Management of Exploration and Mining Queensland* (QDME 1995).
 - o The relevant management programs and completion criteria to be implemented as part of the final rehabilitation plan as outlined in Chapter 5 of *Flora, Fauna and Freshwater Ecology Assessment of the Meteor Downs South Project, near Rolleston, Central Queensland*

(Wormington *et al.* 2012) have been conducted. The relevant management programs and completion criteria are presented below:

- i **Weed Species Management.** The spread of weeds will be limited by the adherence to the *Land Access Code* (DEEDI 2010). Management options shall consider relevant aspects in the *Central Highlands Pest Management Plan* (CHRC 2012) and the *Capricorn Pest Management Group* (Capricorn Pest Management Group 2006). These options generally include selective physical or chemical weed treatments and introduction of biological control agents. Other options available to avoid weed invasion of rehabilitation include fire, variation in substrate of the reformed land so that it does not favour weeds (e.g. use rubble instead of top-soil), use native vegetation wherever possible and provide wash down facilities for vehicles entering or leaving the site.
- ii **Loss of habitat for significant fauna - Management.** Fence off and revegetate areas disturbed by the mining operation with native species endemic to the area. Where feasible, trees and litter collected during the construction phase and from open cut pits shall be stockpiled for later placement on rehabilitation areas to provide microhabitat opportunities for ground dwelling fauna to return to revegetated areas. Storage shall be on existing cleared areas.
- iii **Feral animal management.** Management options shall consider include the preferred methods of control recommended by the Central Highlands Regional Council (CHRC 2012) for Dingoes, Rabbits, Feral Pigs and Feral Cats. Methods include fencing, trapping, shooting, poison baits and biological controls. In addition, cultural techniques such as management of dumps (these have food resources that attract fauna such as feral cats, feral pigs and wild dogs) and removal of abandoned on-site structures that provide shelter for feral cats could be implemented.
- iv **Domestic animal management.** Unstable erosive areas shall be fenced and excluded from grazing.
- v **Fire management.** A site-specific fire management plans shall be developed. Fire management planning shall consider the *Fire Management System Volume 1: Planning and Reporting* (Melzer and Clarke 2003) or other fire managing planning systems.
- vi **Erosion and sedimentation management.** Reshape waste dumps with slopes of suitable angle for the soil type and revegetated to minimise erosion.
- vii **Hydrological and Freshwater Ecology Impacts.** Waste dumps shall be designed to have similar runoff and infiltration properties as the natural soils of the area.

16 Operational controls to achieve completion criteria relevant to topsoil placement and revegetation on waste dumps are summarised below:

- a Vegetation clearing, topsoil stripping and topsoil placement objectives, actions and controls are described in the Topsoil Management Plan and will include the following strategies:
 - i Topsoil will be applied to the rock mulch layer to a minimum depth of approximately 0.1m and deep ripped, to incorporate the topsoil with the underlying basalt. The basalt and topsoil mix will be seeded to a mix of shrub and tree species, including *Eucalyptus*, *Corymbia* and *Acacia* species that reflect Regional Ecosystems in the area with similar slope attributes. The aim of the rock mulch and topsoil mix is to create an inoculation and germination resource that reduces grass seed populations and associated competitive moisture impacts on tree seed.
 - ii Rock mulching operations will not be undertaken waste dump plateau areas and berms, with slopes of less than 5 %, as erosion risks are minimal. Topsoil will be applied at higher rates (to a minimum depth of approximately 0.4m) on these flatters areas.
- b The native vegetation seed mix, containing the tree and grass species listed in the completion criteria, will be applied at a rate of approximately 15kg/ha.
- c Rehabilitation monitoring results, which relate sowing rates and vegetation outcomes to topsoil and overburden characteristics, will be used to refine the species list and determine optimal sowing rates of each species. The species list and sowing rates may be adjusted based on overburden and growth media characteristics of the planned rehabilitation area.

- d Where possible, seed application will be undertaken in warm weather when the prospect of rain is highest.

Void Domain

- 17 This domain is characterised by a deep void comprising a steep high wall. The pit floor generally comprises carbonaceous shales below the mined-out coal seam. The low wall is opposite the high wall and comprises angle of repose spoil rising to well above original ground level. The void is served with a ramp structure which allows heavy vehicle access through mined out spoil into the pit.
- 18 Treatment of the final void will form part of the mine planning process, so that spoil placement during the operational phase of mining will minimise works required at closure to meet completion criteria
- 19 Rehabilitation goals and objectives in [EA EPML00559513](#) Schedule 2 - Table H1 that are relevant to managing voids for closure during operations are presented in Table 8.

Table 8 Void Domain Rehabilitation Goals and Objectives

Rehabilitation Goals	Rehabilitation Objectives
Long-term safety	<ul style="list-style-type: none"> Site is safe for humans and animals now and in the foreseeable future.
Non-polluting	<ul style="list-style-type: none"> Polluted water contained on site.
Stable	<ul style="list-style-type: none"> Very low probability of subsidence, slope slippage or degradation of the high wall. Landform design achieves appropriate erosion rates. Rates of soil loss will reduce over a three-year period post-closure to acceptable levels. Vegetation cover established on the Low wall. Establish specified self-sustaining natural vegetation and habitats.

- 20 Completion criteria for the void domain are presented below.
- a A geotechnical study has been completed within 3 years prior to mine closure to confirm:
- i that high wall slopes are stable and safe; and
- ii the criteria of 12 degrees for low wall and an average of 40 degrees for high wall slopes are achievable and sustainable over the long-term.
- b Safety assessment has been made of high wall slopes that are >30 degrees and >5m in height.
- c Evidence has been included in decommissioning records of elimination of any exposed carboniferous material that may present a spontaneous combustion risk.
- d Evidence in decommissioning records that carboniferous material has been encapsulated within an inert cover.
- e Evidence has been included in Rehabilitation Report that required waste management measures have been implemented.
- f An audit of the hazardous materials register has been conducted to identify the location, use and disposal of potentially hazardous materials during the life of the mine.
- g Hazardous materials, carboniferous material and mining waste shall be assessed and managed in accordance with the Mine Waste Management Plan and any other relevant management plans. Relevant assessment and management of these materials shall be documented to provide evidence of their management and meet completion criteria requirements.

- 21 Operational controls to achieve completion criteria relevant to the void domain are summarised below:
- Optimisation of in-pit dumping as far as practicable during operations to mitigate the magnitude of final void/dump profiles and, where applicable, facilitate stabilisation of Tertiary/Permian high wall strata;
 - High walls and low walls shall be constructed to mine plans and designs that will achieve the final void slope completion criteria at closure.
 - High walls and low walls shall be constructed to mine plans and designs that ensure that no carboniferous material is left exposed in the final void at closure.
 - A geotechnical study will be completed within 3 years prior to mine closure to confirm:
 - that high wall slopes are stable and safe; and
 - the criteria of 12 degrees for low wall and an average of 40 degrees for high wall slopes are achievable and sustainable over the long-term.
- 22 Rock mulch will be placed on final low wall slopes to a minimum depth of about 0.5m. Salvage of competent basalt strata will allow the mine to apply competent rock mulch over final batters. Topsoil will be applied to the rock mulch layer to a minimum depth of approximately 0.1m and deep ripped, to incorporate the topsoil with the underlying basalt. The basalt and topsoil mix will be seeded to a mix of grass and tree species, including *Eucalyptus*, *Corymbia* and *Acacia* species that reflect Regional Ecosystems in the area with similar slope attributes. The seed mix will be applied to final low wall slopes at a rate of about 15kg/ha. The aim of the rock mulch and topsoil mix is to create an inoculation and germination resource that reduces grass seed populations and associated competitive moisture impacts on tree seed.

Infrastructure Domain

- 23 Rehabilitation goals and objectives in [EA EPML00559513](#) Schedule 2 - Table H1 that are relevant to MIA and infrastructure areas are presented in Table 9.

Table 9 Infrastructure Domain Rehabilitation Goals and Objectives

Rehabilitation Goals	Rehabilitation Objectives
Long-term safety	<ul style="list-style-type: none"> Site is safe for humans and animals now and in the foreseeable future.
Non-polluting	<ul style="list-style-type: none"> Hazardous material adequately handled. Polluted water contained on site.
Stable	<ul style="list-style-type: none"> Very low probability of subsidence or slope failure. Landform design achieves appropriate erosion rates. Vegetation cover to minimise erosion and to re-establish the pre-mine agricultural capability.
Sustainable land use	<ul style="list-style-type: none"> All infrastructure to be removed or retained where applicable. Soil properties to support eventual use as grazing land. Establish specified self-sustaining natural vegetation and habitats. Establish land use with comparable management requirements to similarly used non-mined land.

- 24 Mining infrastructure will remain until the end of the mine life so progressive rehabilitation will not be undertaken.
- 25 Completion criteria for the MIA and infrastructure domain are presented below.
- Excavations have been backfilled.

- b** Risk assessment relative to safety of humans, stock and wildlife completed and risk mitigation measures have been implemented in accordance with relevant guidelines and Australian Standards such as ISO 31000 Risk Management.
- c** Any remaining infrastructure has written agreement with post-mining landholder.
- d** The identification of potential hazardous materials during mine life and their removal, or selected capping material applied with cover thickness appropriate to the contaminant.
- e** Topsoil has been spread over disturbed areas in accordance with the site Topsoil Management Plan.
- f** Surface water monitoring has been conducted and complies with guidelines derived from ANZECC 2000 for 5 years during mine operation and for 3 years post mine operation.
- g** Local program of fire control and proscribed weeds and woody weeds control has been implemented.
- h** Fencing and appropriate signage around a perimeter is in place to restrict access; these have been erected in accordance with relevant guidelines and Australian Standards.
- i** Capping requirement has been established over mine life.
- j** If required, an appropriate “barrier layer” has been selected and implemented beneath the top capping suitable to the level of sulphides or other contaminants not removed.
- k** Average broad range topsoil pH range of 6.0 to 9.0 and an Electrical Conductivity of less than 1dS/cm has been achieved.
- l** Appropriate storage of all chemicals and fuels has been undertaken in accordance with *AS10940 – The Storage and Handling of Flammable and Combustible Liquids*.
- m** Evidence has shown removal of all infrastructure including concrete, steel and timber.
- n** Compliance with the Rehabilitation Management Plan.
- o** Completion of a post-mine contamination assessment report.
- p** Mine water transferred to the final mining void at cessation of operations.
- q** Surface water monitoring in accordance with guidelines derived from ANZECC 2000 has been conducted for 5 years during mine operations and for 3 years post mine operation.
- r** Minor drainage works to reinforce and consolidate natural drainage has been implemented.
- s** Completion of a geotechnical study and assessment that rehabilitated MIA areas are stable and safe by qualified entity.
- t** All slopes have been regraded to 12 degrees (average).
- u** Greater than 12 degree slopes have been subjected to a geotechnical assessment and drainage plan.
- v** A benchmark erosion study has been conducted based on rainfall and sediment run-off rates in undisturbed region (to be conducted by qualified entity).
- w** Spray-on barriers (mulch) have been applied if required.
- x** Evidence in Rehabilitation Report that erosion rates are compatible with surrounding undisturbed region within 5 years of cessation of mining.
- y** Compliance with the site’s Topsoil Management Plan.
- z** Scarification with direct seeding and fertilizer (primarily grasses and legumes) has been conducted.
- aa** Contour deep ripping, to establish grasses and legumes to support cattle grazing has been implemented.
- bb** The success of the final land use is measured by live weight gain in grazing cattle on mining infrastructure lands.

- cc** Evidence in the Rehabilitation Report that measured erosion rates have shown to be comparable to unmined land in the same locality.
- dd** Results have shown that significant active erosion features are not present and that any initial erosion has been stabilised by vegetation cover.
- ee** Predicted economics and/or benefits have been defined and agreed by the stakeholders.
- ff** Buildings, water management structures, roads (except those used by the public) and other infrastructure have been removed unless stakeholders have entered into formal written agreements for their retention.
- gg** Where practicable, area accomplishes and remains as sustainable grazing.
- hh** Testing to confirm achievement of pH in range 6.0 to 9.0 for semi-arid grazing practices has been conducted.
- ii** Testing to confirm achievement of an Electrical Conductivity in soils of less than 1dS/cm for semi-arid grazing practices has been achieved.
- jj** Water testing has been conducted of surface water (ANZECC 2000) to ensure livestock standards achieved.
- kk** Regrading to an appropriate gradient has been undertaken for dry-land grazing practices.
- ll** Environmental Audit has been conducted by qualified entity to grade success of:
 - i** Erosion mitigation program;
 - ii** Vegetation program;
 - iii** Water monitoring program; and
 - iv** Weed management.
- mm** Documented usage of revegetation methods as per Rehabilitation Management Plan.
- nn** Evidence of revegetation work with species forming the vegetation communities referenced in Table 5 of *Flora, Fauna and Freshwater Ecology Assessment of the Meteor Downs South Project, near Rolleston, Central Queensland* (2012) to be included in Rehabilitation Report.
- oo** Baseline Land Suitability Class has been determined in accordance with Technical Guidelines for Environmental Management of Exploration and Mining Queensland (QDME 1995).
- pp** Environmental Audit has been conducted by appropriately qualified persons to:
 - i** establish suitability of all areas for dryland grazing practices within 3 years of cessation of mining.
 - ii** ensure post-mining land is of a Suitability Class (QDME 1995) similar to the pre-mining class as determined by the baseline study – *MDS Soils, Land, Overburden and Process Waste Study* (GSSE 2013); and
 - iii** there is long-term performance of safety barriers.
- 26** The key operational controls to achieve rehabilitation objectives and completion criteria for mine infrastructure areas are summarised below:
 - a** Procedures for hazardous material handling and management are implemented effectively during operations;
 - b** Procedures for creating safe, stable and non-polluting landforms with self-sustaining natural vegetation developed during progressive waste dump rehabilitation and will be applied efficiently to infrastructure areas at closure;
 - c** Rock mulching operations will not be undertaken on MIA and infrastructure areas with slopes of less than 5 %, as erosion risks are minimal. Topsoil will be applied at higher rates (to a minimum depth of approximately 0.4m) on these flatters areas and seeded with grasses and legumes to support cattle grazing and re-establish the pre-mine agricultural capability.

8 Rehabilitation Monitoring Performance

- 1 A key component of the rehabilitation program is the demonstration of achievement of completion criteria. A Rehabilitation Monitoring Plan to assess rehabilitation performance against completion criteria will be developed and implemented. This section provides a summary the rehabilitation monitoring program.
- 2 The aims of the MDS rehabilitation monitoring program are to:
 - a Describe, classify, sample and analyse topsoil and underlying spoil materials to:
 - i demonstrate achievement of completion criteria for ph, EC and treatment of hazardous overburden; and
 - ii investigate profile development and water relations under different monitoring scenarios.
 - b Measure gross erosion features (calculated on a per hectare basis) to provide a practical local site based assessment of erosion status that can be compared with:
 - i other sites and rehabilitation scenarios; and
 - ii undisturbed nearby land, to meet completion criteria requirements.
 - c Assess vegetation growth and ecological characteristics over time through the measurement of groundcover levels, species diversity, tree density/basal area and crown cover (in the upper-storey).
- 3 The rehabilitation monitoring methodology in the Rehabilitation Monitoring Plan includes:
 - a Soil and spoil characterisation;
 - b Erosion assessment;
 - c Vegetation monitoring;
 - d Land suitability assessment; and
 - e Performance review and corrective actions.
- 4 Locations of monitoring sites will be depicted in the Rehabilitation Monitoring Plan and will include long term monitoring sites on rehabilitation areas and representative areas of undisturbed nearby land which will be monitored for erosion rates, to meet completion criteria requirements.
- 5 Assessment will be undertaken when a site is first established and then yearly for 3 years thereafter until an adequate baseline is established, followed by ongoing assessment at longer intervals for as long as monitoring is required.
- 6 Rehabilitation monitoring results will be reviewed to enable continuous improvement of site rehabilitation procedures including mine waste amelioration, surface drainage, surface preparation, growth medium development, species lists and seeding rates.

Performance Review and Corrective Actions

- 7 Annual review will include:
 - a Ensuring that any significant changes to the long-term mine plan are incorporated into rehabilitation plans;
 - b Surveyed mine site disturbance is updated on mine plans and conforms with the Plan of Operations;
 - c All relevant rehabilitation monitoring programs are being conducted to the required standards and data is readily available;
 - d Rehabilitation performance is trending towards final completion criteria and required rehabilitation repair works are scheduled;
 - e Spoil and topsoil characterisation are current;

- f Topsoil records (stockpiles and spread over rehabilitation) are current;
 - g Revegetation records are current;
 - h All relevant plans and procedures are updated to incorporate any required improvements to rehabilitation related activities.
- 8 Should areas of rehabilitation require maintenance, remedial action will be undertaken and may include drainage and erosion repair re-seeding.

9 Records

Records shall be retained are presented in Table 10.

Table 10: Rehabilitation Management Records to be Maintained

Record	File Location	Site Retention Period
All rehabilitation monitoring records or reports	Environment Section	Life of Mine
Plan of Operations commitments in relation to rehabilitation	Environment Section	Life of Mine
Permit to Disturb	Environment Section	Life of Mine
Topsoil stockpile locations	Environment Section – GIS	Life of Mine
Pre mining soil and vegetation surveys and maps	Environment Section	Life of Mine
Disturbance and accrual reports	Environmental Section	5 years

10 Terms & Definitions

Term	Definition
Administering authority	QLD Department of Environment Science or its successor.
Domains *	Land management units within a mine site, usually with similar geophysical characteristics. Within domains, elements may be designated where different rehabilitation techniques and/or timing of work is required.
Environmental Authority (EA)	An environmental authority issued under the <i>Environmental Protection Act 1994</i> that approves an environmentally relevant activity applied for in an application. An EA authorises carrying out an activity and the conditions in the EA generally state what is and what is not permitted as part of carrying out that activity. An EA does not authorise any environmental harm unless a condition stated by the authority specifically authorises environmental harm. EA conditions relate to the operation of the activity and may also cover rehabilitation requirements. In most cases, the conditions in your EA set the environmental outcomes that must be achieved. Where there is a high risk that something associated with an activity will cause serious environmental harm if it is not managed appropriately, the EA may include conditions that prescribe how that risk must be managed.
Environmental Hazards*	These are chemical, physical or biological changes that may cause environmental harm to one or more environmental values.
EA Conditions	Compliance conditions of the EA pertaining to environmentally relevant activities
EM Plan	Environmental Management Plan

Term	Definition
EP Act	Environmental Protection Act 1994
Endwall	The lengthwise extremities of the pit. (As opposed to the side extremities which are the highwall and lowwall).
Final Void	The last mining pit and remaining ramps
FRR	Final Rehabilitation Report
Highwall	The pit wall of un-mined land
Lowwall	The spoil placed immediately adjacent to the pit in the previously mined strip and can rise to crest of a pre-strip dump.
Objectives*	The end points that rehabilitation aims to achieve. They may be described in terms of future land use, biodiversity values, conservation values, health and safety outcomes, aesthetics or social outcomes or combinations of these.
Pre-stripping	The operation to remove overburden with truck and shovel
Rehabilitation*	Rehabilitation is the process of making a former mine site safe, stable and self-sustaining. Note: This usage is far broader than rehabilitation's literal meaning of re-establishing former condition or effectiveness. While it may be appropriate to attempt to restore the pre-mining conditions after mining has ceased for some smaller mines and mines in areas with special values, this may not be possible or an optimum result across mine sites particularly in specific domains.
RMP	Rehabilitation Management Plan
Residual void	A void remaining after mine closure
Salinity	Generally refers to the concentration of sodium chloride and other salts either in soil or water
Spoil	Overburden after removal to expose the coal seam
Stable*	Resistant to change in landform, pollution generation or land use potential to an extent that is similar to unmined land in the locality.
Topsoil	The upper layer of the soil profile removed for reuse in rehabilitation as an inoculant and growth medium.

* Definition from DEHP (2014)

11 References

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12 Version Management

Version	Details	Contributors
1.0	Original Draft (2017)	Alan Irving & Associates, and Environmental Superintendent (R. Gooley)
2.0	Updated to be consistent with updated Waste Rock Management Plan Version 2.0 (2018).	Alan Irving & Associates

13 Document Submission History

Action	Date Authorised	Responsible Officer

Appendix 1 - Rehabilitation Goals, Objectives, Indicators and Completion Criteria

Mine Feature Name	Rehabilitation Goal	Rehabilitation Objective	Indicators	Completion Criteria
FINAL VOID				
Final Void	Long-term safety	Site is safe for humans and animals now and in the foreseeable future.	<ul style="list-style-type: none"> • Presence and/or absence of physical risk factors which could result in injury or death. • Geotechnical Study report. • Risk Assessment documentation. 	<ul style="list-style-type: none"> • A Geotechnical study has been completed within 3 years prior to mine closure to confirm: <ul style="list-style-type: none"> a) that High wall slopes are stable and safe; and b) the criteria of 12 degrees for Low wall and an average of 40 degrees for High wall slopes are achievable and sustainable over the long-term. • A safety assessment of High wall slopes that are >30 degrees and >5m in height has been conducted. • Risk assessment relative to safety of humans, stock and wildlife completed and risk mitigation measures have been implemented in accordance with relevant guidelines and Australian Standards such as ISO31000 Risk Management. • Completion of a Rehabilitation Report by an appropriate and qualified person at the end of the mine life to ensure successful rehabilitation of the final void and other landforms. This Rehabilitation Report has been completed in accordance with the relevant guidelines and Australian standards.

Mine Feature Name	Rehabilitation Goal	Rehabilitation Objective	Indicators	Completion Criteria
Final Void	Long-term safety	Site is safe for humans and animals now and in the foreseeable future.	<ul style="list-style-type: none"> • Presence and availability of heavy metals and other toxic material or other introduced contaminants. 	<ul style="list-style-type: none"> • The identification of potential hazardous materials during mine life through water quality monitoring and material characterisation has been conducted. • During the 5 years prior to mine closure surface water monitoring and leaching tests have been undertaken in compliance with guidelines derived from ANZECC 2000. • Hydrological modelling has been conducted of the groundwater environment in the vicinity of the final void to establish relationship between water in the final void and the groundwater. • Evidence has been included in decommissioning records of elimination of any exposed carboniferous material that may present a spontaneous combustion risk. • Evidence in decommissioning records that carboniferous material has been encapsulated within an inert cover.
Final Void	Long-term safety	Site is safe for humans and animals now and in the foreseeable future.	<ul style="list-style-type: none"> • Adequacy and long-term performance of safety barriers, etc. 	<ul style="list-style-type: none"> • Final void design has included: <ol style="list-style-type: none"> a) Bund walls; b) Remediated waterways; c) Fencing; and d) Signage • Cattle have been excluded from accessing bunding. • A Landholder program has been conducted. • Where risk mitigation measures include fencing and appropriate signage around a perimeter to restrict asses; these have been erected in accordance with relevant guidelines and Australian Standards.

Mine Feature Name	Rehabilitation Goal	Rehabilitation Objective	Indicators	Completion Criteria
Final Void	Non-polluting	Polluted water contained on site.	<ul style="list-style-type: none"> Water quality. Leachate and drainage control. 	<ul style="list-style-type: none"> Surface water monitoring has been conducted with water quality criteria derived from ANZECC 2000 for 3 years post mining operation. Evidence that effective leachate prevention has been conducted through testing of mining waste and management in accordance with a documented Mine Waste Management Plan. Evidence from surface water monitoring that successful prevention measures have been implemented for poor quality leachate or discharge mobilisation from the void to watercourses. A groundwater study has been conducted on the long-term groundwater levels and on the post-mining aquifer recovery (once the details of the final void for mine closure has been finalised). Evidence that no significant difference in water quality has occurred relative to historic (background) groundwater quality. Successful establishment of adequate drainage control between the Final Void edge and location of bunds has been made to redirect any runoff away from the edge of the void. Evidence in the Rehabilitation Report that the void water levels have remained similar to modelled scenarios and the risk of void overflow have been maintained as minimal where appropriate.
Final Void	Non-polluting	Hazardous and toxic materials are not buried within the mine area.	<ul style="list-style-type: none"> A life of mine hazardous materials register indicating the volumes used and disposal methods is available. 	<ul style="list-style-type: none"> Evidence has been included in Rehabilitation Report that required waste management measures have been implemented. An audit of the hazardous materials register has been conducted to identify the location, use and disposal of potentially hazardous materials during the life of the mine.

Mine Feature Name	Rehabilitation Goal	Rehabilitation Objective	Indicators	Completion Criteria
Final Void	Stable	Very low probability of subsidence, slope slippage or degradation of the Highwall.	<ul style="list-style-type: none"> Laboratory and field studies conducted to determine probabilities of landform failure. 	<ul style="list-style-type: none"> A Geotechnical study has been completed and assessment that High wall slopes are stable and safe by appropriately qualified persons has been conducted. Safety assessment has been made of High wall slopes that are >30 degrees and >5m in height. Completion of an assessment report by a Registered Professional Engineer of Queensland (RPEQ) on the geotechnical issues and erosivity of the proposed final landforms, including final voids, to demonstrate long-term landform stability. Reference has been made to the Queensland Mining Guidelines (or subsequent reprints) during the completion of this assessment.
Final Void	Stable	<ul style="list-style-type: none"> Landform design achieves appropriate erosion rates. Rates of soil loss will reduce over a three-year period post-closure to acceptable levels. 	<ul style="list-style-type: none"> Rate of soil loss will be similar to sites in the general area surrounding the mine. 	<ul style="list-style-type: none"> Benchmark erosion study has been conducted based on rainfall and sediment run-off rates in undisturbed region (to be conducted by appropriately qualified persons). Spray-on barriers (mulch) if required has been applied. The erosion rates on disturbed land are similar to rates on the analogue sites surrounding undisturbed region within 3 years of cessation of mining.

Mine Feature Name	Rehabilitation Goal	Rehabilitation Objective	Indicators	Completion Criteria
Final Void	Stable	<ul style="list-style-type: none"> Vegetation cover established on the Lowwall. Establish specified self-sustaining natural vegetation and habitats. 	<ul style="list-style-type: none"> Self-sustaining vegetation assemblage growing on the Lowwall over a period of 3 years post-mine closure. Presence of key local species and diversity. 	<ul style="list-style-type: none"> Groundcover species have been sown into the Low wall and species which may include Buffel Panic and Rhodes Grasses and associated legumes. Compatible with the rehabilitation program outlined below, standard establishment techniques have included Contour deep ripping; and <ol style="list-style-type: none"> Small shrub species have been established; Medium shrub species have been established; Small tree species have been established; and Tree species have been established. Environmental Audit has been conducted by appropriately qualified persons to grade success of: <ol style="list-style-type: none"> Erosion mitigation program; Vegetation program; Water monitoring program; and Weed management.
Final Void	Sustainable land use	Post mine land use for the residual voids is water storage.	<ul style="list-style-type: none"> Physical and Chemical properties of contained water. 	<ul style="list-style-type: none"> Final void water quality: pH in range 6.0 to 9.0. Electrical Conductivity less than 5000dS/cm.
Final Void	Sustainable land use	Post mine land use for areas between Final Void crest and safety bund walls is vegetation establishment, which excludes cattle.	<ul style="list-style-type: none"> Groundcover and erosion. 	<ul style="list-style-type: none"> Evidence has shown ground cover between the void crests and bunds as being >70% where ground cover is defined as any cover that assists in controlling erosion and may include live cover. Results have shown that significant active erosion features are not present and that any initial erosion has been stabilised by vegetation cover.

Mine Feature Name	Rehabilitation Goal	Rehabilitation Objective	Indicators	Completion Criteria
ELEVATED LANDFORMS (INCLUDING OVERBURDEN DUMPS, QUARRY AND SECTIONS OF ROM/CRUSHING AND SCREENING AREAS)				
Elevated Landforms	Long-term safety	Site is safe for humans and animals now and in the foreseeable future.	<ul style="list-style-type: none"> • Presence and or absence of physical risk factors which could result in injury or death. • Risk assessment documentation 	<ul style="list-style-type: none"> • A Geotechnical study has been completed within 3 years prior to mine closure to confirm: • That elevated landform slopes are stable and safe; and • the criteria of 12 degrees (approx. 20%) for landform slopes are achievable and sustainable over the long-term. • A safety assessment of elevated sections of the landform has been conducted. • Evidence that final landform construction has met the design requirements of Rehabilitation Management Plan. • Risk assessment relative to safety of humans, stock and wildlife completed and risk mitigation measures have been implemented in accordance with relevant guidelines and Australian Standards such as ISO 31000 Risk Management.
Elevated Landforms	Long-term safety	Site is safe for humans and animals now and in the foreseeable future.	<ul style="list-style-type: none"> • Exposure to and availability of heavy metals and other toxic material or other introduced contaminants. 	<ul style="list-style-type: none"> • Potential hazardous materials have been identified during mine life and removed, or selected capping material has been applied with cover thickness appropriate to the contaminant. • Leaching tests have been conducted to complement the analyses undertaken and reported under the Overburden Assessment section of the MDS <i>Soils, Land, Overburden and Process Waste Study</i>: as well as ongoing overburden and reject characterisation programs. • Surface water monitoring has been conducted consistent with guidelines derived from ANZECC 2000 for the final 5 years of mine operation and for 3 years post mine operation. • Local program of fire control and proscribed weeds and woody weeds control have been conducted.

Mine Feature Name	Rehabilitation Goal	Rehabilitation Objective	Indicators	Completion Criteria
Elevated Landforms	Long-term safety	Site is safe for humans and animals now and in the foreseeable future.	<ul style="list-style-type: none"> Adequacy and long-term performance of safety barriers. 	<ul style="list-style-type: none"> Fencing and appropriate signage is in place to restrict access has been conducted. Cattle are excluded. Where risk mitigation measures include fencing and appropriate signage around a perimeter to restrict access, these have been erected in accordance with relevant guidelines and Australian Standards.
Elevated Landforms	Non-polluting	Hazardous overburden materials adequately handled.	<ul style="list-style-type: none"> A program of identification of hazardous and benign overburden materials. 	<ul style="list-style-type: none"> Selective burial of hazardous materials and covering of landforms with benign materials including topsoil has been conducted. If required, a selection of an appropriate "barrier layer" beneath the top capping suitable to the level of sulphides or other contaminants not removed, has been applied. Compliance with the site's Topsoil Management Plan; Average broad range topsoil pH range of 6.0 to 9.0 and an Electrical Conductivity of less than 1dS/cm.
Elevated Landforms	Non-polluting	Tailings and rejects: Hazardous overburden materials adequately handled.	<i>Note: The site has no on-site tailings storage facilities.</i>	<i>No decommissioning or capping of tailings storage facilities is required.</i>
Elevated Landforms	Non-polluting	Elimination of all permanent water storages on the site outside the final void.	<ul style="list-style-type: none"> Polluted water contained on site. Leachate and drainage control. 	<ul style="list-style-type: none"> Mine water has been transferred to the final mining void at cessation of operations. Surface and groundwater water monitoring has been conducted according to guidelines derived from ANZECC 2000 for 5 years during mine operation and for 3 years post mine operation. Minor drainage works to reinforce and consolidate natural drainage to the north of the site as part of final landform, have been completed. Evidence in the Rehabilitation Report, as prepared by an appropriately qualified person, that the rock lined drains have remained stable. Average broad range topsoil pH range has been achieved of 6.0 to 9.0 and an Electrical Conductivity of less than 1dS/cm with reference to the MDS Soils, Land, Overburden and Process Waste Study.

Mine Feature Name	Rehabilitation Goal	Rehabilitation Objective	Indicators	Completion Criteria
Elevated Landforms	Stable	Very low probability of subsidence or slope slippage.	<ul style="list-style-type: none"> Design criteria. Safety assessment. Erosion rate. Slope stability. 	<ul style="list-style-type: none"> A Geotechnical study and assessment that the elevated landforms are stable and safe has been conducted by qualified entity. All elevated landforms regraded to 12 degrees overall where possible. Evidence provided in the Rehabilitation Report that the reshaping of elevated sections of the landform have complied with the site's final landform design criteria. Erosion rates from disturbed areas and rehabilitated areas are comparable with reference (undisturbed) areas. Evidence that the reshaping of the upper surface of the elevated landforms has been a stable gradient to direct runoff to the rock-lined waterway and prevent gully erosion. Slopes on elevated sections of the landform are geotechnically stable enough to maintain covers constructed for containment of hazardous material and for ecosystem support.
Elevated Landforms	Stable	Landform design achieves appropriate erosion rates.	<ul style="list-style-type: none"> Slope angle and length 	<ul style="list-style-type: none"> All elevated sections of the landform have been graded to 12 degrees (approximately 20%). Greater than 12 degree slopes have been subject to a geotechnical assessment and drainage plan. Vertical intervals between slope breaks are 10m so that the length of slope will be approximately 50m. Slope breaks include a waterway and a graded bank constructed at a slope of less than 2%.

Mine Feature Name	Rehabilitation Goal	Rehabilitation Objective	Indicators	Completion Criteria
Elevated Landforms	Stable	Landform design achieves appropriate erosion rates.	<ul style="list-style-type: none"> Rate of soil loss. 	<ul style="list-style-type: none"> A benchmark erosion study has been conducted based on rainfall and sediment run-off rates in undisturbed region (to be conducted by qualified entity). Drainage points have been established approximately every 50m on exposed slopes. Spray-on barriers (mulch) have been applied if required. Erosion rates similar to the surrounding undisturbed region have been achieved within 3 years of cessation of mining. Results have shown that significant active erosion features are not present and that any initial erosion has been stabilised by vegetation cover. Evidence has been included in Rehabilitation Report.
Elevated Landforms	Stable	<ul style="list-style-type: none"> Vegetation cover to minimise erosion. Resilience to disturbance. A perennial, self-sustaining ground cover is maintained that is resilient to environmental stresses such as fire, drought and pest species is extensive enough to control erosion; and contributes to the integrity of constructed covers. 	<ul style="list-style-type: none"> Vegetation type and density. 	<ul style="list-style-type: none"> Scarification with direct seeding and fertilizer (primary grasses and legumes) has been completed. Revegetation works have been implemented in accordance with the Rehabilitation Management Plan and standard establishment techniques have included contour deep ripping: and <ul style="list-style-type: none"> a) shrub species have been established; and b) tree species have established. Desirable grass species comprise at least 60% of total grass cover. Tree density and height of >25 stems per 5ha each being >2m in height have been established. The relevant management programs and completion criteria to be implemented as part of the final rehabilitation plan as outlined in Chapter 5 of <i>Flora, Fauna and Freshwater Ecology Assessment</i> of the Meteor Downs South Project, near Rolleston, Central Queensland (2012) have been conducted. Evidence of utilised revegetation techniques has been included in the Rehabilitation Report.
Elevated Landforms	Sustainable land use	Soil properties to support the final land use proposed to be a self-sustaining native ecosystem comprising of local native vegetation assemblages.	<ul style="list-style-type: none"> Physical and chemical properties of surface materials. 	<ul style="list-style-type: none"> Testing to confirm achievement of pH in range 6.0 to 9.0. Testing to confirm achievement of Electrical Conductivity of less than 1dS/cm.

Mine Feature Name	Rehabilitation Goal	Rehabilitation Objective	Indicators	Completion Criteria
Elevated Landforms	Sustainable land use	Established specified self-sustaining natural vegetation and habitats.	<ul style="list-style-type: none"> • Presence of key species. • Species type and diversity. • Weeds. 	<ul style="list-style-type: none"> • Environmental Audit has been conducted by qualified entity to grade success of: <ol style="list-style-type: none"> a) Erosion mitigation program; b) Vegetation program; c) Water monitoring program; and d) Weed management. • The following species forming the vegetation communities referenced in Table 5 of <i>Flora, Fauna and Freshwater Ecology Assessment</i> of the Meteor Downs South Project, near Rolleston, Central Queensland (2012) have been introduced into the revegetation seed mix and establishment has been attempted: <ol style="list-style-type: none"> a) <i>Melaleuca bracteata</i>; b) <i>Eucalyptus orgadophila</i>; c) <i>Corymbia erythrophloia</i>; d) <i>E.melanophloia</i>; e) <i>Themeda triandra</i>; f) <i>Heteropogon contortus</i>; g) <i>Aristida spp</i>; h) <i>Chloris divaricata</i>; i) <i>Iseilema vaginiflorum</i>; j) <i>Eucalyptus populnea</i>; and k) <i>Paspalidium caespitosum</i>.
Elevated landforms	Sustainable land use	Establish land use with comparable management requirements to similarly used non-mined land.	<ul style="list-style-type: none"> • Initial establishment of native species to form the basis of a longer term self-sustaining native ecosystem. 	<ul style="list-style-type: none"> • Baseline Land Suitability Class has been determined in accordance with <i>Technical Guidelines for Environment Management of Exploration and Mining Queensland</i> (QDME 1995). • Environmental Audit conducted by appropriately qualified persons to: <ol style="list-style-type: none"> a) establish progress towards a native ecosystem; b) identify the Land Suitability Class; and c) establish adequacy and predicted long-term performance of safety barriers.

Mine Feature Name	Rehabilitation Goal	Rehabilitation Objective	Indicators	Completion Criteria
MIA (INCLUDING INFRASTRUCTURE, CRUSHING EQUIPMENT, SCREENING EQUIPMENT, ROM AREAS, & ROADS) AT THE APPROXIMATE ORIGINAL CONTOUR				
MIA and Infrastructure areas	Long-term safety	Site is safe for humans and animals now and in the foreseeable future.	<ul style="list-style-type: none"> Unless the subsequent landholder agrees in writing to assume responsibility for infrastructure components such as roads, the final rehabilitation plan will include the following indicators and activities. Removal of all constructed structures including dams, concrete to a depth of 1m, disused industrial equipment and materials. 	<ul style="list-style-type: none"> Excavations have been backfilled. Risk assessment relative to safety of humans, stock and wildlife completed and risk mitigation measures have been implemented in accordance with relevant guidelines and Australian Standards such as ISO 31000 Risk Management. Any remaining infrastructure has written agreement with post-mining landholder.
MIA and Infrastructure areas	Long-term safety	Site is safe for humans and animals now and in the foreseeable future.	<ul style="list-style-type: none"> Exposure to and availability of heavy metals and other toxic material or other introduced contaminants. 	<ul style="list-style-type: none"> The identification of potential hazardous materials during mine life and their removal, or selected capping material applied with cover thickness appropriate to the contaminant. Topsoil has been spread over disturbed areas in accordance with the site Topsoil Management Plan. Surface water monitoring has been conducted and complies with guidelines derived from ANZECC 2000 for 5 years during mine operation and for 3 years post mine operation. Local program of fire control and proscribed weeds and woody weeds control has been implemented.
MIA and Infrastructure areas	Long-term safety	Site is safe for humans and animals now and in the foreseeable future.	<ul style="list-style-type: none"> Adequacy and long-term performance of safety barriers. 	<ul style="list-style-type: none"> Fencing and appropriate signage around a perimeter is in place to restrict access; these have been erected in accordance with relevant guidelines and Australian Standards.
MIA and Infrastructure areas	Non-polluting	Hazardous material adequately handled.	<ul style="list-style-type: none"> Technical design of capping. Compliance with risk assessment documentation. 	<ul style="list-style-type: none"> Capping requirement has been established over mine life. If required, an appropriate "barrier layer" has been selected and implemented beneath the top capping suitable to the level of sulphides or other contaminants not removed. Average broad range topsoil pH range of 6.0 to 9.0 and an Electrical Conductivity of less than 1dS/cm has been achieved. Appropriate storage of all chemicals and fuels has been undertaken in accordance with AS10940 – <i>The Storage and</i>

Mine Feature Name	Rehabilitation Goal	Rehabilitation Objective	Indicators	Completion Criteria
				<p><i>Handling of Flammable and Combustible Liquids.</i></p> <ul style="list-style-type: none"> Evidence has shown removal of all infrastructure including concrete, steel and timber. Compliance with the Rehabilitation Management Plan. Completion of a post-mine contamination assessment report. Evidence of decommissioning has been included in the Rehabilitation Report.
MIA and Infrastructure areas	Non-polluting	Polluted water contained on site.	<ul style="list-style-type: none"> Surface, groundwater and downstream monitoring. 	<ul style="list-style-type: none"> Mine water transferred to the final mining void at cessation of operations. Surface water monitoring in accordance with guidelines derived from ANZECC 2000 has been conducted for 5 years during mine operations and for 3 years post mine operation. Minor drainage works to reinforce and consolidate natural drainage has been implemented.
MIA and Infrastructure areas	Stable	Very low probability of subsidence or slope failure.	<ul style="list-style-type: none"> Design criteria of slopes regraded to a maximum of 12 degrees (average) overall where required. 	<ul style="list-style-type: none"> Completion of a geotechnical study and assessment that rehabilitated MIA areas are stable and safe by qualified entity.
MIA and Infrastructure areas	Stable	Landform design achieves appropriate erosion rates.	<ul style="list-style-type: none"> Slope angle and length. 	<ul style="list-style-type: none"> All slopes have been regraded to 12 degrees (average). Greater than 12 degree slopes have been subjected to a geotechnical assessment and drainage plan.
MIA and Infrastructure areas	Stable	Landform design achieves appropriate erosion rates.	<ul style="list-style-type: none"> Rate of soil loss. 	<ul style="list-style-type: none"> A benchmark erosion study has been conducted based on rainfall and sediment run-off rates in undisturbed region (to be conducted by qualified entity). Drainage points approximately every 50m on exposed slopes have been established. Spray-on barriers (mulch) have been applied if required. Evidence in Rehabilitation Report that erosion rates are compatible with surrounding undisturbed region within 5 years of cessation of mining. Compliance with the site's Topsoil Management Plan.

Mine Feature Name	Rehabilitation Goal	Rehabilitation Objective	Indicators	Completion Criteria
MIA and Infrastructure areas	Stable	Vegetation cover to minimise erosion and to re-establish the pre-mine agricultural capability.	<ul style="list-style-type: none"> Vegetation type and density to support cattle grazing at the same standard as the pre-mining grazing activity. 	<ul style="list-style-type: none"> Scarification with direct seeding and fertilizer (primarily grasses and legumes) has been conducted. Contour deep ripping, establish grasses and legumes to support cattle grazing has been implemented. The success of the final land use is measured by live weight gain in grazing cattle on mining infrastructure lands. Evidence in the Rehabilitation Report that measured erosion rates have shown to be comparable to unmined land in the same locality. Results have shown that significant active erosion features are not present and that any initial erosion has been stabilised by vegetation cover. Evidence has been included in Rehabilitation Report.
MIA and Infrastructure areas	Sustainable land use	All infrastructure to be removed or retained where applicable.	<ul style="list-style-type: none"> Beneficial land use – low intensity grazing is established and proven to be sustainable. 	<ul style="list-style-type: none"> Predicted economics and/or benefits have been defined and agreed by the stakeholders. Buildings, water management structures, roads (except those used by the public) and other infrastructure have been removed unless stakeholders have entered into formal written agreements for their retention. Where practicable, area accomplishes and remains as sustainable grazing. <p><i>To the extent that some Naroo Dam water impinges on the MDS mining lease, water quality in that water body will have been monitored for contaminants; and the grazing water quality criteria in the relevant Water Quality Guidelines will have been used as criteria for water management.</i></p>
MIA and Infrastructure areas	Sustainable land use	Soil properties to support eventual use as grazing land.	<ul style="list-style-type: none"> Physical and chemical properties of surface materials. 	<ul style="list-style-type: none"> Testing to confirm achievement of pH in range 6.0 to 9.0 for semi-arid grazing practices has been conducted. Testing to confirm achievement of an Electrical Conductivity in soils of less than 1dS/cm for semi-arid grazing practices has been achieved. Water testing has been conducted of surface water (ANZECC 2000) to ensure livestock standards achieved.

Mine Feature Name	Rehabilitation Goal	Rehabilitation Objective	Indicators	Completion Criteria
MIA and Infrastructure areas	Sustainable land use	Soil properties to support eventual use as grazing land.	<ul style="list-style-type: none"> Physical properties. 	<ul style="list-style-type: none"> Regrading to an appropriate gradient has been undertaken for dry-land grazing practices.
MIA and Infrastructure areas	Sustainable land use	Establish specified self-sustaining natural vegetation and habitats.	<ul style="list-style-type: none"> Presence of key species. Species type and diversity. Weeds. 	<ul style="list-style-type: none"> Environmental Audit has been conducted by qualified entity to grade success of: <ol style="list-style-type: none"> Erosion mitigation program; Vegetation program; Water monitoring program; and Weed management. Documented usage of revegetation methods as per Rehabilitation Management Plan. Evidence of revegetation work with species forming the vegetation communities referenced in Table 5 of <i>Flora, Fauna and Freshwater Ecology Assessment</i> of the Meteor Downs South Project, near Rolleston, Central Queensland (2012) to be included in Rehabilitation Report.
MIA and Infrastructure areas	Sustainable land use	Establish land use with comparable management requirements to similarly used non-mined land.	<ul style="list-style-type: none"> Dryland grazing similar to grazing activities on surrounding unmined lands. 	<ul style="list-style-type: none"> Baseline Land Suitability Class has been determined in accordance with <i>Technical Guidelines for Environmental Management of Exploration and Mining Queensland</i> (QDME 1995). Environmental Audit has been conducted by appropriately qualified persons to: <ol style="list-style-type: none"> establish suitability of all areas for dryland grazing practices within 3 years of cessation of mining. ensure post-mining land is of a Suitability Class; (QDME 1995) similar to the pre-mining class as determined by the baseline study – <i>MDS Soils, Land, Overburden and Process Waste Study</i>; and there is long-term performance of safety barriers.

APPENDIX L

Environmental Policies

Environmental Policy

Sojitz undertakes environmental preservation activities in accordance with the following Environmental Policy.

Sojitz Group Environmental Policy

As a global company, Sojitz Group considers environmental issues a crucial topic to be addressed in management. Striving for a sustainable society, we will work to preserve the environment and prevent pollution in our business activities, while creating businesses that are both highly competitive and environmentally friendly.

1. Comply with environmental laws and regulations

In the course of our business operations, we will comply with laws and regulations concerning the environment, international treaties, and agreements to which we subscribe.

2. Continuously improve our environmental management system

Under our environmental management system, we will establish and periodically review environmental objectives and aim for constant improvement, in order to enhance our environmental performance.

3. Minimize environmental burden

Through reducing greenhouse gases such as CO₂ to prevent climate change and preserving biodiversity, we will strive to minimize the environmental burden of our businesses.

4. Conserve resources and reduce/recycle waste

We will engage in curbing the use of natural resources such as energy and water, and the reducing and recycling of waste.

5. Consider the environment in new businesses

When starting new businesses and expanding or further developing existing businesses, we will work to reduce the burden on the environment and prevent pollution.

6. Pursue sustainable resources

We will promote initiatives for the stable supply of resources and realization of a suitable energy mix.

7. Educate and promote awareness on the environment

In addition to ensuring that all of our officers and employees are notified of this policy, we will implement educational activities to ensure widespread awareness.

Adopted April 1st, 2004

Revised July 2nd, 2007

Revised August 6th, 2013

Revised January 1st, 2017

Revised May 9th, 2018



ENVIRONMENT AND COMMUNITY POLICY



Our Aim

U&D Mining's vision is to be an industry-leading Coal Explorer and Emerging Producer, where we as a company create sustainable value from our resources and relationships in a way that is safe, environmentally responsible and respectful of all stakeholders. Our belief is that if we all hold Safety as a Value then together we achieve Zero Harm to ourselves, to others we interact with, to the Environment and to the Community.

We require your support to achieve these goals!

Environment and Community Objectives

To achieve this aim we will:

- Minimise the impact of our operations by effectively preventing pollution, damage or other harm to the environment by mitigating harmful risks.
- Respect and work with the current occupiers of any land impacted by our exploration or mine development activities.
- Take all reasonable steps to prevent or recover any incident that may or has breached environmental legislation, license requirements, tenure conditions, or any specific U&D Mining requirements.
- Work to build long-term partnerships with communities, governments, business partners and other stakeholders.
- Accept that everyone is personally accountable for operating in an environmentally responsible manner, as well as are those who they work with, manage and supervise.
- Honour, respect and work cooperatively with the Traditional Owners of the land impacted by our activities, as well as ensure we work within any Native Title or Cultural Heritage legislation, licenses, or any specific U&D Mining requirements.

U&D Mining Commits to:

- Educating all employees and contractors in defining an acceptable level of risk for the task at hand and in implementing risk management practices to achieve safe operations.
- Training and coaching managers, employees and contractors on Environment and Community requirements and then holding them accountable for compliance.
- Ensuring compliance with applicable laws, U&D Mining's standards, and any other stated requirements as a minimum foundation for the delivery of acceptable HSEC performance.
- Promoting with employees, contractors and the community awareness of Environmental issues through ongoing training, communication and reporting.
- Implementing and maintain integrated management systems and programs, including measurable objectives and targets, to ensure effective implementation of this Environment and Community Policy.
- Regularly reviewing this Policy to ensure it remains appropriate to U&D Mining's objectives and applicable legislation.

Yinan Zhang
Vice Chairman

Hao Liu
CEO

This policy applies to employees, management and contractors within U&D Mining and requires full cooperation and assistance of all personnel.

APPENDIX M

Hydrological Technical Memorandum

12 November 2019

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Prepared on behalf of:
Sojitz Coal Mining Pty Ltd
PO Box 126
Brisbane Qld 4001

Attention: Simon Barber

MDS Rail Loop

Hydrological Impacts to MNES Technical Note

RE: EPBC 2019/8482 Meteor Downs South Rail loop

Dear Simon

Thank you for your email, dated 18 October 2019, clarifying additional information requested by the Department in consideration of impacts relating to changes to surface hydrology. SLR notes the following items regarding the information requested:

- 4(a)ii The impacts of changes to surface hydrology to habitat in the proposed action area and surrounding areas.
- Discussion regarding any expected impacts to habitat as a result of the changes to surface hydrology.
- Discussion regarding the likelihood of the changes having any direct or indirect effects on MNES

SLR submits the following information in response to the above request.

1 Existing Hydrology

The Project falls within the Comet sub-catchment area of the Fitzroy Basin. There are three main flow paths which traverse the allotment within which the development is located. Aldebaran Creek is located to the north of the proposed development with a catchment of 404 km² whilst tributaries of Meteor Creek, with a catchment of only 41km², traverse to the south.

Surface water flows in area surrounding the Project are ephemeral, are associated with heavy rainfall and generally cease soon after the rainfall events leaving some temporary localised pools. When these disappear during dry months, the only sources of permanent water on site are artificial water troughs to the west of the proposed impact area.

The topography across the site is flat to gently undulating and is generally in the order of 2 % relief in the east of the site and between 2.5 % and 6.5 % relief associated with a low ridge in the west of the site. There are no wetland protection areas or wetlands of high ecological significance shown on the map of referable wetlands (DES, 2019). The site does flood, though the current landscape has flood depths generally below 0.5m with water velocities in Aldebaran Creek approximately 1.5m/sec (SLR, 2019a).

As a consequence of the artificial swales constructed for the Leucaena plantation in the north of the site, water ponds after significant rainfall and creates a small ephemeral wetland area adjacent to the rail line in the northeast corner of the site (SLR, 2019b). Although a range of waterbirds have been seen utilising this area, it does not contain any wetland plants such as sedges or other biological features of a wetland area and is only present during the wet season (SLR 2019b).

2 Changes to Surface Hydrology

A flood study and stormwater management plan has been undertaken for the proposed development (SLR 2019a). This assessment determined that the proposed development has small localised impacts on flood levels for the surrounding locality, with very limited impact propagating past the property boundary. Surface water runoff from the proposed development is proposed to be captured in two sedimentation basins (A and B), to prevent any increase in discharge and to manage water quality leaving the site.

The chance of an area being flooded is described as the Annual Exceedance Probability (AEP). The sedimentation basin capacities are sufficient to capture the 1 % 24 hr AEP flood event without overtopping, however, the 1 % AEP flood extent associated with these creeks do not impact the development area.

Water modelling indicates the development will have minor impact on flooding and pondage around the project site. The degree of afflux predicted on the site varies from -10 to 10mm variation across most of the site during a peak flood level event of 1% Annual Exceedance Probability (AEP), often referred to as a one in a hundred-year flood. The majority of areas showing greater levels of afflux (>10mm) are within the project disturbance footprint. Figure 1 below shows the limited extent of predicted afflux across the site in relation to the project disturbance footprint.

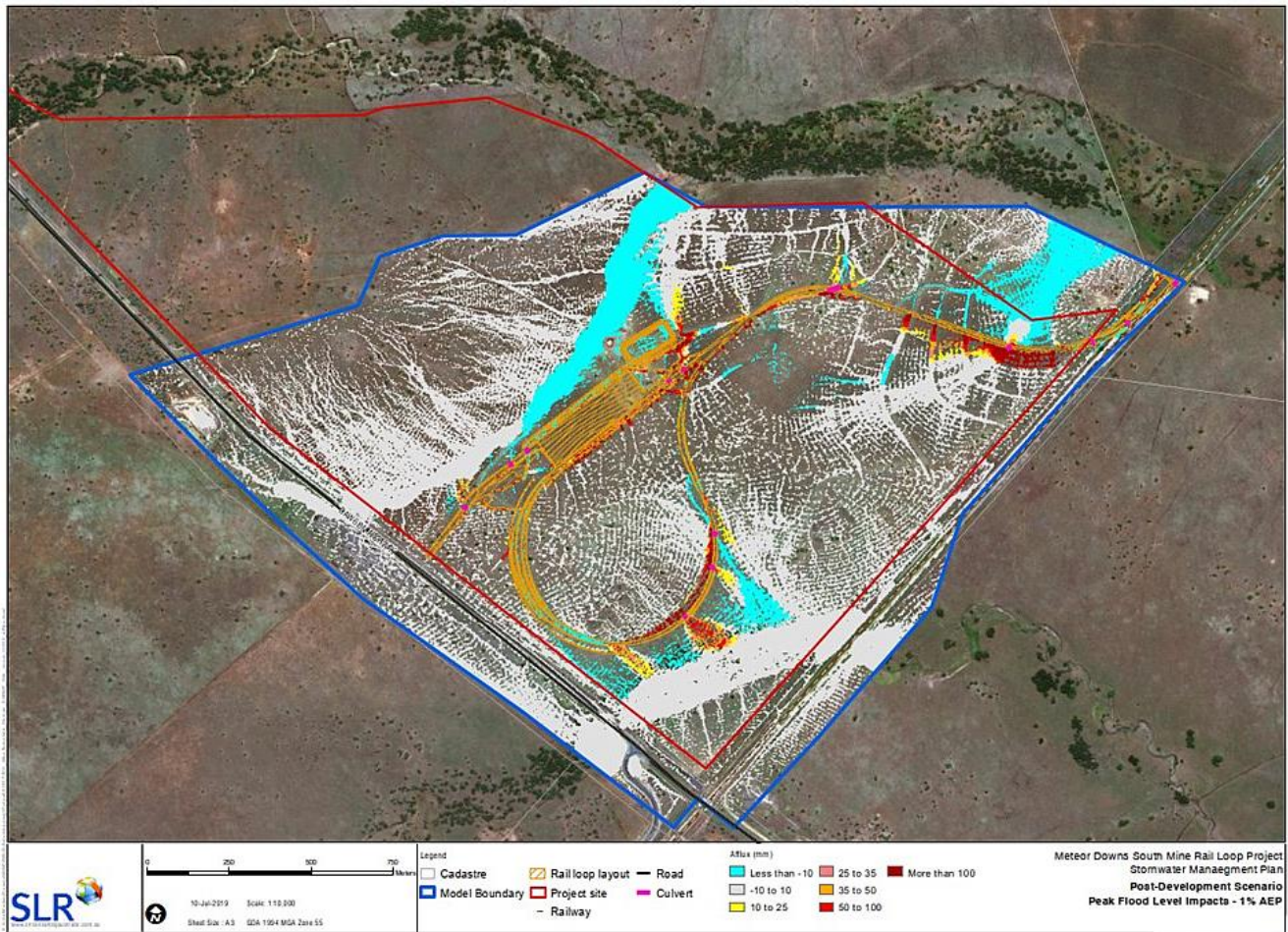


Figure 1: Predicted afflux levels during peak flood levels (1% AEP)

3 Impacts of changed surface hydrology on Matters of National Environmental Significance

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, which are defined in the EPBC Act as matters of national environmental significance (MNES). The MNES listed in the EPBC Act that are relevant to this report are:

- Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin threatened ecological community (Natural Grasslands TEC) - listed as endangered under the EPBC Act.
- King Bluegrass (*Dicanthium queenslandicum*) - listed as endangered under EPBC Act and vulnerable under the *Queensland Nature Conservation Act* (1992).

The Natural Grasslands TEC is represented on site by the state-equivalent unit Regional Ecosystem 11.8.11 (*Dicanthium sericeum* grassland on Cainozoic igneous rocks). At total of 77.02ha of the Natural Grasslands TEC occurs within the project footprint. The TEC was determined to occur within the Leucaena plantation, so 78.1ha of Natural Grasslands TEC will be retained and managed on the 175ha project site. The distribution of the Natural Grasslands TEC on site is shown in **Figure 2** below.

King Bluegrass habitat occurs within approximately 87.73ha of the project site, with no King Bluegrass recorded within areas of Leucaena. Within the 79.7ha project footprint, 60.2ha does not contain any King Bluegrass, however, the project will result in the removal of 19.5ha of potential habitat containing approximately 7,766 King Bluegrass tussocks. A total of 68.23 ha of potential habitat for King Bluegrass will be retained in the 175 ha Project site. The distribution of King Bluegrass on site is shown in **Figure 3** below.

With the exception of the area occupied by the Leucaena plantation, there is a high degree of spatial overlap between these two MNES on site. They occur on flat or gently undulating rises, on fine textured soils (often cracking clays) derived from either basalt or fine-grained sedimentary rocks. Soils have either formed *in situ* or have been transported to form extensive alluvial plains along ancient and flood-prone watercourses in areas with relatively high summer rainfall (DSEWPaC 2012). These conditions are indicative of sites prone to periodic flood events.

Although Regional Ecosystem 11.8.11 is generally treeless, it may have scattered trees including *Eucalyptus orgadophila*, *E. melanophloia*, *Corymbia erythrophloia* and *Acacia salicina* (Queensland herbarium, 2019), the latter of which is noted to occur primarily along watercourses and floodplains where it has a tolerance to flooding (Calvert, 2010). *Acacia salicina* was found as scattered trees in association with the grassland community on site.

The soil and vegetation associations for these MNES indicate that they occur naturally in areas prone to periodic flooding and are reliant on landforms and soils created by periodic flooding. Flooding is not listed as a threatening process in the conservation and listing advice (TSSC, 2009) and the continued presence of King Bluegrass and the natural grassland TEC in an area observed to contain a seasonal and ephemeral wetland on site is further evidence that these MNES are not negatively impacted by either periodic flooding or temporary ponding of shallow water.

The flood assessment concluded that ponding or permanent retention of surface water either on the site or on adjoining land will not occur, and that all drains are free draining. The predicted afflux on site from -10 to 10mm variation during a peak flood level event of 1% Annual Exceedance Probability (AEP) would be regarded as trivial across a site where elevation varies by several metres ascending from Aldebaran Creek in the north to the Dawson Highway in the south. It is evident that during previous flood events, the degree of inundation of the Natural Grassland TEC and the King Bluegrass population must vary considerably across the range of elevations.

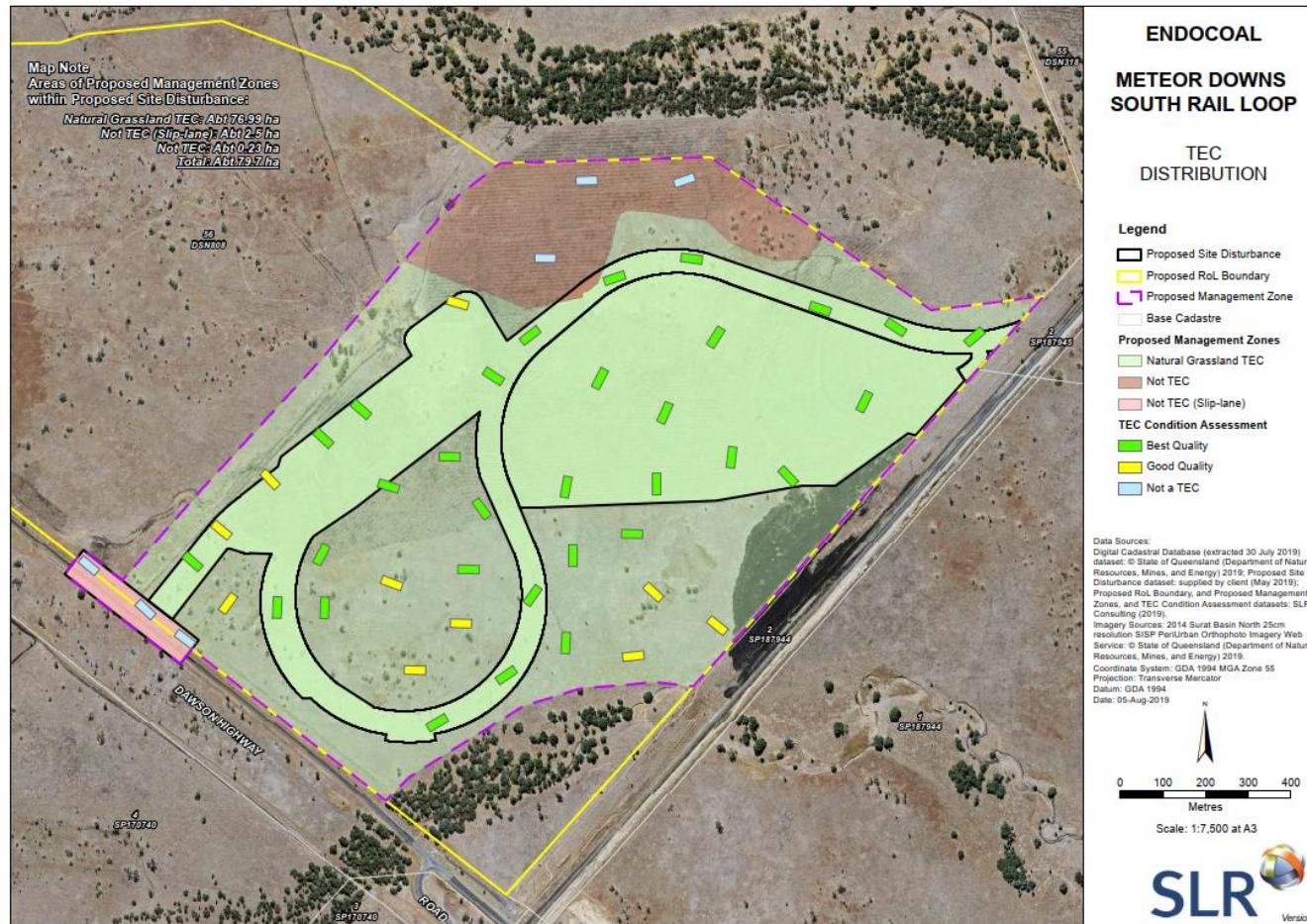


Figure 2: Distribution of the Natural Grasslands threatened ecological community on the project site (SLR 2019c)

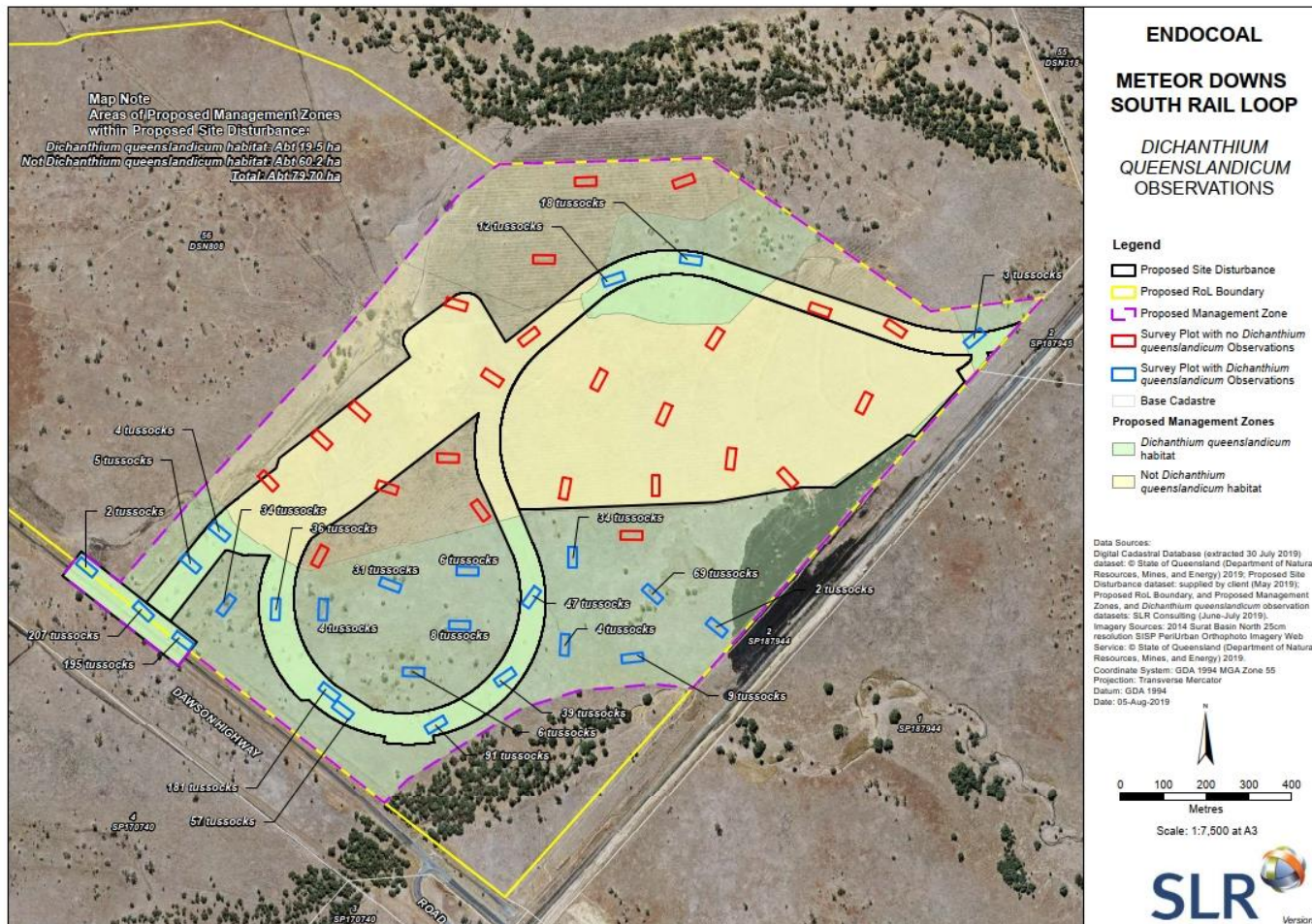


Figure 3: Distribution of King Bluegrass on the project site (SLR 2019c)

Other threatening processes may be influenced by flooding. Increased erosion as a consequence of infrastructure development is listed as a threatening process for King Blue Grass and its habitat (TSSC, 2009). These issues were addressed in the Flood Impact Assessment and Stormwater Management Plan (SLR 2019a) and in a subsequent site-specific Erosion and Sediment Control Plan (ESCP).

These reports concluded that erosion resulting from changed hydrology around infrastructure is unlikely. The proposed development has limited interference with overland flow. Eight culverts placed in existing drainage lines have been designed into the infrastructure plan and sized to minimise afflux and flooding in a 1 % AEP event. The Flood Impact Assessment and Stormwater Management Plan (SLR 2019a) showed:

- no impact, actionable nuisance, or worsening of stormwater, flooding or drainage to adjoining allotments or the Dawson Highway.
- some minor increases in flood levels within the railway corridor as a result of localised drainage works. The impacts are confined to the extent of the channel and do not affect the existing railway line ballast. Impacts are very isolated, up to 350 mm but more typically up to 40 mm. Associated increases in velocity are 0.3-0.5m/s.
- Existing flow paths are maintained, and therefore no increase in concentration of overland flow occurs on the existing railway line.
- overland flow paths through rain on grid (ROG) modelling and hydraulic conveyance through structures has been maintained. The proposed development does not impede or interfere with any drainage, stormwater or floodwater flows from the railway corridor.
- Proposed development does not adversely increase flood levels or velocities through existing drainage infrastructure.

Increased erosion or sediment loads have potential to negatively impact MNES. During construction, the ESCP will include a range of temporary erosion control measures developed in accordance with international best practice to prevent negative impacts on adjacent MNES. During operation of the rail loop, runoff from rainfall within disturbed areas has the potential to contain sediment. The Stormwater Management Plan outlines the management of clean and contaminated stormwater, with the diversion of clean stormwater around the site, while stormwater runoff from disturbed areas and the coal stockpile is diverted into Sediment Basin A for later use in dust suppression. It was calculated that runoff from the industrial area and coal stockpile during a 1% 24 hr AEP rainfall event would be approximately 20 ML, and this would be diverted into Sediment Basin A with a capacity of 32ML, with a 0.03% chance of overtopping in a 119 year period (SLR, 2019a). It is therefore unlikely that any sediment from within the project area will be transported to adjacent natural grassland communities, even during extreme rainfall events.

An indirect influence of flooding is changes to weed populations. Weed invasion, particularly *Parthenium* (*Parthenium hysterophorus*) and Buffel Grass (*Cenchrus ciliaris*) is considered a threatening process (TSSC, 2009). Buffel Grass is susceptible to flooding, with any inundation exceeding three days causing significant mortality of buffel (DAFF, 2008). Flooding or ponding of water on site would have potential benefit to the MNES through reduction in Buffel Grass.

Conversely, flooded country is very prone to *Parthenium* weed spread (CRC for Weed Management 2003). Within the study site, *Parthenium* was noted as being most prevalent in low-lying areas and along watercourses (SLR, 2019b). The potential impact of *Parthenium* on MNES was identified in the Meteor Downs Rail Loop King Bluegrass Impact Management Plan (SLR, 2019d) and strategies identified to minimise its impact, including grazing exclusion to allow the grassland community to maintain a high level of competitiveness to reduce weed invasion. This strategy aligns with recommendations from the CRC for Weed Management (2003) that flooded pastures may need to be spelled from grazing to gain their competitive edge over *Parthenium*.

4 Summary

The results of the Flood Impact Assessment and Stormwater Management Plan (SLR 2019a) show that even during an extreme 1% AEP event, afflux across the significant majority of area will be limited to $\pm 10\text{mm}$, as shown in Figure 1. The magnitude of predicted change in inundation cannot be considered significant when compared to the natural variation in topography across the site. A far greater variation of inundation would be experienced by MNES across the site during previous flood events. The most significant afflux will be experienced within the project disturbance footprint where MNES will not exist. The Flood Impact Assessment and Stormwater Management Plan demonstrate that ponding will not occur across the site, and that sediment-laden runoff from within the disturbed area will not influence adjacent MNES and its habitat. Potential impacts of flooding on site have been adequately predicted and managed through exceeding design capacity for an extreme 1% AEP event, which is unlikely to occur within the ten year lifespan of this project.

It is concluded that changes to surface hydrology is unlikely to have a significant impact to MNES and its habitat either through direct or indirect influences.

5 References

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