

Capricorn Stone Products Pty Ltd

Progressive Rehabilitation Closure Plan



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ENVIRONMENTAL CONSULTING

Capricorn Stone Products Pty Ltd – Progressive Rehabilitation
Closure Plan - Capricorn Sandstone Quarries, 227 Power
Station Road, Stanwell QLD 4702

Applicant Name: Capricorn Stone Products Pty Ltd

AR #:

Project #: Progressive Rehabilitation Closure Plan

EA Application #:

Existing EA Permit #: EPML04041216

Report Prepared by: STEER Environmental Consulting

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Client: Capricorn Stone Products Pty Ltd

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Abbreviations

- CSQ
- CSP
- DES
- DoR
- EA
- EP Act
- EPA
- ERA
- MERFP Act
- ML
- NUMA
- PMLU
- PRC Plan
- PRCP Schedule
- RMP
- The Application Form
- The Guideline
- The Site
- Capricorn Sandstone Quarries Pty Ltd
- Capricorn Stone Products Pty Ltd
- Department of Environment and Science
- Department of Resources
- Environmental Authority
- *Environmental Protection Act 1994*
- Environmental Protection Agency
- Environmentally Relevant Activity
- *Mineral and Energy Resources (Financial Provisioning) Act 2018*
- Mining lease
- Non use mining area
- Post Mining Land Use
- Progressive Rehabilitation and Closure Plan
- Progressive Rehabilitation and Closure Plan Schedule
- Rehabilitation Management Plan
- Submission of progressive rehabilitation and closure plan (ESR/2019/4957)
- Progressive Rehabilitation and Closure Plans (ESR/2019/4964)
- Capricorn Sandstone Quarries, 227 Power Station Road Stanwell, QLD 4702

Document Purpose

Capricorn Sandstone Quarries Pty Ltd (CSQ) operates an environmentally relevant activity (ERA) at 227 Power Station Road, Stanwell 4702 (the site) the conditions of Environmental Authority (EA) EPML04041216 (Appendix A) which is held by Capricorn Stone Products Pty Ltd (CSP). CSQ has a formal agreement with CSP to undertake the ERA at the site. The specific ERA undertaken at the site is as follows:

Schedule 3 20:

Clay pit mining, dimension stone mining or mining gemstones (including the material from which gemstones are extracted) (b) more than 100,000t but not more than 1,000,000t in a year

The *Mineral and Energy Resources (Financial Provisioning) Act 2018* (MERFP Act) was passed by Parliament on 30 November 2018. The MERFP Act amended the *Environmental Protection Act 1994* (EP Act) to include new requirements for progressive rehabilitation and closure of mined land. The amendment to the EP Act requires EA holders to develop and submit a progressive rehabilitation and closure plan. A progressive rehabilitation and closure plan consists of two parts:

1. The rehabilitation planning part (PRC plan), and
2. A progressive rehabilitation and closure plan schedule (PRCP schedule).

This document forms the rehabilitation planning part of the progressive rehabilitation and closure plan.

PRC Plan Structure

This PRC plan is structured to comply with section five of the application form “*Submission of progressive rehabilitation and closure plan*” (ESR/2019/4957) (the application form) which states:

Section 5 – PRC plan structure

The PRC plan must be prepared in accordance with the structure/format shown in Appendix 1 of this application form.

Section 6 of the application form states the following:

Section 6 – PRC plan Checklist

The PRC plan must meet the information requirements stated in section 3 of the Guideline – Progressive Rehabilitation and Closure Plans (ESR/2019/4964), and sections 126C and 126D of the EP Act (note there is a limited exception for transitional PRC plans).

This PRC plan is structured to comply with the requirements of section 5 of the application form and includes the information required in section 3 of the Guideline – “*Progressive Rehabilitation and*

Closure Plans” (ESR/2019/4964) (the Guideline), and sections 126C and 126D of the EP Act, except where exemptions apply for transitional applications.

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EA Holder – Capricorn Stone Products Pty Ltd.

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3 Rehabilitation Planning Part

The following sections follow the structure required by Appendix 1 of the application form and contains the information required in section 3 of the Guideline and sections 126C and 126D of the EP Act, except where exemptions apply for transitional applications.

3.1 Project planning

3.1.1 Baseline information

The mining activity at the site dates to the late 1800s and the current activity dates to the mid-1990s. Given the length of time since mining began in the 1800s and from when the original approval was granted, baseline data is unable to be located. The following sections do however provide baseline information where available.

3.1.1.1 Site topography - Local topography

The site consists of a sandstone outcrop which rises to an elevation of approximately 140 m at the eastern side of the activity down to 60 m on the western side of the activity (Figure 1).



Figure 1. Topography around the site (image QLD Globe ©).

3.1.1.2 Site topography - Regional topography

In a regional context, the topography consists of extensive rugged/mountainous areas interspersed with lower lying areas associated with watercourses. Elevations reach a height of 470 m in the Dee Range to the south-east, 400 m in the Moonlight Ranges to the north-west and the Native Cat Range to the west, and 500 m in the Berserker Range to the north-east (Figure 2). The Fitzroy River runs to the east of the site through the regional centre of Rockhampton into an extensive floodplain and ultimately discharges into the Pacific Ocean (Figure 2).

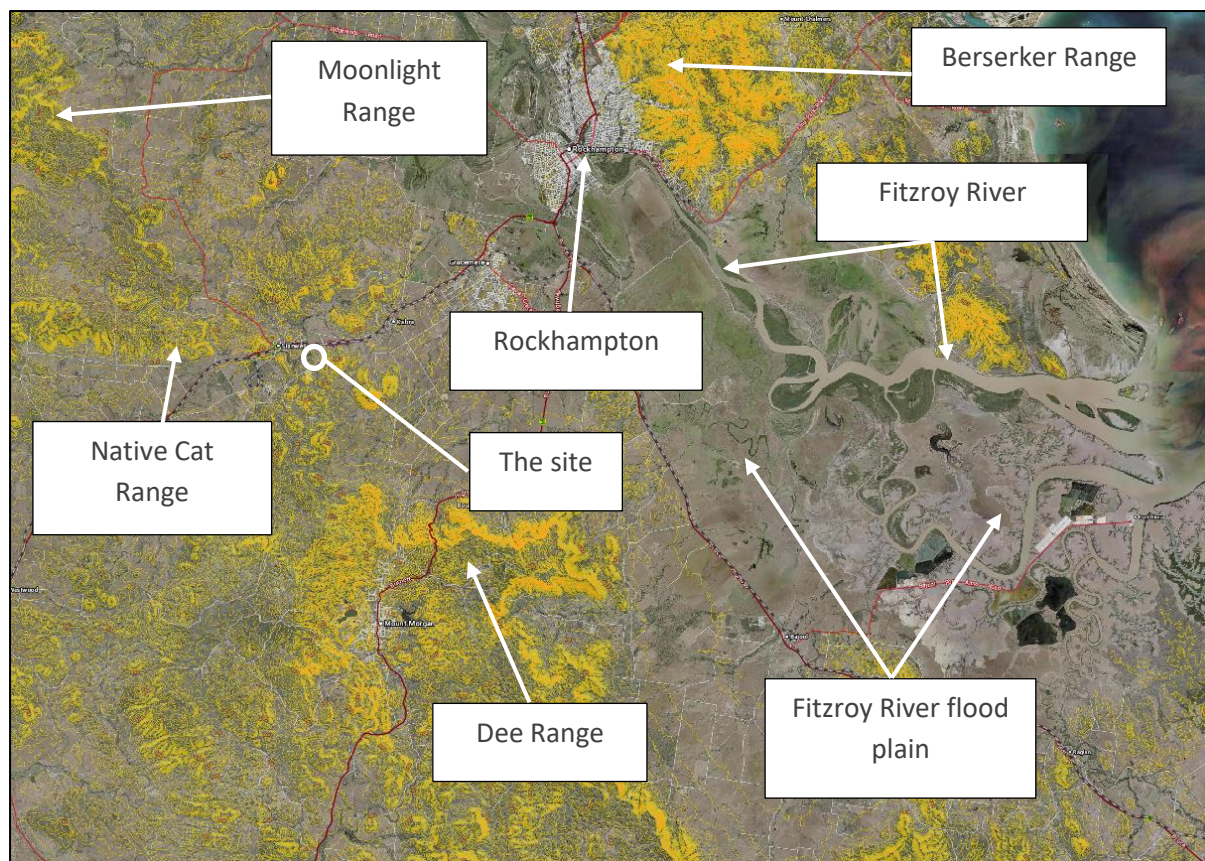


Figure 2. Regional topography (Image Qld Globe ©).

3.1.1.3 Climate

The average annual rainfall is 773 mm with the majority falling between October and March (Figure 3). Average temperature ranges from 32.2 °C in January to 9.7 °C in July. Note, climate data is from Rockhampton Aero approximately 17 km north-east of the site.

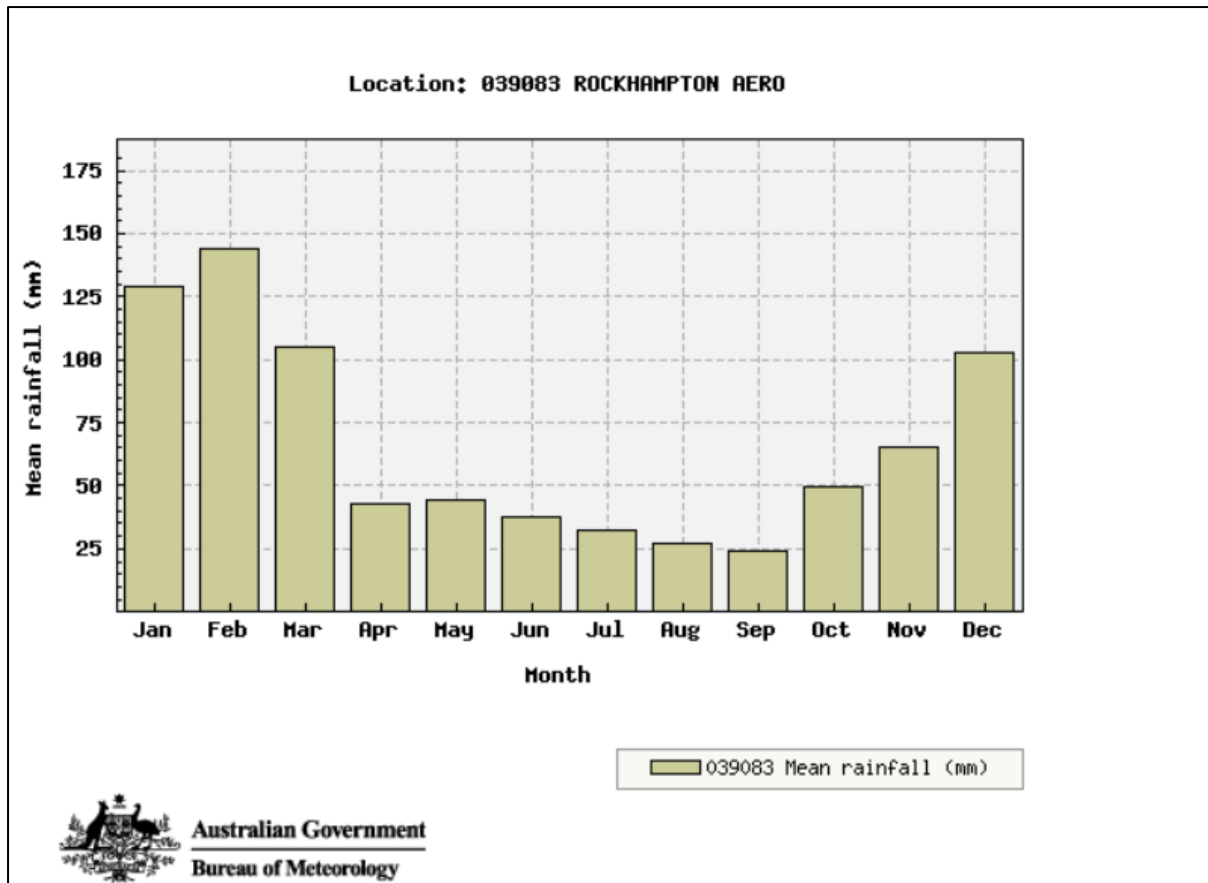


Figure 3. Average rainfall in the area (Source Australian Government Bureau of meteorology).

Annual evaporation for the area is between 2,000 mm and 2,400 mm (Figure 4).

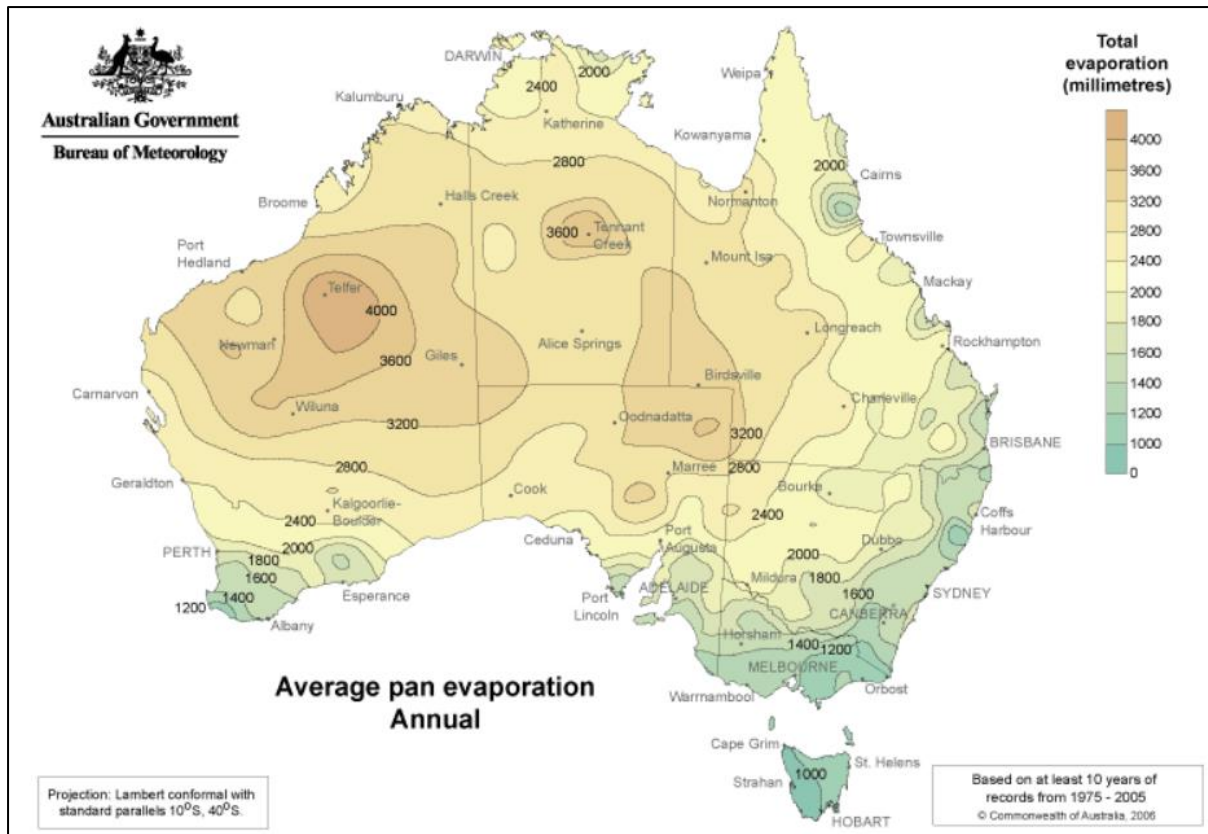


Figure 4. Average annual evaporation (Source Australian Government Bureau of meteorology).

3.1.1.4 Geology

A representation of geological formations in the area can be seen in Figure 5. A description of the geology of the site is as follows:

- Rock unit name:
 - Stanwell Formation.
- Lithological summary:
 - Mudstone, sandstone, siltstone, minor coal.
- Dominant Rock:
 - Arenite-Mudrock.
- Rock type:
 - Stratified unit (including volcanic and metamorphic).
- Age:
 - Early Cretaceous.

Geological information sourced from QLD Globe.

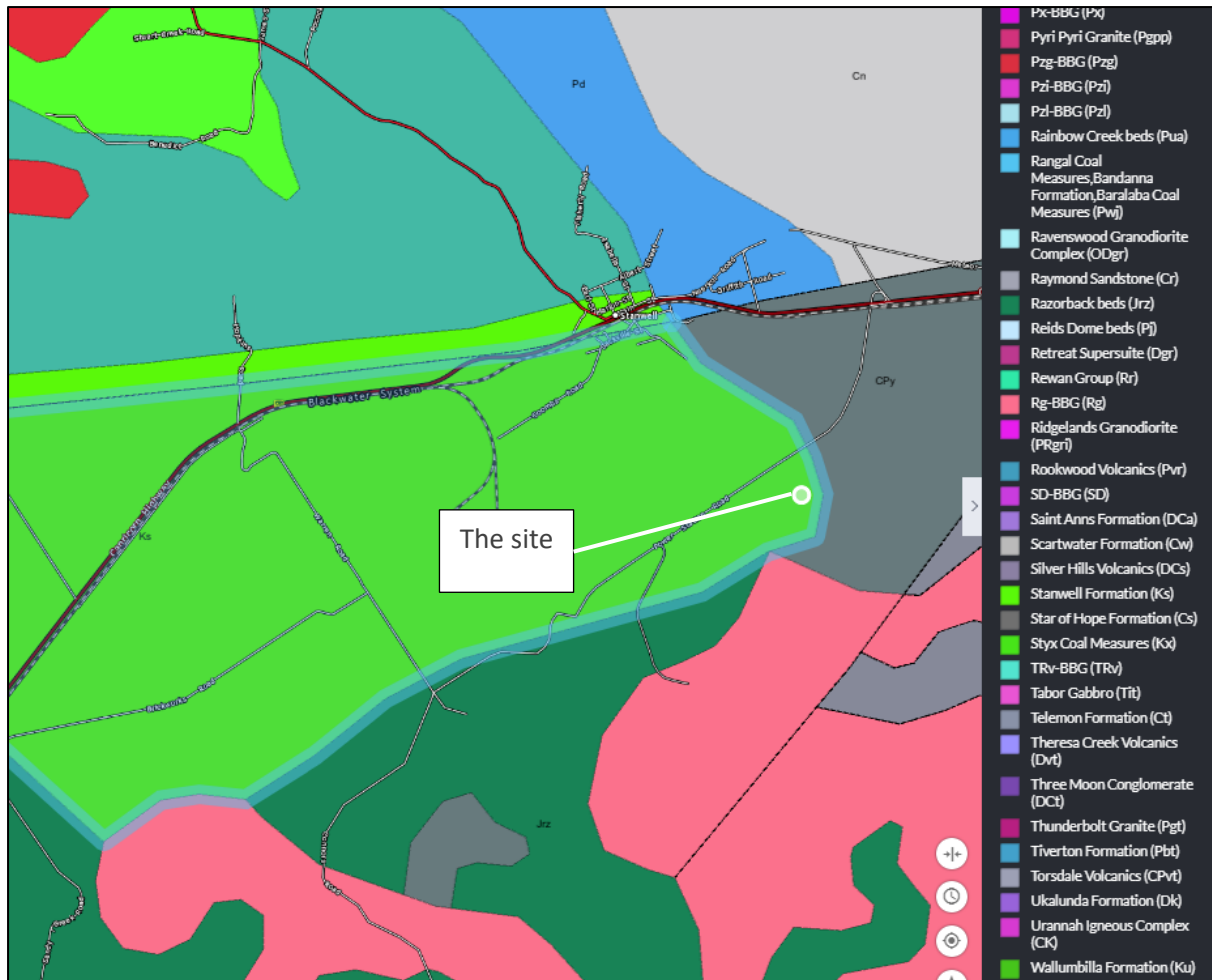


Figure 5. Local geology (Source QLD Globe).

3.1.1.5 Site hydrology and fluvial networks

As the original approval for this site dates to the mid-1990s, no information regarding assessment of site hydrology is available.

Neerkol Creek is located approximately 800 m to the north and two ephemeral tributaries are located approximately 550 m to the west and 400 m to the east (Figure 6).

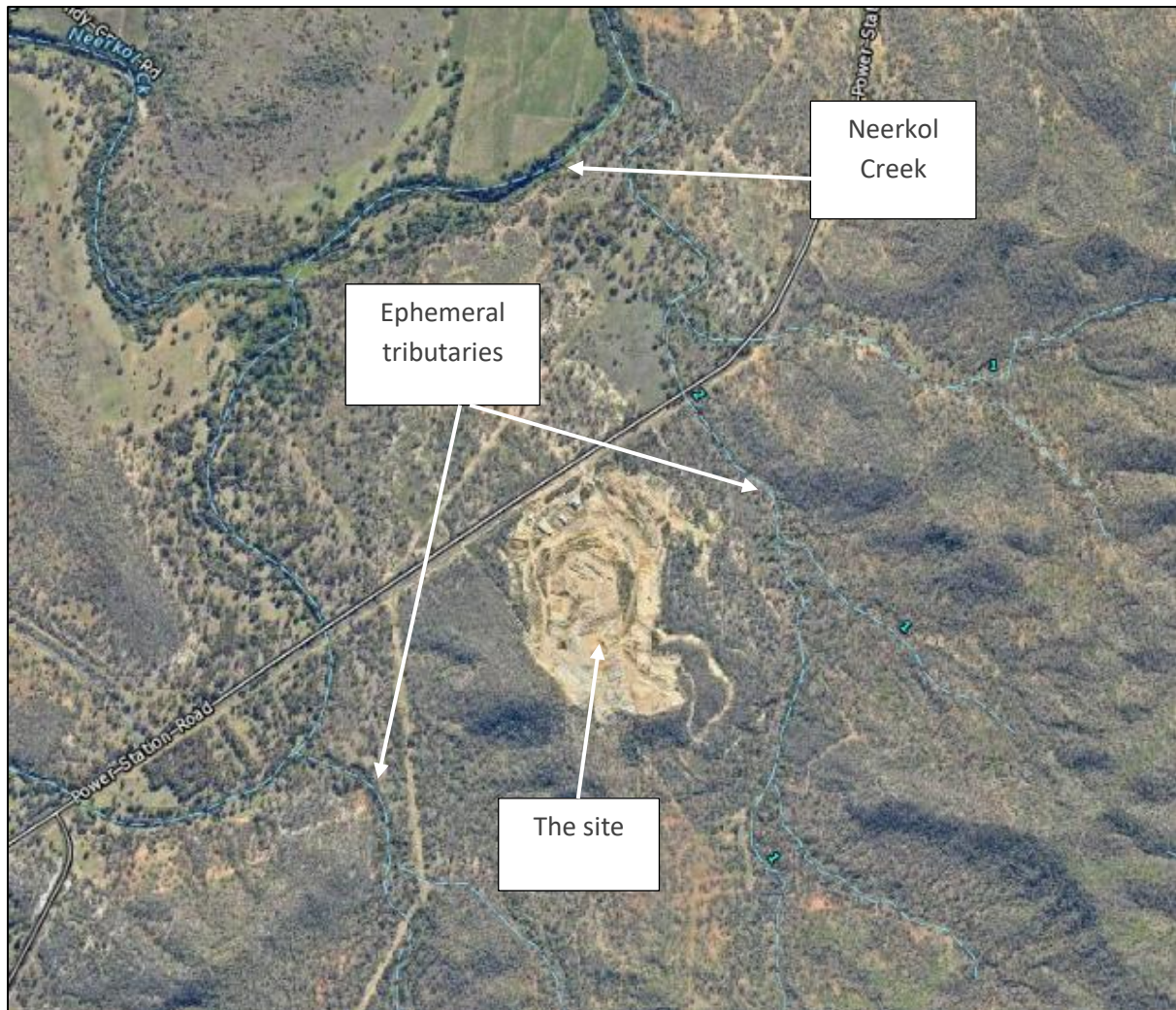


Figure 6. Fluvial networks near the site (Image Qld Globe ©).

3.1.1.6 Groundwater levels and properties

The closest bores to the site are located approximately 1.4 km to the west (RN 111668) and 1.7 km to the north (RN 91227). The bore report for RN 111668 contains no information regarding water level or quality. The bore report for RN 91227 indicates a water level of -6.0 m, however no information regarding water quality is included. As the original approval for this site dates to the mid-1990s, no information regarding assessment of groundwater is available.

3.1.1.7 Soil types, properties and productivity

The soils in the area are composed of weathered sandstone mixed with organic matter. As the original approval for this site dates to the mid-1990s, no information regarding assessment of soils at the site is available.

3.1.1.8 Land stability, vegetation communities and ecological data

The area is characterised by valleys alternating with sharply rising hills and ridges up to 150 m. The valleys are relatively stable with native ecosystems stabilising soils and preventing erosion. The steep, sharply rising hills and ridges are also stabilised by native vegetation; however the steepness of the area and the nature of the sandstone substrate render some areas relatively unstable from the perspective of potential erosion from rain events and the possibility of rockfalls. Much of the surrounding area is not considered appropriate for human traffic. The final landform design of the site will be inherently more stable than much of the surrounding area and will have no predisposition to ongoing stability issues.

3.1.1.9 Vegetation communities and ecological data (including existing regional ecosystem mapping)

The document “*Ecological Assessment Supporting Information Report Capricorn Stone Products Pty Ltd*” includes an assessment of vegetation communities and ecological data in the area and is included as Appendix B.

Regional ecosystem mapping is included as Appendix C.

3.1.1.10 Fauna presence and populations

The document “*Ecological Assessment Supporting Information Report Capricorn Stone Products Pty Ltd*” includes an assessment of fauna in the area and is included as Appendix B.

3.1.1.11 Pre-mining land use

The pre-mining land use was natural ecosystem.

3.1.1.12 Identification of underlying landholders.

Capricorn Stone Products Pty Ltd are freehold owners of the following Lots on Plans:

- 179 LN2465.
- 252 SP275125.

The following Lots on Plans are state owned reserve parcels:

- 184 LIV40877.
- 1 LIV40877.

The following Lots on Plans are state land parcels:

- 1 LIV40877.
- 2 LIV40877.
- 3 LIV40877.
- 4 LIV40877.
- 5 LIV40877.
- 6 LIV40877.

The location of the Lots on Plan can be viewed in Figure 7.

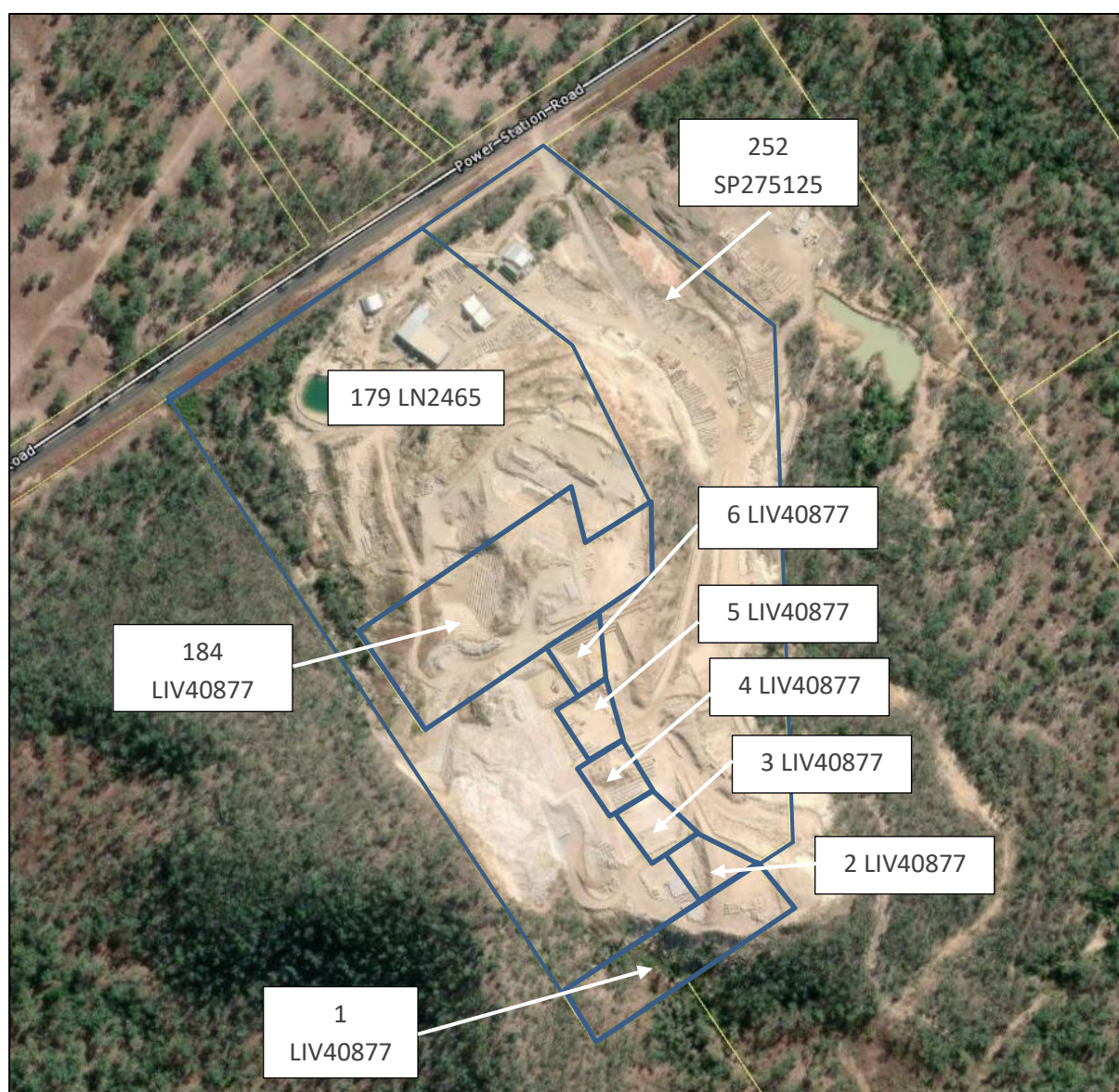


Figure 7. Lots on Plan at the site (Image QLD Globe ©).

3.1.2 Project description

The following sections provide a description of the project as per the Guideline.

3.1.2.1 Mining tenements

The mining leases on the subject parcels of land are ML 80102 (18.84 ha) and ML 7341 (5.97 ha). The extent of these leases can be seen in Figure 8.



Figure 8. Mining leases at the site (Image QLD Globe ©).

3.1.2.2 Primary mine features

The mining operation consist of mechanically sawing sandstone blocks from the hillside. There are no chemical processes used at any point in the mining process. The resource being extracted exists as a sandstone outcrop rising to approximately 140 m. As such there is no interference with any aquifers (saline or otherwise) and there is no interaction with acid forming rock or acid sulphate soils. Given these characteristics, there are no waste rock dumps, heap leach pads, contaminated water storages, tailings dams, pits, voids or any other hazardous features associated with the mine.

Primary mine features include the following:

- Buildings including.
 - Staff amenities.
 - Administration.
 - Workshops.
 - Processing.
- Stormwater management dams.
- Minor fuel storage (max 12,000 L).

The location of these items as well as the approximate location of the extraction and laydown areas can be seen in Figure 9.



Figure 9. Approximate locations of stormwater management dams (blue polygons), buildings (purple polygons), lay down areas (white polygon), extraction area (yellow polygon) and minor fuel storage (red circle) (Image QLD Globe ©).

3.1.2.3 Type of mining operation

The mining operation at the site is a simple process. The resource which is being extracted is purely sandstone which exists as an outcrop that rises from the surrounding area to a height of approximately 140 m. The sandstone is cut into large blocks using large circular saws mounted on excavators (Figures 10 and 11). The sandstone blocks may be sold whole or further processed into smaller value-added products (Figure 12). The further processing of sandstone blocks is essentially identical to the

extraction process as it consists of mechanically sawing larger sandstone blocks into smaller ones. There are no chemical processes involved at any stage of the activity and therefore there is no production of contaminants which have the potential to cause environmental harm. The only contaminant produced as a result of the mining process is sediment from disturbed areas and from the sawing of sandstone blocks. Sediment from disturbed areas and from the sawing of sandstone blocks is managed by onsite stormwater management infrastructure.

There are no exploration permits, mineral development licences, mining claims or petroleum tenures associated with the activity.



Figure 10. Excavator mounted saw.



Figure 11. Excavator mounted saw cutting blocks at the site.



Figure 12. Smaller value-added products in storage at the site.

3.1.2.4 Proposed duration of operation as a whole

The sandstone resource at the site is a highly valuable commodity which is extracted at an extremely slow rate when compared to common mining operations of minerals and coal. The most recent lidar

investigation (2012) identified in excess of 4,897,000 m³ of winnable sandstone remaining in the ML area. This volume of sandstone equates to approximately 11,500,000 tonnes of sandstone. Annual extraction at the mine ranges 20,000-50,000 tonnes. Therefore, even at maximum extraction rates of 50,000 tonnes per annum the mine would have a life of 230 years. However, for discussion relating to the life of the mine a much more conservative figure of 80-100 years is generally used.

Sandstone from the mine is of extremely high quality and is in demand for new works and restoration of historic structures. It is fully expected that the mine will continue to operate on exactly the same footprint as it currently occupies for at least the next century.

3.1.3 Design for closure

The Guideline identifies one of the main purposes of the PRC plan is for applicants to plan how ERAs will be carried out in way that maximises progressive rehabilitation. The characteristics of the resource and the mining activity at the site makes planning for progressive rehabilitation impractical. This is explained in detail in section 3.1.13.1 “*Maximising progressive rehabilitation*”.

In regard to design for closure, the Guideline states the following:

*To demonstrate that rehabilitation will be maximised for the mine site, the rehabilitation planning part of the PRC plan **for new or expanding sites** must include a description of how the following aspects have been designed for closure:*

- *location of mine features/infrastructure, having regard to the following considerations:*
 - *protection of environmental values of the site and receiving environment, including matters of National Environmental Significance, matters of State Environmental Significance and matters of Local Environmental Significance*
 - *surrounding land uses and proximity to sensitive receptors*
 - *proximity to the open-pit exit or exits*
 - *the gradient of the footprint area, both for the direction of drainage from the landform and for the dumping costs*
 - *local and regional topography*
 - *surface and ground water features (quality, quantity and seasonal variation)*
 - *geotechnical conditions (i.e. soil/rock characteristics) and suitability for the structure type (i.e. presence of structural features that may transmit seepage)*
 - *competing water and land uses*
 - *visual impact*
- *size, shape and design of mine features/infrastructure (e.g. waste rock dump design)*
- *mining methods (such as utilising underground methods versus extraction via an open cut pit).*

As the site is **neither new nor expanding**, information regarding these items has not been included.

3.1.3.1 *Maximising progressive rehabilitation*

The sandstone resource which is the focus of the mining activity at the site is highly variable, with different colours and grades of sandstone existing at different locations across the site. This results in

multiple active extraction faces existing simultaneously across the site (Figure 13) as operations move between different areas depending on customer requirements. This effectively results in the entire extractive area being active for the entire life of the mine. As discussed in section 3.1.12.4 *“Proposed duration of operation as a whole”*, the volume of available material at the site will last for approximately 80 to 100 years. There is no way to foresee what customer demands will be that far into the future, therefore there is no realistic way to know in which order different areas will be exhausted. This makes planning for progressive rehabilitation impractical until the activity draws closer to exhausting the resource. The maximum approved disturbance area at the site is only 23 hectare’s which is extremely small for a mining operation. Given there will be no exhausted areas available for rehabilitation until many decades into the future and the relatively small size of the disturbed area, rehabilitation will be planned for the entire site upon exhaustion of all winnable resource.

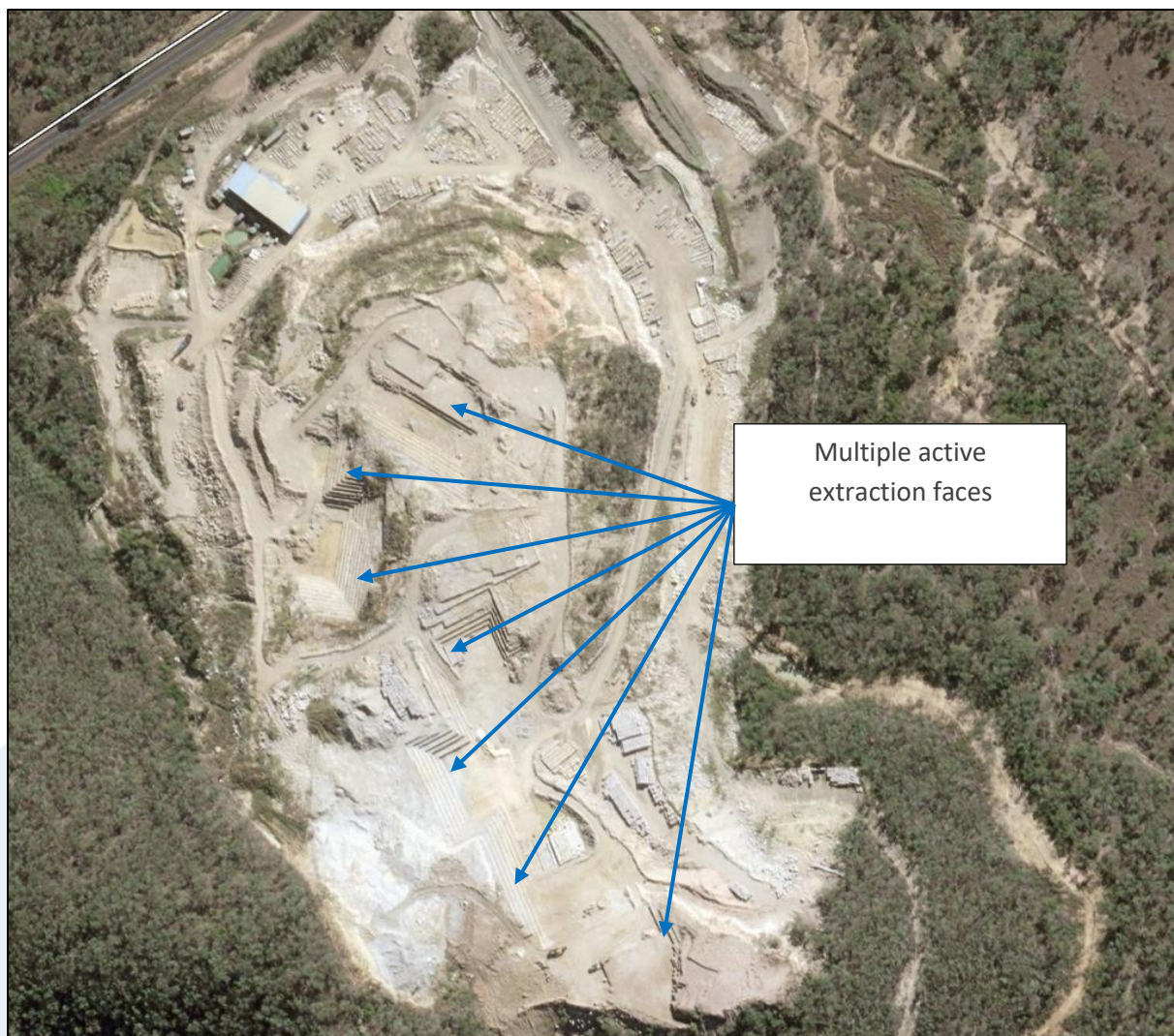


Figure 13. Multiple active extraction faces at the site (Image QLD Globe ©).

3.1.4 Rehabilitation/improvement planning

As discussed in section 3.1.12.1 “*Maximising progressive rehabilitation*”, the characteristic of the resource and the resulting multiple active extraction faces across the site makes progressive rehabilitation of the site impractical. Given this, the current PRC plan will consider the site as a whole for rehabilitation purposes.

The Guideline states:

In order to meet the legislative requirements in sections 126C(1)(b) and (c)(ii) of the EP Act, the rehabilitation planning part must include:

- *identification of all relevant activities on the mine site*
- *the predicted duration of each of the relevant activities proposed for the mine site*
- *the size/extent of the relevant activities*
- *whether the different relevant activities can be progressively rehabilitated.*

The activities at the mine site are relatively simple and include the following:

- Extraction areas.
- Lay down areas.
- Administration and staff amenities.
- Workshops and processing area.
- Stormwater management infrastructure.

All of the above activities will continue for the entire duration of the mine site which is estimated to be approximately 80 to 100 years. The size/extent of these activities can be seen in section 3.1.12.2 “*Primary mine features*”. As previously stated, the multiple active extraction faces at the site does not allow for the progressive rehabilitation of the site.

3.1.5 Spatial information

Spatial information for the following has been provided:

- The location and maximum extent of disturbance footprint for the mine life.
- The post mining land uses (PMLU) for the area within the resource tenures.

Spatial information which has not been included and justification for doing so is as follows:

- Spatial information for non-use mining areas (NUMA) has not been included as there are no NUMAs associated with the activity.
- Spatial information for sensitive receptors has not been included as the nearest sensitive receptor is approximately 1.7 km from the site.
- Spatial information for floodplains has not been included as there are no floodplains associated with the site.
- Spatial information for existing rehabilitation areas has not been included as there is no existing rehabilitation associated with the site.

The mining activity at the site is an extremely slow process with all extraction areas expected to remain active for the entire life of the mine which is approximately 80 to 100 years. Given this, no spatial information regarding rehabilitation for the next ten years has been included.

3.2 Post mining land use

Land outcome documents for the site include the following:

- EA EPML04041216 (Appendix A).
- Capricorn Stone Products PL Rehabilitation Management Plan (9.11.16) (Appendix E).
- Landholder Agreement (Appendix F).

EA EPML04041216 includes conditions relating to rehabilitation at the site. Condition C3 of the EA states the following:

Rehabilitation

A Rehabilitation Management Plan (RMP) must be developed by an appropriately qualified person and include at least the following;

- a) The post-mining land use;*
- b) Rehabilitation must comply with the Guideline Resource Activities — Rehabilitation requirements for mining resources activities (EM1122);*
- c) State the rehabilitation objectives proposed to achieve the rehabilitation goals of;*
 - i. safe to humans and wildlife;*
 - ii. non-polluting;*
 - iii. stable;*
 - iv. able to sustain an agreed post-mining land use;*
- d) Describe the methods of rehabilitation needed to achieve the rehabilitation objectives and goals;*
- e) State the completion criteria proposed to measure the success of rehabilitation objectives and goals.*

Condition C4 of EA EPML04041216 states the following:

The RMP must be submitted to the administering authority by 9 November 2016.

The RMP was submitted as per conditions C3 and C4 of the EA on 16 November 2016 and subsequently accepted by the administering authority.

Regarding PMLUs, the Guideline states the following:

Where a PMLU has been previously addressed in a land outcome document and is able to be transitioned into the PRCP schedule, the holder is not required to complete the information requirements under section 126C(1)(j) of the EP Act in this section for those PMLUs.

The RMP which was provided to the administering authority on 16 November 2016 identifies and addresses the PMLUs which are applicable to the site. Given this, there is no requirement to complete the information requirements under section 126C(1)(j) of the EP Act for those PMLUs.

The PMLUs for the site include native ecosystem and future industry. The site is located at 227 Power Station Road, Stanwell 4702. This site is within the special management area directly adjacent to the Stanwell-Gladstone Infrastructure Corridor State Development Area. The area is zoned to allow for future development of high and low impact industry with the Stanwell Power Station already operating in the special industry zone immediately to the west of the site (Figure 14). The PMLU of future industry is consistent with local and state government plans.

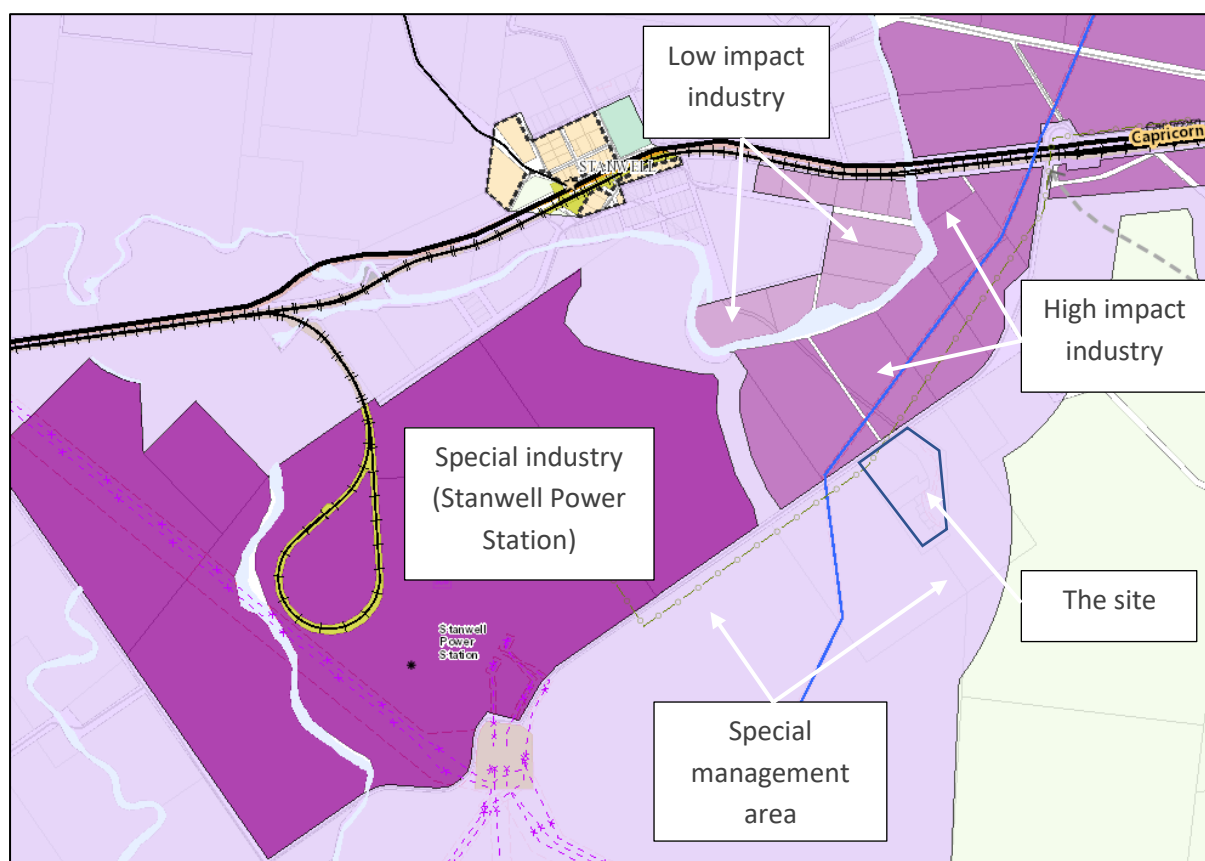


Figure 14. Zones within the Stanwell-Gladstone Infrastructure Corridor State Development Area surrounding the site.

3.3 Non-use management areas

There are no NUMAs associated with the activity.

3.4 Voids in flood plains

There are no voids associated with the activity.

3.5 Community consultation

3.5.1 Community consultation register

Section 126C (1)(c)(iii) of the EP Act requires a proposed PRC plan include details of consultation undertaken by the applicant in developing the proposed PRC plan. Section 3.5 of the Guideline requires the rehabilitation planning part must include a community consultation register identifying the consultation which was carried out. The Guideline requires the community consultation register include the following details:

- Consultation date(s)
- Identification of each community member
- Description of consultation type (workshop, quarterly meetings, etc.)
- Information provided to the community
- Issues raised/discussed by the community
- How issues have been considered
- Decisions/outcomes of engagement
- Commitments made by the applicant.

The mining operation at the site began in the late 1800s and has continued from this time. As the current mining activity was approved in the mid-1990s, no specific details regarding community consultation which was undertaken at the time is available. A summary of the consultation which would have been necessary to gain approval for the project is as follows:

- Consultation with local government to secure land use approvals as required by the relevant planning instrument of the time.
- Consultation with DES (then EPA) to secure approval for the activity.
- Consultation with local government to secure a compensation agreement.
- Consultation with the state to secure a sales permit for resources and to negotiate royalties payable for extraction of resources.

Consultation with DES resulted in the land use document EA EPML0401212 being approved on 4 August 2016. Condition C4 required a Rehabilitation Management Plan (RMP) be developed and submitted to DES by 9 November 2016. The RMP was submitted as per the requirements of the EA and subsequently accepted by DES. The PMLUs in this PRC plan are consistent with the PMLUs identified in the RMP which was provided to DES on 9 November 2016.

3.5.2 Community consultation plan

Section 126C (1)(c)(iv) of the EP Act requires a proposed PRC plan include details of how the applicant will undertake ongoing consultation in relation to the rehabilitation to be carried out under the plan. This community consultation plan is intended to address the requirements of Section 126C (1)(c)(iv) of the EP Act.

The Guideline includes information regarding items which the applicant of a PRC plan is expected/must address as part of the community consultation plan. These items are as follows:

- Identification relevant members of the community.
- Objectives of community consultation.

- Proposed consultation frequency.
- Information to be released for community consultation.
- How feedback/comments will be considered.

The following sections will address the items required by the Guideline.

3.5.2.1 Community identification

Identified relevant members of the community are as follows:

- Rockhampton Regional Council.
 - CSP has a compensation agreement with RRC for ML7341.
- Stanwell Corporation
 - Operators of the Stanwell Power Station which is approved by EA EPPR00708913 on the adjoining Lot on Plan 177 LN2465.
 - Stanwell corporation also own adjoining Lots on Plan which are not associated with EA EPPR00708913. These are as follows:
 - Lot 1 SP140242.
 - Lot 3 RP604041.
 - Lot 3 RP604044.
- Traditional owners.
 - Darumbal People Aboriginal Corporation Registered Native Title Body.
- Capricorn Conservation Council.
 - Local community environmental advocacy group.
- Fitzroy Basin Association.
 - Non-profit natural resource management organisation operating in the Fitzroy Region. The Fitzroy Basin Association provides environmental advice and assistance to landholders, community members and organisations, traditional owners, and government agencies.

3.5.2.2 Objectives of community consultation

The objectives of the community consultation include the following:

- Inform community members of the intended rehabilitation activities at the site.
- Address concerns which community members may have regarding rehabilitation activities.
- Access local knowledge from community members regarding enhancements which could be made to proposed rehabilitation activities.
- Inform community members of any proposed changes to rehabilitation at the site.

3.5.2.3 Proposed consultation frequency

The mining operation at the site will continue for the next 80 to 100 years, and there is currently no intention to alter the approved rehabilitation plan for the site. As rehabilitation of the site will not occur for another 80 to 100 years, The following community consultation frequencies are proposed:

- First community consultation process to take place within twelve months of the PRCP schedule being approved.

- Community consultation will take place every fifteen years following the first consultation.
- Additional community consultation will take place where there are changes to rehabilitation plans, final outcomes or the timing of progressive rehabilitation.

Significant areas of land to the north, west and northeast are zoned as high, medium and low impact industry. There is the potential for significant industrial activities to occur in the area over the life of the mine. Given the length of time the mine will be operational, the potential for considerable change in the makeup of the local community and environmental values, and the intention for the rehabilitation plan for the site to remain unchanged, there is little to be gained by more frequent community consultation at this time. Considering this, a fifteen-year consultation frequency will allow CSP to consider any changes in the community and industry in the local area over the life of the mine and make appropriate adjustments to the rehabilitation plan if required.

3.5.2.4 Information to be released

Information to be released will include the following:

- Details of the approved rehabilitation plan.
- Details of any proposed changes to the approved rehabilitation plan.
- Details of comments or submissions from previous community consultation.
- Details of any actions/proposed actions resulting from comments or submissions from previous community consultation.

3.5.2.5 How feedback/comments will be considered.

Feedback/comments will be considered using the following criteria:

- Is the source of feedback/comments considered to be a reliable source?
- Can the content of feedback/comments be verified using appropriate scientific principles?
- Are recommendations contained in feedback/comments likely to enhance rehabilitation outcomes?
- Are recommendations contained in feedback/comments likely to have a positive or negative impact on adjacent or downstream land uses and environmental values?
- Are recommendations contained in feedback/comments likely to be cost effective?

3.5.2.6 Community consultation tables

The information sheet 'Common Issues with Progressive Rehabilitation and Closure Plan Applications (PRCP applications)' published by DES contains advice regarding the recommended format of a community consultation register and plan. The information sheet highly recommends providing both the community consultation register and plan in tables and provides examples of appropriately formatted tables. As discussed in section 3.2.1, the current activity was approved in the mid 1990s and no specific information regarding community consultation from that time is available. Given this, there is no information available to populate a community consultation register table with therefore, no table has been included for a community consultation register. As the community consultation plan relates to future activities, a table containing the proposed details of the community consultation plan is included as Appendix D.

3.6 Rehabilitation management methodology

3.6.1 General rehabilitation practices

See RMP – Appendix D.

3.6.2 Tailings storage facilities

The activity does not generate mine tailings and therefore there are no tailings storage facilities associated with the activity.

3.6.3 Voids

There are no voids associated with the activity.

3.6.4 Underground mining

There is no underground mining associated with the activity.

3.6.5 Built infrastructure

See RMP – Appendix D.

3.7 Risk assessment

See Appendix G.

3.8 Monitoring and maintenance

See RMP – Appendix D.

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4 Appendices

Appendix A – EA EPML04041216

Permit

Environmental Protection Act 1994

Environmental authority EPML04041216

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

Environmental authority number: EPML04041216

Environmental authority takes effect on 20 May 2022.

Environmental authority holder(s)

Name(s)	Registered address
CAPRICORN STONE PRODUCTS PTY LTD	227 Power Station Road STANWELL QLD 4702

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Schedule 3, 20: Clay pit mining, dimension stone mining or mining gemstones (including the material from which gemstones are extracted) (b) more than 100,000t but not more than 1,000,000t in a year	ML7341 ML80102
Schedule 2, 16: Extraction and Screening 2: Extracting, other than by dredging, in a year, the following quantity of material (b) more than 100,000t but not more than 1,000,000t	Lot 1 on LIV40877, Lot 179 on LN2465, Lot 184 on LIV40877, Lot 2 on LIV40877, Lot 252 on SP275125, Lot 3 on LIV40877, Lot 4 on LIV40877, Lot 5 on LIV40877, Lot 6 on LIV40877
Schedule 2, 16: Extraction and Screening 3: Screening, in a year, the following quantity of material (b) more than 100,000t but not more than 1,000,000t	

Additional information for applicantsEnvironmentally 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).

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:

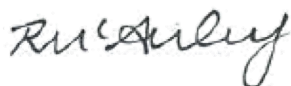
- a) if the authority is for a prescribed ERA and it states that it takes effect on the day nominated by the holder of the authority in a written notice given to the administering authority-on the nominated day; or
- b) if the authority states a day or an event for it to take effect-on the stated day 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 *Sustainable Planning Act 2009* 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.

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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.



Rebecca McAuley
Department of Environment and Science
Delegate of the administering authority
Environmental Protection Act 1994

Enquiries:

Minerals Business Centre
Department of Environment and Science
Phone: 07 4222 5352
Email: ESCairns@des.qld.gov.au

Date issued: 20 May 2022

Environmental authority EPML04041216**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)

Conditions of environmental authority

Location: ML7341 & ML80102

Relevant activities: Schedule 3 of the *Environmental Protection Regulation 2019*; ERA 20(b) - Dimension stone mining, if the activity involves mining a quantity of material of more than 100,000t but not more than 1,000,000t in a year.

Schedule 2 of the *Environmental Protection Regulation 2019*; ERA 16(2)(b) Extracting, other than by dredging, in a year, the following quantity of material - more than 100,000t but not more than 1,000,000t.

Schedule 2 of the *Environmental Protection Regulation 2019*; ERA 16(3)(b)—Screening, in a year, the following quantity of material—more than 100,000t but not more than 1,000,000t.

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

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Part 1 - Mining Activities	
Schedule A - General	
Condition number	Condition
A1	Conditions contained in Part 1 — Mining Activities of this environmental authority only apply to the mining activities conducted on ML7341 and ML-80102.
A2	This environmental authority authorises environmental harm referred to in the conditions. Where there is no condition or this environmental authority is silent on a matter, the lack of a condition or silence does not authorise environmental harm.
A3	In carrying out the relevant activity authorised by this environmental authority, the holder of this environmental authority must comply with the approved site plans (Attachment 1 — Approved site plans) and must not exceed the area of disturbance specified in Table A1 — Areas of disturbance on site (in ha) .
A4	The holder of this environmental authority must: a) install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority; b) maintain such measures, plant and equipment in a proper and efficient condition; c) operate such measures, plant and equipment in a proper and efficient manner; and d) Ensure all instruments and devices used for the measurement or monitoring of any parameter under any condition of this environmental authority are properly calibrated.

Table A1 – Table 1 – Areas of disturbance on site (in ha)

Domain Description	Disturbance Domain	Approximate Area (ha)
Total area of allotments under EA		24
Domains	Active mining	12
	Processing, set-down, overburden	10
	Stormwater management	0.9
	Buildings, structures, fuel/oil store	0.1
Total area of disturbance		23

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A5	Monitoring Except where specified by another condition of this environmental authority, all monitoring records or reports required by this environmental authority must be kept for a period of not less than five years.
A6	Financial assurance The activity must not be carried out until the environmental authority holder has given financial assurance to the administering authority as security for compliance with this environmental authority and any costs or expenses, or likely costs or expenses, mentioned in section 298 of the <i>Environmental Protection Act 1994</i>.
A7	The amount of financial assurance must be reviewed by the holder of this environmental authority when a plan of operations is amended or replaced or the authority is amended.
A8	Financial assurance must be lodged with the administering authority in the amount, the form and within the time required by the administering authority.
A9	Risk management The holder of this environmental authority must develop and implement a risk management system for relevant activities which mirrors the content requirement of the Standard for Risk Management (ISO31000:2009), or the latest edition of an Australian standard for risk management, to the extent relevant to environmental management, within 90 business days of the environmental authority effective date.
A10	Notification of emergencies, incidents and exceptions The holder of this environmental authority must notify the administering authority by written notification within 24 hours, after becoming aware of any emergency, monitoring result or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with, the conditions of this environmental authority.
A11	Within 10 business days following the initial notification of an emergency or incident, or receipt of monitoring results, whichever is the latter, further written advice must be provided to the administering authority, including the following: a) results and interpretation of any samples taken and analysed; b) outcomes of actions taken at the time to prevent or minimise unlawful environmental harm; and proposed actions to prevent a recurrence of the emergency or incident.

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A12	Complaints The holder of this environmental authority must record all environmental complaints received about the relevant activities including: a) name, address and contact number for of the complainant; b) time and date of complaint; c) reasons for the complaint; d) investigations undertaken; e) conclusions formed; f) actions taken to resolve the complaint; g) any abatement measures implemented; and h) the person responsible for resolving the complaint.
A13	The holder of this environmental authority must, when requested by the administering authority, undertake relevant specified monitoring within a reasonable timeframe nominated or agreed to by the administering authority to investigate any complaint of environmental harm. The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures, where implemented, must be provided to the administering authority within 10 business days of completion of the investigation, or no later than 10 business days after the end of the timeframe nominated by the administering authority to undertake the investigation.
A14	Third-party reporting The holder of this environmental authority must: a) within one year of the commencement of this environmental authority, obtain from an appropriately qualified person a report on compliance with the conditions of this environmental authority; b) obtain further such reports at regular intervals, not exceeding three-yearly intervals, from the completion of the report referred to above; and c) provide each report to the administering authority within 90 days of its completion.
A15	Amendments to standards, policies or guidelines Where a condition of this environmental authority requires compliance with a standard, policy or guideline published externally to this environmental authority and the standard is amended or changed subsequent to the issue of this environmental authority, the holder of this environmental authority must: a) comply with the amended or changed standard, policy or guideline within two years of the amendment or change being made, unless a different period is specified in the amended standard or relevant legislation; and b) until compliance with the amended or changed standard, policy or guideline is achieved, continue to remain in compliance with the corresponding provision that was current immediately prior to the relevant amendment or change.
Schedule B: Air	

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Condition number	Condition
B1	Dust and particulate matter monitoring The EA holder must ensure that the dust and particulate matter emissions generated by the relevant activities do not cause exceedances of the following levels when measured at any sensitive or commercial place: - Dust deposition of 120 milligrams per square metre per day, averaged over one month, when monitored in accordance with the most recent version of Australian Standard AS3580.10.1 Methods for sampling and analysis of ambient air—Determination of particulate matter—Deposited matter — Gravimetric method. - A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometres (PM 10) suspended in the atmosphere of 50 micrograms per cubic metre over a 24-hour averaging time, for no more than five exceedances recorded each year, when monitored in accordance with the most recent version of either: - Australian Standard AS3580.9.6 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—PM10 high volume sampler with size-selective inlet — Gravimetric method, or - Australian Standard AS3580.9.9 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—PM 10 low volume sampler—Gravimetric method. A concentration of particulate matter suspended in the atmosphere of 90 micrograms per cubic metre over a 1 year averaging time, when monitored in accordance with the most recent version of AS/NZS3580.9.3:2003 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—Total suspended particulate matter (TSP)—High volume sampler gravimetric method.
B2	The environmental authority holder must implement a dust management plan that ensures all reasonable and feasible avoidance and mitigation measures are employed so that dust and particulate emissions generated by the relevant activities do not migrate beyond the boundaries of mining leases ML7341 & ML80102.
Schedule C: Land	
Condition number	Condition
C1	Chemicals and flammable or combustible liquids All explosives, hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods and flammable and combustible liquids, including petroleum products, must be stored and handled in accordance with the current Australian standard.
C2	The environmental authority holder must minimise the potential for contamination of land and waters by diverting uncontaminated stormwater around contaminated areas and facilities used for the storage of chemicals and flammable or combustible liquids.
C3	Rehabilitation

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	A Rehabilitation Management Plan (RMP) must be developed by an appropriately qualified person and include at least the following; a) The post-mining land use; b) Rehabilitation must comply with the Guideline Resource Activities — Rehabilitation requirements for mining resources activities (EM1122); c) State the rehabilitation objectives proposed to achieve the rehabilitation goals of; i. safe to humans and wildlife; ii. non-polluting; iii. stable; iv. able to sustain an agreed post-mining land use; d) Describe the methods of rehabilitation needed to achieve the rehabilitation objectives and goals; e) State the completion criteria proposed to measure the success of rehabilitation objectives and goals.
C4	The RMP must be submitted to the administering authority by 9 November 2016 .
C5	Rehabilitation objectives must be successfully implemented by the holder of the environmental authority in accordance with the RMP prior to surrender of the EA.
C6	Contaminated Land Before applying for surrender of a mining lease, the holder must (if applicable) provide to the administering authority a site investigation report under the Act, in relation to any part of the mining lease which has been used for notifiable activities or which the holder is aware is likely to be contaminated land, and also carry out any further work that is required as a result of that report to ensure that the land is suitable for its final land use.
C7	The environmental authority holder must minimise the potential for contamination of land by hazardous contaminants.
Schedule D: Noise	
Condition number	Condition
D1	Noise limits The holder of this environmental authority must ensure that noise generated by the mining activities does not cause the criteria in Table D1 — Noise limits to be exceeded at a sensitive place or commercial place.

Table D1 – Noise Limits

Noise level dB(A) measured as:	Monday to Saturday			Sundays and Public Holidays		
	7am to 6pm	6pm to 10pm	10pm to 7am	9am to 6pm	6pm to 10pm	10pm to 9am
	Noise Measured at the nearest sensitive place					
L_{Aeq,adj, 15 mins}	CV = 50 AV = 5	CV = 45 AV = 5	CV = 40 AV = 0	CV = 45 AV = 5	CV = 40 AV = 5	CV = 35 AV = 0
L_{A1, adj, 15 mins}	CV = 55 AV = 10	CV = 50 AV = 10	CV = 45 AV = 5	CV = 50 AV = 10	CV = 45 AV = 10	CV = 40 AV = 5
	Noise Measured at the nearest commercial place					
L_{Aeq,adj, 15 mins}	CV = 55 AV = 10	CV = 50 AV = 10	CV = 45 AV = 5	CV = 50 AV = 10	CV = 45 AV = 10	CV = 40 AV = 5

Table D1 - Noise limits notes:

- 1 CV = Critical Value
- 2 AV = Adjustment Value
- 3 To calculate noise limits in Table D1:
 - i. If $bg \leq (CV - AV)$: Noise limit = $bg + AV$
 - ii. If $(CV - AV) < bg \leq CV$: Noise limit = CV
 - iii. If $bg > CV$: Noise limit = $bg + 0$
- 4 In the event that measured bg ($L_{A90, adj, 15 mins}$) is less than 30 dB(A), then 30 dB(A) can be substituted for the measured background level
- 5 bg = background noise level ($L_{A90, adj, 15 mins}$) measured over 3-5 days at the nearest sensitive receptor
- 6 If the project is unable to meet the noise limits as calculated above alternative limits may be calculated using the processes outlined in the "Planning for Noise Control" guideline.

D2	Monitoring and reporting Noise monitoring and recording must include the following descriptor characteristics and matters: a) LAN, T (where N equals the statistical levels of 1, 10 and 90 and T = 15 mins); b) background noise LA90; c) the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels; d) atmospheric conditions including temperature, relative humidity and wind speed and directions; e) effects due to any extraneous factors such as traffic noise; f) location, date and time of monitoring; and g) if the complaint concerns low frequency noise, Max LpLIN,T and one third octave band measurements in dB(LIN) for centre frequencies in the 10 — 200 1-1Z range.
D3	Restrictions The environmental authority holder is not permitted to undertake explosive blasting on the site.

Schedule E: Groundwater	
Condition number	Condition
E1	No Release to groundwaters The holder of this environmental authority must not release contaminants to groundwater.
E2	The environmental authority holder must develop a Groundwater Management Plan (GMP) sufficient to prevent any impacts to groundwater.
Schedule F: Waste	
Condition number	Condition
F1	Waste All waste generated in carrying out the activities permitted on this environmental authority must be reused, recycled or lawfully disposed of offsite.
Schedule G: Water	
Condition number	Condition
G1	Stormwater and water sediment controls An Erosion and Sediment Control Plan (ESCP) must be developed by a Certified Professional in Erosion and Sediment Control' and implemented by the environmental authority holder. The ESCP must be submitted to the administering authority by 9 November 2016. <i>Note: For all stages of the mining activities on the site, the ESCP must minimise erosion and the release of sediment to receiving waters and contamination of stormwater.</i>
G2	The stormwater runoff from disturbed areas, generated by (up to and including) a 24 hour storm event with an average recurrence interval of 1 in 5 years must be retained on site or managed to remove contaminants before release.
G3	The method of water sampling required by this environmental authority must comply with that set out in the latest edition of the administering authority's Water Quality Sampling Manual.
G4	Contaminants released from site Contaminants released from site must not exceed the limits defined in Table G3 - Contaminant release point and receiving waters limits when released from the points prescribed in Table G1 — Release points for contaminants released from site . <i>Note: A figure depicting release point locations is to be provided with the ESCP submitted in accordance with condition G1.</i>

G5	Contaminants released to receiving waters Contaminants released to receiving waters must not exceed the limits defined in Table G3 Contaminant release points and receiving waters limits when monitored at the points prescribed in Table G2 — Receiving waters monitoring points.
G6	During a release event parameters specified in Table G3 - Contaminated water release point and receiving waters limits must be monitored at the locations and frequencies specified in Table G1 — Release points for contaminant released from site and Table G2 - Receiving waters monitoring points, and illustrated in Figure 1 - Areas of disturbance on site. <i>Note: A figure depicting monitoring point locations is to be provided with the ESCP submitted in accordance with condition G1.</i>
G7	If any parameter monitored at the locations specified in Table G1 — Release points for contaminants released from site and Table G2 - Receiving waters monitoring points exceed the limits specified in Table G3 - Contaminant release points and receiving waters limits, the environmental authority holder must compare the downstream monitoring results to the upstream monitoring results, and: 1. If the downstream monitoring result is less than or equal to the upstream monitoring result and the receiving water limit, then no action is to be taken; 2. If the downstream monitoring result is greater than the receiving water limit, complete an investigation into the exceedances and the potential for environmental harm and provide a written report to the administering authority within 28 days of receiving the result, including: a) monitoring data required by conditions G1 and G2; b) details of the investigations into environmental harm; c) recommendations to prevent the exceedance of release limits and/or receiving waters limits; and d) actions taken to prevent environmental harm.

Table G1 — Release points for contaminants released from site.

Release point (RP)	Longitude TBA	Latitude TBA	Contaminated water source and location	Monitoring point	Monitoring frequency
RP2 ¹	TBA ¹	TBA ¹	TBA ¹	At release point during flow event	Within 2 hours of a then daily during a release
RP2 ¹	TBA ¹	TBA ¹	TBA ¹	At release point during flow event	
RP3 ¹	TBA ¹	TBA ¹	TBA ¹	At release point	

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				during flow event	
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Table G1 — Release points for contaminants released from site notes:

1. Release point locations and details must be provided with the ESCP which must be submitted to the administering authority in accordance with condition G1.

Table G2 — Receiving waters monitoring points.

Table 22 Receiving water monitoring points				
Monitoring points	Longitude	Latitude	Receiving waters location description	Monitoring frequency
Upstream reference monitoring points				
TBA ¹	TBA ¹	TBA ¹	TBA m upstream of the RPX TBA ¹	Within 2 hours of a release, then daily during a release
TBA ¹	TBA ¹	TBA ¹	TBA m upstream of the RPX TBA ¹	
Downstream compliance monitoring points				
TBA ¹	TBA ¹	TBA ¹	TBA m upstream of the RPX TBA ¹	Within 2 hours of a release, then daily during a release
TBA ¹	TBA ¹	TBA ¹	TBA m upstream of the RPX TBA ¹	

Table G2 — Receiving waters monitoring points notes:

1. Release point locations and details must be provided with the ESCP which must be submitted to the administering authority in accordance with condition G1.

Table G3 — Contaminant release points and receiving waters limits

Monitoring Parameter	Release point limit	Receiving waters limits
Suspended solids (TSS) mg/L	50 ⁴	85 ¹
Electrical conductivity (EC) uS/cm	250 ^{1,5}	445 ^{1,2}
pH	6.5 – 8.5 ¹	6.5 – 8.5 ¹
TBA ³	TBA ³	TBA ³

Table G3 — Contaminant release points and receiving waters limits notes:

1. Based on values for aquatic ecosystem protection, moderately disturbed ecosystems, derived from the Fitzroy River Sub-basin fresh waters, Table 2, Environmental Protection (Water) Policy 2009, Fitzroy River Sub-basin Environmental Values and Water Quality Objectives Basin No. 130 (part), including all waters of the Fitzroy River Sub-basin September 2011.

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2. Base flow electrical conductivity value from the Fitzroy River Sub-basin fresh waters, Table 2, Environmental Protection (Water) Policy 2009, Fitzroy River Sub-basin Environmental Values and Water Quality Objectives Basin No. 130 (part), including all waters of the Fitzroy River Sub-basin September 2011.
3. Any other water quality parameters that have the potential to exceed the receiving water quality objectives must be provided to the administering authority within 3 months of the environmental authority effective date. The parameters must be based on monitoring data of water storages that release to the receiving environment.
4. Based on values derived from the Best Practice Erosion and Sediment Control (BPESC) document.
5. High flow electrical conductivity value from the Fitzroy River Sub-basin fresh waters, Table 2, Environmental Protection (Water) Policy 2009, Fitzroy River Sub-basin Environmental Values and Water Quality Objectives Basin No. 130 (part), includes all waters of the Fitzroy River Sub-basin September 2011.

END OF PART 1

Part 2- Extractive and Screening Activities	
Schedule H - General	
Condition number	Condition
H1	Conditions contained in Part 2 — Extractive Activities of this environmental authority only apply to the extractive activities conducted on the approved land.
H2	Scale and intensity of activity This approval authorises the operation of plant and equipment associated with the extraction. The amount of extracted material from the quarry in any one (1) year is to be no more than 350,000 tonnes.
H4	Approved plans The environmental authority is approved generally in accordance with the plan in Appendix A .
H5	Hours of operation Extraction must only be carried out from Monday to Saturday inclusive (excluding public holidays), between 0600 and 1800 hours .
H6	Prevent and/or minimise likelihood of environmental harm A person carrying out an environmentally relevant activity (ERA) to which this approval relates, must take all reasonable and practicable measures to prevent and/or to minimise the likelihood of environmental harm being caused.
H7	A copy of this environmental authority must be kept in a location readily accessible to personnel carrying out the activity.

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H8	Record keeping The operator of an ERA authorised by this environmental authority must record, compile and keep all data required by this approval. These data must be made available to the administering authority upon request.
H9	All records required by this approval must be kept for five (5) years .
H10	Notification Any emergency, incident or event, which results in the release of contaminants not in accordance with, or reasonably expected to be in accordance with the conditions of this approval, must be reported by telephone to the administering authorities' Pollution Hotline² or the district office located in the area where the release occurred. Any such release must be reported as soon as the holder of the environmental authority becomes aware of the emergency incident or event. ²At the time of issuing this permit the number for the Pollution Hotline was 1300 130 372. This number may change at any time in the future and should be checked prior to use.
H11	Information to follow notification A written notice detailing the following information must be provided to the administering authority within seven (7) days of any advice provided in accordance with condition H10: - The name of the operator, including their approval/registration number; - The name and telephone number of a designated contact person; - The quantity and nature of the substance released; - Vehicle and registration details; - The names of person/s involved in the release and/or cleanup; - The location and time of the release; - The suspected cause of the release; - A description of the effects of the release; - Details of the area of impact; - The results of any sampling performed in relation to the release; - Actions taken to mitigate any environmental harm caused by the release and details of the success of these actions; and - Proposed actions to prevent a recurrence of the release.
H12	Alterations No change, replacement or operation of any plant or equipment is permitted if the change, replacement or operation of plant or equipment increases, or is likely to substantially increase the risk of environmental harm above that expressly provided by this environmental authority.
H13	Spill Kits An appropriate spill kit must be kept on site.
H14	Anyone operating under this environmental authority must be trained in the use of the spill kit.
Schedule I - Air	

Environmental authority EPML04041216

Condition number	Condition
I1	Odour Nuisance The release of noxious or offensive odours or any other noxious or offensive airborne contaminants resulting from the activity must not cause a nuisance at any nuisance sensitive place.
I2	Dust Nuisance The release of dust and/or particulate matter resulting from the activity must not cause an environmental nuisance at any nuisance sensitive place.
I3	Dust suppression measure must be implemented and maintained on site to prevent the movement of dust created as a result of the activity past the site boundaries.
I4	Dust emissions from stockpiles of material are to be controlled by reasonable and practicable methods such as the following; a) Water sprays; and b) Covers i.e. artificial covers such as tarpaulins or vegetation matter to prevent emissions.
I5	Release of dust or particulate, exceeding the following levels, when measured at any nuisance sensitive place, is considered as an environmental nuisance: a) Dust deposition of 4.0 grams per square meter per month, when measured in accordance with Australian Standard AS 3580.10:2003 Methods of sampling and analysis of ambient air — Determination of particulate matter — Deposited matter — Gravimetric method (or more recent edition); or b) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometres (PM10) suspended in the atmosphere of 50 micrograms per cubic metre over a 24 hour averaging period, at a nuisance sensitive place downwind of the site, when monitored in accordance with Australian Standard AS 3580 9.6 'Ambient Air — Particulate Matter — Determination of suspended particulate PM10 high volume sampler with size — selective inlet — gravimetric method'; or an alternative method of monitoring PM10 that may be permitted by the Air Quality Sampling Manual as published periodically by the administering authority.
I6	When requested by the administering authority, dust and particulate monitoring must be undertaken within a reasonable timeframe nominated by the administering authority, to investigate any complaint of environmental nuisance caused by dust and/or particulate matter. The results of the monitoring must be notified to the administering authority within seven (7) days following completion of the monitoring. Monitoring must be carried out at a place(s) relevant to the potentially affected nuisance sensitive place and at upwind control sites and must include: a) For a complaint alleging dust nuisance, dust deposition; b) For a complaint alleging adverse health effects caused by dust, the concentration per cubic metre of particulate matter with an aerodynamic diameter of less than 10 micrometres (μm) (PM10) suspended in the atmosphere over a 24hr averaging time.

Schedule J - Land	
Condition number	Condition
J1	Topsoil can be removed from site and utilised elsewhere.
J2	Protecting land from contaminants Activities on site must be conducted in a way that prevents any potential or actual release of contaminants to land.
J3	There are to be no fuels or oils stored on site for use with the extractive activity. Extraction equipment will be refuelled by transporting fuel on site.
Schedule J - Water	
Condition number	Condition
K1	Erosion protection measures and sediment control measures must be implemented and maintained to minimise: a) Erosion of soils in areas disturbed by the activity; and b) The release of sediment to any waters. Erosion protection and sediment control measures may include: a) Suitable banks; b) Structures; and c) Diversion drains.
K2	All waters flowing over disturbed areas including but not limited to the extraction area and storage areas, must be diverted to an onsite sediment basin.
K3	Sediment basins must be constructed and maintained: a) So as to minimise the likelihood of any release of contaminants or wastes through the bed or banks of the structure to any waters (including groundwater); b) So that a freeboard of not less than 0.5 meters is maintained at all times, except in the event of exceptional weather conditions where the maintenance of such is impossible.
K4	Contaminants must not be directly or indirectly released to any waters, including groundwater, or the bed or banks of any waters.
K5	Stormwater management Suitable banks and/or diversion drains must be installed and maintained so that all stormwater originating from land up-gradient of disturbed areas, including extraction and storage areas is diverted away from entering these areas and any ponds or other structures used for the storage or treatment of contaminants.
K6	Contaminants other than settled/treated stormwater runoff water must not be released to surface waters or the bed or banks of any watercourse.
Schedule L - Noise	

Environmental authority EPML04041216

Condition number	Condition
L1	Nuisance Noise resulting from the activity must not cause an environmental nuisance at any sensitive place.
L2	Noise from the activity must not result in levels greater than those specified in Table L1 — Noise Limits at any noise sensitive place or commercial place.

Table L1: Noise Limits

Noise level dB(A) measured as:	Monday to Saturday			Sundays and public holidays		
	7am - 6pm	6pm - 10pm	10pm - 7am	9am - 6pm	6pm - 10pm	10pm - 9am
	Noise measured at a 'Noise sensitive place'					
L_{A10} , adj, 15 mins	b/g + 5	b/g + 5	b/g + 0	b/g + 5	b/g + 5	b/g + 0
L_{A1} , adj, 15 mins	b/g + 10	b/g + 10	b/g + 5	b/g + 10	b/g + 10	b/g + 5
Noise measured at a 'Commercial place'						
L_{A10} , adj, 15 mins	b/g + 10	b/g + 10	b/g + 5	b/g + 10	b/g + 10	b/g + 5
L_{A1} , adj, 15 mins	b/g + 15	b/g + 15	b/g + 10	b/g + 15	b/g + 15	b/g + 10

Note 1: b/g = background noise level, *L_{A90,adj, 15mins}* In no case is the background noise level, *L_{A90 15mins}* to be less than 25dB(A). In the event that measured b/g is less than 25dB(A), then 25 dB(A) is to be used.

Note 2: The noise levels specified for *L_{A90,adj, 15mins}* are measured outdoors in the field at a location at least 4m from the external façade of a building at the nuisance sensitive or commercial place and 1.2m to 1.5m above ground level.

L3	When requested by the administering authority, noise monitoring must be undertaken within a reasonable timeframe nominated by the administering authority, to investigate any complaint of environmental nuisance caused by noise. The results of the monitoring must be notified to the administering authority within seven (7) days following completion of the monitoring.
L4	The method of measurement and reporting of noise levels in response to any noise monitoring conducted under this approval must be in accordance with the most recent edition of DERM's <i>Noise Measurement Manual</i> .
Schedule M - Social	
Condition number	Condition
M1	Complaint response

Environmental authority EPML04041216

	The operator of the activity must record the following details for all complaints received and provide this information to the administering authority on request: a) Time, date, name and contact details of the complainant; b) The allegation made by the complainant; c) Details of communications with the complainant; d) Any investigations undertaken; and e) Conclusions formed and any actions taken.
M2	The operator of the activity must attempt to make contact with any complainant within 24 hours of a complaint being received and initiate complaint resolution measures.
Schedule N - Waste	
Condition number	Condition
N1	All waste (not including overburden) generated in carrying out the activity must be disposed of at a facility that can lawfully accept that waste. No waste is to be disposed of on site.
N2	Waste, including vegetation matter, must not be burnt on site.
N3	Any spillage of wastes, contaminants or other materials must be cleaned up as quickly as practicable. Such spillages must not be cleaned up by hosing, sweeping or otherwise releasing such wastes, contaminants or material to any waters.

END OF PART 2

Definitions

Words and phrases used throughout this environmental authority are defined below. Where a definition for a term used in this environmental authority is not provided within this environmental authority, but is provided in the EP Act 1994 or subordinate legislation, the definition in the EP Act or subordinate legislation must be used.

'activity' means an environmentally relevant activity, or associated auxiliary activity to which this approval relates.

'Administering Authority' is the agency that administers the environmental authority provisions under the *Environmental Protection Act 1994*.

'appropriately qualified person' means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods or literature.

'background', with reference to the water schedule means the average of samples taken prior to the commencement of mining from the same waterway that the current sample has been taken.

'blasting' means the use of explosive materials to fracture:

- a) rock, coal and other minerals for later recovery, or
- b) structural components or other items to facilitate removal from a site or for reuse.

'bund' means:

- a) an earth mound or similar structure (e.g. a concrete block wall), whether impervious or not, constructed to contain spilled material (e.g. petrol, diesel, oil, etc.); or
- b) a structure to prevent or reduce soil erosion.

'certified', with respect to watercourse diversions, means assessed and approved by a suitably qualified and experienced person. In relation to 'as constructed' drawings and specifications, the certification must be by the suitably qualified person who supervised the construction of the watercourse diversion, or re-establishment of the watercourse.

'certification', 'certifying' or 'certified' by an appropriately qualified and experienced person in relation to a design plan or an annual report regarding dams/structures, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

- a) exactly what is being certified and the precise nature of that certification
- b) the relevant legislative, regulatory and technical criteria on which the certification has been based
- c) the relevant data and facts on which the certification has been based, the source of that material, and the efforts made to obtain all relevant data and facts

- d) the reasoning on which the certification has been based using the relevant data and facts, and the relevant criteria.

'Certified Professional in Erosion and Sediment Control', a CPESC is a recognised specialist in soil erosion and sediment control. CPESCs have approved educational training, demonstrated expertise, experience in controlling erosion and sedimentation, and meet certification standards.

'Chemical' means:

- a) an agricultural chemical product or veterinary chemical product within the meaning of the Agricultural and Veterinary Chemicals Code Act 1994 (Commonwealth), or
- b) a dangerous good under the Australian Code for the Transport of Dangerous Goods by Road and Rail approved by the Australian Transport Council, or
- c) a lead hazardous substance within the meaning of the Workplace Health and Safety Regulation 1997, or
- d) a drug or poison in the Standard for the Uniform Scheduling of Drugs and Poisons prepared by the Australian Health Ministers' Advisory Council and published by the Commonwealth, or
- e) any substance used as, or intended for use as:
 - i. a pesticide, insecticide, fungicide, herbicide, rodenticide, nematocide, miticide, fumigant or related product, or
 - ii. a surface active agent, including, for example, soap or related detergent, or
 - iii. a paint solvent, pigment, dye, printing ink, industrial polish, adhesive, sealant, food additive, bleach, sanitiser, disinfectant, or biocide, or
 - iv. a fertiliser for agricultural, horticultural or garden use, or
 - v. a substance used for, or intended for use for mineral processing or treatment of metal, pulp and paper, textile, timber, water or wastewater, or
 - vi. manufacture of plastic or synthetic rubber.

'commercial place' means a workplace used as an office or for business or commercial purposes, which is not part of the mining activity and does not include employees' accommodation or public roads.

'contaminant', A contaminant can be—

- a) a gas, liquid or solid; or
- b) an odour; or
- c) an organism (whether alive or dead), including a virus; or
- d) energy, including noise, heat, radioactivity and electromagnetic radiation; or
- e) a combination of contaminants.

'contamination', of the environment is the release (whether by act of omission) of a contaminant into the environment.

'deposit' means to drop, place or throw a contaminant in waters or onto a place or releases the contaminant or otherwise cause it to move into waters or onto a place.

'disturbance' of land includes:

- a) compacting, removing, covering, exposing or stockpiling of earth
- b) removal or destruction of vegetation or topsoil or both to an extent where the land has been made susceptible to erosion
- c) carrying out mining within a watercourse, waterway, wetland or lake
- d) the submersion of areas by tailings or hazardous contaminant storage and dam/structure walls
- e) temporary infrastructure, including any infrastructure (roads, tracks, bridges, culverts, dam/structures, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be removed . after the mining activity has ceased
- f) releasing of contaminants into the soil, or underlying geological strata.

However, the following areas are not included when calculating areas of 'disturbance':

- a) areas off lease (e.g. roads or tracks which provide access to the mining lease)
- b) areas previously disturbed which have achieved the rehabilitation outcomes
- c) by agreement with the administering authority, areas previously disturbed which have not achieved the rehabilitation objective(s) due to circumstances beyond the control of the mine operator (such as climatic conditions)
- d) areas under permanent infrastructure. Permanent infrastructure includes any infrastructure (roads, tracks, bridges, culverts, dam/structures, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be left by agreement with the landowner
- e) disturbance that pre-existed the grant of the tenure.

'effective dust control system' means a method, process, procedure or course of action that if taken, will minimise the likelihood of environmental nuisance being caused.

'environmental authority', an environmental authority issued under section 195 that approves an environmentally relevant activity applied for in an application.

'environmental authority holder', means the holder of an environmental authority issued under section 195 that approves an environmentally relevant activity applied for in an application and any others works conducted by an entity on the approved leases under the environmental authority.

'environmental nuisance' as defined in section 15 of the EP Act.

'groundwater monitoring program', means the holder of the environmental authority must appropriately monitor the potential impacts to groundwater and develop a suitable plan or program that achieves this requirement.

'holder', for a mining tenement, means a holder of the tenement under the Mineral Resources Act 1989, and the holder of the associated environmental authority under the Environmental Protection Act 1994.

'infrastructure' means water storage dams, levees,, roads and tracks, buildings and other structures built for the purpose of the mining activity.

'land' in the 'land schedule' of this document means land excluding waters and the atmosphere, that is, the term has a different meaning from the term as defined in the Environmental Protection Act 1994. For the

purposes of the Acts Interpretation Act 1954, it is expressly noted that the term 'land' in this environmental authority relates to physical land and not to interests in land.

'land use' —means the selected post mining use of the land, which is planned to occur after the cessation of mining operations.

'm' means metres.

'measures' includes any measures to prevent or minimise environmental impacts of the mining activity such as bunds, silt fences, diversion drains, capping, and containment systems.

'minimise' is to reduce to the smallest possible amount or degree.

'mining activities' is an activity that is an authorised activity for a mining tenement under the *Mineral Resources Act 1989*. For the purpose of this EA it refers to ERA 20(b) - Dimension stone mining, involving mining a quantity of material of at least 100,000t but not more than 1,000,000t in a year.

'non-polluting' means having no adverse impacts upon the receiving environment.

'offensive' means causing offence or displeasure; is disagreeable to the sense; disgusting; nauseous or repulsive.

'protected area' means — a protected area under the Nature Conservation Act 1992, or

- a) a marine park under the Marine Parks Act 1992, or
- b) a World Heritage Area.

'receiving environment' in relation to an activity that causes or may cause environmental harm, means the part of the environment to which the harm is, or may be, caused. The receiving environment includes (but is not limited to):

- a) a watercourse
- b) groundwater

'receiving waters' means the waters into which this environmental authority authorises releases of mine affected water.

'rehabilitation' the process of reshaping and revegetating land to restore it to a stable landform.

'release' of a contaminant includes:

- a) to deposit, discharge, emit or disturb the contaminant; and
- b) to cause or allow the contaminant to be deposited, discharge, emitted or disturbed; and
- c) to allow the contaminant to escape; and
- d) to fail to prevent the contaminant from escaping.

'revegetation' is the re-establishment of vegetation¹ of a species and density of cover similar to surrounding undisturbed areas or the landform that existed before mining activities on soil surfaces associated with the construction or rehabilitation of a watercourse diversion.

'self-sustaining' means not requiring on-going intervention and maintenance to maintain functional riverine processes and characteristics

'sensitive place' means:

- a) a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises, or
- b) a motel, hotel or hostel, or
- c) an educational institution, or
- d) a medical centre or hospital, or
- e) a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 1992* or a World Heritage Area, or
- f) a public park or gardens.

Note: The definition of 'sensitive place' and 'commercial place' is based on Schedule 1 of EPP Noise. That is, a sensitive place is inside or outside on a dwelling, library and educational institution, childcare or kindergarten, school or playground, hospital, surgery or other medical institution, commercial & retail activity, protected area or an area identified under a conservation plan under *Nature Conservation Act 1992* as a critical habitat or an area of major interest, marine park under *Marine Parks Act 2004*, park or garden that is outside of the mining lease and open to the public for the use other than for sport or organised entertainment. A commercial place is inside or outside a commercial or retail activity.

A mining camp (i.e., accommodation and ancillary facilities for mine employees or contractors or both, associated with the mine the subject of the environmental authority) is not a sensitive place for that mine or mining project, whether or not the mining camp is located within a mining tenement that is part of the mining project the subject of the environmental authority. For example, the mining camp might be located on neighbouring land owned or leased by the same company as one of the holders of the environmental authority for the mining project, or a related company. Accommodation for mine employees or contractors is a sensitive place if the land is held by a mining company or related company, and if occupation is restricted to the employees, contractors and their families for the particular mine or mines which are held by the same company or a related company.

For example, a township (occupied by the mine employees, contractors and their families for multiple mines that are held by different companies) would be a sensitive place, even if part or all of the township is constructed on land owned by one or more of the companies.

'static screens' means any rock screen, rock separator, aggregate separator or similar devices that do not utilise any mechanical screening methods.

'suitably qualified and experienced person' means a person who is a Registered Professional Engineer of Queensland under the provisions of the Professional Engineers Act 2002, who has an **appropriate level of**

¹ Not including a species declared under the Land Protection (Pest and Stock Route Management) Regulation 2003 as a category class 1 pest, category class 2 pest or category class 3 pest.

expertise in the structures, geomechanics, hydrology, hydraulics and environmental impact of watercourse diversions.

An **appropriate level of expertise** includes:

- demonstrable competency, experience and expertise in:
 - investigation, design or construction of watercourses diversions
 - operation and maintenance of watercourse diversions
 - geomechanics with particular emphasis on channel equilibrium, geology and geochemistry
 - hydrology with particular reference to flooding, estimation of extreme storms, water management or meteorology
 - hydraulics with particular reference to sediment transport and deposition and erosion control
 - hydrogeology with particular reference to seepage and groundwater
 - solute transport processes and monitoring thereof, or
- sufficient knowledge and experience to certify that where the **suitably qualified and experienced person** has relied on advice and information provided by other **persons with relevant expertise***:
 - they consider it reasonable to rely on that advice and information
 - the expert providing the advice and information has knowledge, competency, suitable experience and demonstrated expertise in the matters related to watercourse diversions.

Persons with relevant expertise include:

- Geomorphologist: person who has demonstrated competency and relevant experience in stream geomorphology and watercourse diversions.
- Geotechnical Expert: person who has demonstrated competency and relevant experience in geotechnical assessment of soil characteristics suitable for watercourse diversions.
- Vegetation Expert: person who has demonstrated competency and relevant experience in the identification, role and function of vegetation with watercourses and adjoining floodplains, and has demonstrated competency and relevant experience in revegetation of watercourse diversions and adjoining floodplains. .
- Groundwater Expert: person who has demonstrated competency and relevant experience in groundwater systems.
- Surface Water Expert: person who has demonstrated competency and relevant experience in hydrology.
- Engineer: person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the Professional Persons Act 2002 or has similar qualifications under a respected professional registration association, and has demonstrated competency and relevant experience in design and construction of watercourse diversions.

- Soils Expert: person who has demonstrated competency and relevant experience in soil classification including the physical, chemical and hydrologic analysis of soil.

'the Act' means the *Environmental Protection Act 1994*.

'topsoil' means the surface layer of a soil profile, which is usually more fertile, darker in colour, better structured and supports greater biological activity than underlying layers. The surface layer may vary in depth depending on soil forming factors, including parent material, location and slope, but generally is not greater than about 300mm in depth from the natural surface.

'water' is defined under Schedule 4 of the *Water Act 2000*.

'watercourse' has the same meaning given in the *Water Act 2000*.

'water quality' means the chemical, physical and biological condition of water.

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

Attachment

Figure 1 – Approved site plans

Areas of Disturbance

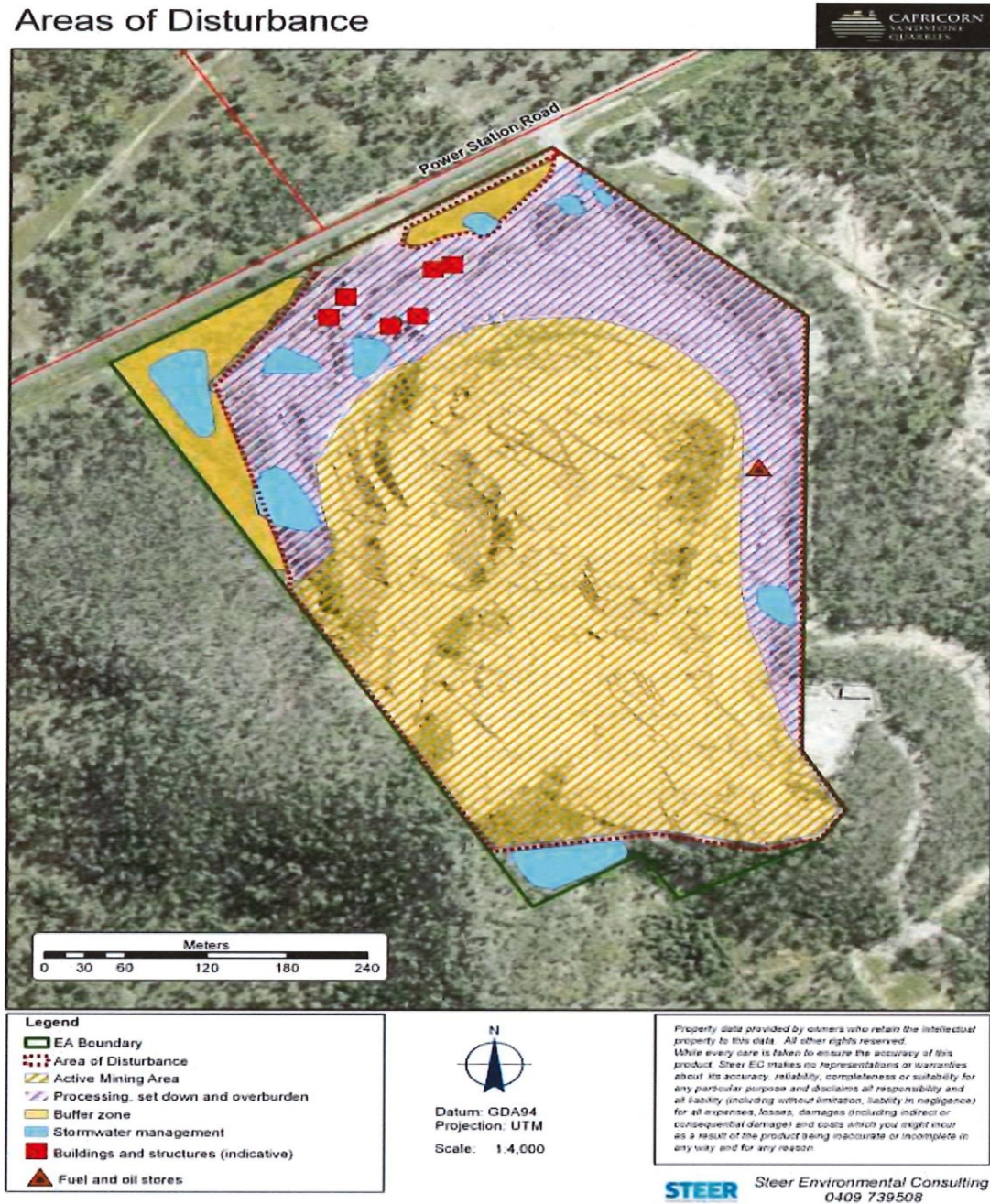
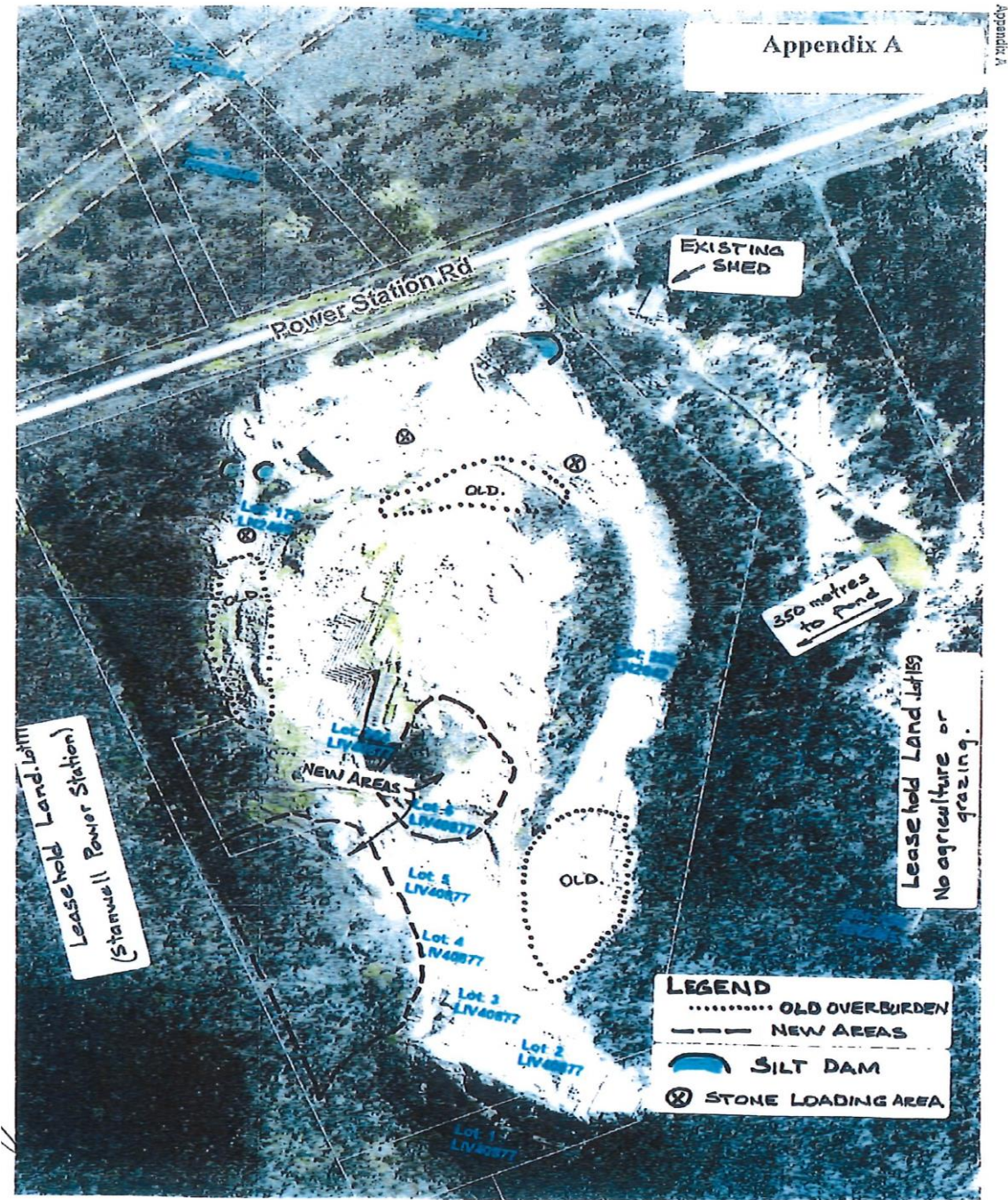


Figure 2 – Release points and monitoring points TBA¹

1 All release and monitoring points are to be provided with the ESCP that must be submitted to the administering authority in accordance with condition H1.

Appendix A



END OF ENVIRONMENTAL AUTHORITY

**Appendix B - Ecological Assessment - Supporting Information Report -
Capricorn Stone Products Pty Ltd, Aurecon, 27 August 2014**

See attached document

Appendix C – Regional Ecosystems Biodiversity Status Report



Queensland Government

Department of Environment and Science

Environmental Reports

Regional Ecosystems

Biodiversity Status

For the selected area of interest

Longitude: 150.34472 Latitude: -23.50123 with 2 kilometre radius

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the input coordinates.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no matters of interest have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Important Note to User

Information presented in this report is based upon the Queensland Herbarium's Regional Ecosystem framework. The Biodiversity Status has been used to depict the extent of "Endangered", "Of Concern" and "No Concern at Present" regional ecosystems in all cases, rather than the classes used for the purposes of the *Vegetation Management Act 1999* (VMA). Mapping and figures presented in this document reflect the Queensland Herbarium's Remnant and Pre-clearing Regional Ecosystem Datasets, and not the certified mapping used for the purpose of the VMA.

For matters relevant to vegetation management under the VMA, please refer to the Department of Resources website <https://www.dnrme.qld.gov.au/>

Please direct queries about these reports to: Queensland.Herbarium@qld.gov.au

Disclaimer

Whilst every care is taken to ensure the accuracy of the information provided in this report, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness, or suitability, for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which the user may incur as a consequence of the information being inaccurate or incomplete in any way and for any reason.



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Summary Information

The following table provides an overview of the AOI with respect to selected topographic and environmental themes. Refer to **Map 1** for locality information.

Table 1: Area of interest details: Longitude: 150.34472 Latitude: -23.50123 with 2 kilometre radius

Size (ha)	1,256.55
Local Government(s)	Rockhampton Regional
Bioregion(s)	Brigalow Belt
Subregion(s)	Mount Morgan Ranges
Catchment(s)	Fitzroy

The table below summarizes the extent of remnant vegetation classed as "Endangered", "Of concern" and "No concern at present" regional ecosystems classified by Biodiversity Status within the area of interest (AOI).

Table 2: Summary table, biodiversity status of regional ecosystems within the AOI

Biodiversity Status	Area (Ha)	% of AOI
Endangered	0.0	0.0
Of concern	114.51	9.11
No concern at present	575.41	45.79
Total remnant vegetation	689.92	54.91

Refer to **Map 2** for further information.

Regional Ecosystems

1. Introduction

Regional ecosystems are vegetation communities in a bioregion that are consistently associated with particular combinations of geology, landform and soil (Sattler and Williams 1999). Descriptions of Queensland's Regional ecosystems are available online from the Regional Ecosystem Description Database (REDD). Descriptions are compiled from a broad range of information sources including vegetation, land system and geology survey and mapping and detailed vegetation site data. The regional ecosystem classification and descriptions are reviewed as new information becomes available. A number of vegetation communities may form a single regional ecosystem and are usually distinguished by differences in dominant species, frequently in the shrub or ground layers and are denoted by a letter following the regional ecosystem code (e.g. a, b, c). Vegetation communities and regional ecosystems are amalgamated into a higher level classification of broad vegetation groups (BVGs).

A published methodology for survey and mapping of regional ecosystems across Queensland (Neldner et al 2020) provides further details on regional ecosystem concepts and terminology.

This report provides information on the type, status, and extent of vegetation communities, regional ecosystems and broad vegetation groups present within a user specified area of interest. Please note, for the purpose of this report, the Biodiversity Status is used. This report has not been developed for application of the *Vegetation Management Act 1999* (VMA). Additionally, information generated in this report has been derived from the Queensland Herbarium's Regional Ecosystem Mapping, and not the regulated mapping certified for the purposes of the VMA. If your interest/matter relates to regional ecosystems and the VMA, users should refer to the Department of Resources website.

<https://www.dnrme.qld.gov.au/>

With respect to the Queensland Biodiversity Status,

"Endangered" regional ecosystems are described as those where:

- remnant vegetation is less than 10 per cent of its pre-clearing extent across the bioregion; or 10-30% of its pre-clearing extent remains and the remnant vegetation is less than 10,000 hectares, or
- less than 10 per cent of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss*, or
- 10-30 per cent of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss and the remnant vegetation is less than 10,000 hectares; or
- it is a rare** regional ecosystem subject to a threatening process.***

"Of concern" regional ecosystems are described as those where:

- the degradation criteria listed above for 'Endangered' regional ecosystems are not met and,
- remnant vegetation is 10-30 per cent of its pre-clearing extent across the bioregion; or more than 20 per cent of its pre-clearing extent remains and the remnant extent is less than 10,000 hectares, or
- 10-30 percent of its pre-clearing extent remains unaffected by moderate degradation and/or biodiversity loss.****

and "No concern at present" regional ecosystems are described as those where:

- remnant vegetation is over 30 per cent of its pre-clearing extent across the bioregion, and the remnant area is greater than 10,000 hectares, and
- the degradation criteria listed above for 'Endangered' or 'Of concern' regional ecosystems are not met.

**Severe degradation and/or biodiversity loss is defined as: floristic and/or faunal diversity is greatly reduced but unlikely to recover within the next 50 years even with the removal of threatening processes; or soil surface is severely degraded, for example, by loss of A horizon, surface expression of salinity; surface compaction, loss of organic matter or sheet erosion.*

***Rare regional ecosystem: pre-clearing extent (1000 ha); or patch size (100 ha and of limited total extent across its range).*

****Threatening processes are those that are reducing or will reduce the biodiversity and ecological integrity of a regional ecosystem. For example, clearing, weed invasion, fragmentation, inappropriate fire regime or grazing pressure, or infrastructure development.*

****Moderate degradation and/or biodiversity loss is defined as: floristic and/or faunal diversity is greatly reduced but unlikely to recover within the next 20 years even with the removal of threatening processes; or soil surface is moderately degraded.

2. Remnant Regional Ecosystems

The following table identifies the remnant regional ecosystems and vegetation communities mapped within the AOI and provides their short descriptions, Biodiversity Status, and remnant extent within the selected AOI. Please note, where heterogeneous vegetated patches (mixed patches of remnant vegetation mapped as containing multiple regional ecosystems) occur within the AOI, they have been split and listed as individual regional ecosystems (or vegetation communities where present) for the purposes of the table below. In such instances, associated area figures have been generated based upon the estimated proportion of each regional ecosystem (or vegetation community) predicted to be present within the larger mixed patch.

Table 3: Remnant regional ecosystems, description and status within the AOI

Regional Ecosystem	Short Description	BD Status	Area (Ha)	% of AOI
11.11.15	Eucalyptus crebra woodland to open woodland on deformed and metamorphosed sediments and interbedded volcanics	No concern at present	469.11	37.33
11.11.3	Corymbia citriodora, Eucalyptus crebra, E. acmenoides open forest on old sedimentary rocks with varying degrees of metamorphism and folding. Coastal ranges	No concern at present	55.19	4.39
11.11.5	Microphyll vine forest +/- Araucaria cunninghamii on old sedimentary rocks with varying degrees of metamorphism and folding	No concern at present	27.59	2.2
11.12.1	Eucalyptus crebra woodland on igneous rocks	No concern at present	23.51	1.87
11.3.2	Eucalyptus populnea woodland on alluvial plains	Of concern	14.94	1.19
11.3.25	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Of concern	76.37	6.08
11.3.4	Eucalyptus tereticornis and/or Eucalyptus spp. woodland on alluvial plains	Of concern	23.2	1.85
non-remnant	None	None	564.8	44.95
water	None	None	1.83	0.15

Refer to **Map 2** for further information. **Map 3** also provides a visual estimate of the distribution of regional ecosystems present before clearing.

Table 4 provides further information in regards to the remnant regional ecosystems present within the AOI. Specifically, the extent of remnant vegetation remaining within the bioregion, the 1:1,000,000 broad vegetation group (BVG) classification, whether the regional ecosystem is identified as a wetland, and extent of representation in Queensland's Protected Area Estate. For a description of the vegetation communities within the AOI and classified according to the 1:1,000,000 BVG, refer to **Table 6**.

Table 4: Remnant regional ecosystems within the AOI, additional information

Regional Ecosystem	Remnant Extent	BVG (1 Million)	Wetland	Representation in protected estate
11.11.15	Pre-clearing 894000 ha; Remnant 2019 521000 ha	13c	None	Low
11.11.3	Pre-clearing 136000 ha; Remnant 2019 98000 ha	10a	None	Medium

Regional Ecosystem	Remnant Extent	BVG (1 Million)	Wetland	Representation in protected estate
11.11.5	Pre-clearing 81000 ha; Remnant 2019 33000 ha	7a	None	Medium
11.12.1	Pre-clearing 1421000 ha; Remnant 2019 854000 ha	13c	None	Low
11.3.2	Pre-clearing 1914000 ha; Remnant 2019 503000 ha	17a	Contains palustrine wetland (e.g. in swales).	Low
11.3.25	Pre-clearing 797000 ha; Remnant 2019 514000 ha	16a	Riverine wetland or fringing riverine wetland.	Low
11.3.4	Pre-clearing 684000 ha; Remnant 2019 180000 ha	16c	Floodplain (other than floodplain wetlands).	Low
non-remnant	None	None	None	None
water	None	None	None	None

Representation in Protected Area Estate: High greater than 10% of pre-clearing extent is represented; Medium 4 - 10% is represented; Low less than 4% is represented, No representation.

The distribution of mapped wetland systems within the area of interest is displayed in **Map 6**.

The following table lists known special values associated with a regional ecosystem type.

Table 5: Remnant regional ecosystems within the AOI, special values

Regional Ecosystem	Special Values
11.11.15	Potential habitat for NCA listed species: Capparis humistrata, Corymbia clandestina, Corymbia xanthope, Cycas megacarpa, Cycas ophiolitica
11.11.3	Potential habitat for NCA listed species: Cycas megacarpa, Cycas ophiolitica, Marsdenia brevifolia, Parsonsia larcomensis, Zieria actites
11.11.5	Potential habitat for NCA listed species: Atalaya collina, Corchorus hygrophilus, Dansiea elliptica, Decaspermum struckoileum, Graptophyllum excelsum, Hernandia bivalvis, Macropteranthes leiocaulis, Macrozamia serpentina, Solanum sporadotrichum, Zieria verrucosa
11.12.1	Potential habitat for NCA listed species: Acacia islana, Capparis humistrata, Corymbia petalophylla, Cycas megacarpa, Cycas ophiolitica, Macrozamia crassifolia, Sannantha brachypoda, Solanum graniticum
11.3.2	Habitat for threatened flora species Homopholis belsonii. This ecosystem is also known to provide suitable habitat for koalas (Phascolarctos cinereus).
11.3.25	Shown to be associated with a high fauna species richness in the Taroom area (Venz et al. 2002). Within parts of the Fitzroy catchment, this RE is known habitat for the threatened freshwater turtle Rheodytes leukops. Known to be important habitat for other riparian freshwater turtle species. This ecosystem is also known to provide suitable habitat for koalas (Phascolarctos cinereus).
11.3.4	Potential habitat for NCA listed species: Acacia pedleyi, Callicarpa thozetii, Cycas megacarpa, Cycas ophiolitica, Digitaria porrecta, Eriocaulon carsonii subsp. orientale, Livistona nitida, Rhaponticum australe, Samadera bidwillii, Sannantha brachypoda. This ecosystem is also known to provide suitable habitat for koalas (Phascolarctos cinereus).

Regional Ecosystem	Special Values
non-remnant	None
water	None

3. Remnant Regional Ecosystems by Broad Vegetation Group

BVGs are a higher-level grouping of vegetation communities. Queensland encompasses a wide variety of landscapes across temperate, wet and dry tropics and semi-arid climatic zones. BVGs provide an overview of vegetation communities across the state or a bioregion and allow comparison with other states. There are three levels of BVGs which reflect the approximate scale at which they are designed to be used: the 1:5,000,000 (national), 1:2,000,000 (state) and 1:1,000,000 (regional) scales.

A comprehensive description of BVGs is available at:

<https://publications.qld.gov.au/dataset/redd/resource/>

The following table provides a description of the 1:1,000,000 BVGs present and their associated extent within the AOI.

Table 6: Broad vegetation groups (1 million) within the AOI

BVG (1 Million)	Description	Area (Ha)	% of AOI
None	None	566.63	45.09
10a	Dry woodlands to open woodlands dominated by <i>Corymbia citriodora</i> (spotted gum). (land zones 10, 7, 12, 11,[8]) (BRB, NET, [DEU])	55.19	4.39
13c	Woodlands of <i>Eucalyptus crebra</i> (sens. lat.) (narrow-leaved red ironbark), <i>E. drepanophylla</i> (grey ironbark), <i>E. fibrosa</i> (dusky-leaved ironbark), <i>E. shirleyi</i> (shirley's silver-leaved ironbark) on granitic and metamorphic ranges (land zones 12, 11, 9, [5]) (BRB, EIU, SEQ, NET, CQC)	492.62	39.2
16a	Open forest and woodlands dominated by <i>Eucalyptus camaldulensis</i> (river red gum) (or <i>E. tereticornis</i> (blue gum)) and/or <i>E. coolabah</i> (coolabah) (or <i>E. microtheca</i> (coolabah)) fringing drainage lines. Associated species may include <i>Melaleuca</i> spp., <i>Corymbia tessellaris</i> (carbeen), <i>Angophora</i> spp., <i>Casuarina cunninghamiana</i> (riveroak). Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (MGD, BRB, GUP, CHC, MUL, DEU, EIU, NWH, SEQ, [NET, WET]) (All bioregions except CYP and CQC)	76.37	6.08
16c	Woodlands and open woodlands dominated by <i>Eucalyptus coolabah</i> (coolabah) or <i>E. microtheca</i> (coolabah) or <i>E. largiflorens</i> (black box) or <i>E. tereticornis</i> (blue gum) or <i>E. chlorophylla</i> on floodplains. Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (All bioregions except WET, principally GUP, BRB, MUL).	23.2	1.85
17a	Woodlands dominated by <i>Eucalyptus populnea</i> (poplar box) (or <i>E. brownii</i> (Reid River box)) on alluvium, sand plains and footslopes of hills and ranges. (land zones 3, 5, 10, 9, 4, 11, 12, [8]) (BRB, MUL, DEU, MUL, EIU)	14.94	1.19
7a	Semi-evergreen vine thickets on wide range of substrates. (land zones 8, 9, 11, 12, 5, 4, 3, 10, [7]) (BRB, EIU, SEQ, CQC, [WET, GUP]) (Tracey 1982 11)	27.59	2.2

Refer to **Map 4** for further information. **Map 5** also provides a representation of the distribution of vegetation communities as per the 1:5,000,000 BVG believed to be present prior to European settlement.

4. Technical and BioCondition Benchmark Descriptions

Technical descriptions provide a detailed description of the full range in structure and floristic composition of regional ecosystems (e.g. 11.3.1) and their component vegetation communities (e.g. 11.3.1a, 11.3.1b). See:

<http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/technical-descriptions/>

The descriptions are compiled using site survey data from the Queensland Herbarium's CORVEG database. Distribution maps, representative images (if available) and the pre-clearing and remnant extent (hectares) of each vegetation community derived from the regional ecosystem mapping data are included. The technical descriptions should be used in conjunction with the fields from the regional ecosystem description database (REDD) for a full description of the regional ecosystem.

Technical descriptions include data on canopy height, canopy cover and native plant species composition of the predominant layer, which are attributes relevant to assessment of the remnant status of vegetation under the *Vegetation Management Act 1999*. However, as technical descriptions reflect the full range in structure and floristic composition across the climatic, natural disturbance and geographic range of the regional ecosystem, local reference sites should be used for remnant assessment where possible (Neldner et al. 2020 (PDF))* section 3.3 of:

<https://publications.qld.gov.au/dataset/redd/resource/>

The technical descriptions are subject to review and are updated as additional data becomes available.

When conducting a BioCondition assessment, these technical descriptions should be used in conjunction with BioCondition benchmarks for the specific regional ecosystem, or component vegetation community.

<http://www.qld.gov.au/environment/plants-animals/biodiversity/benchmarks/>

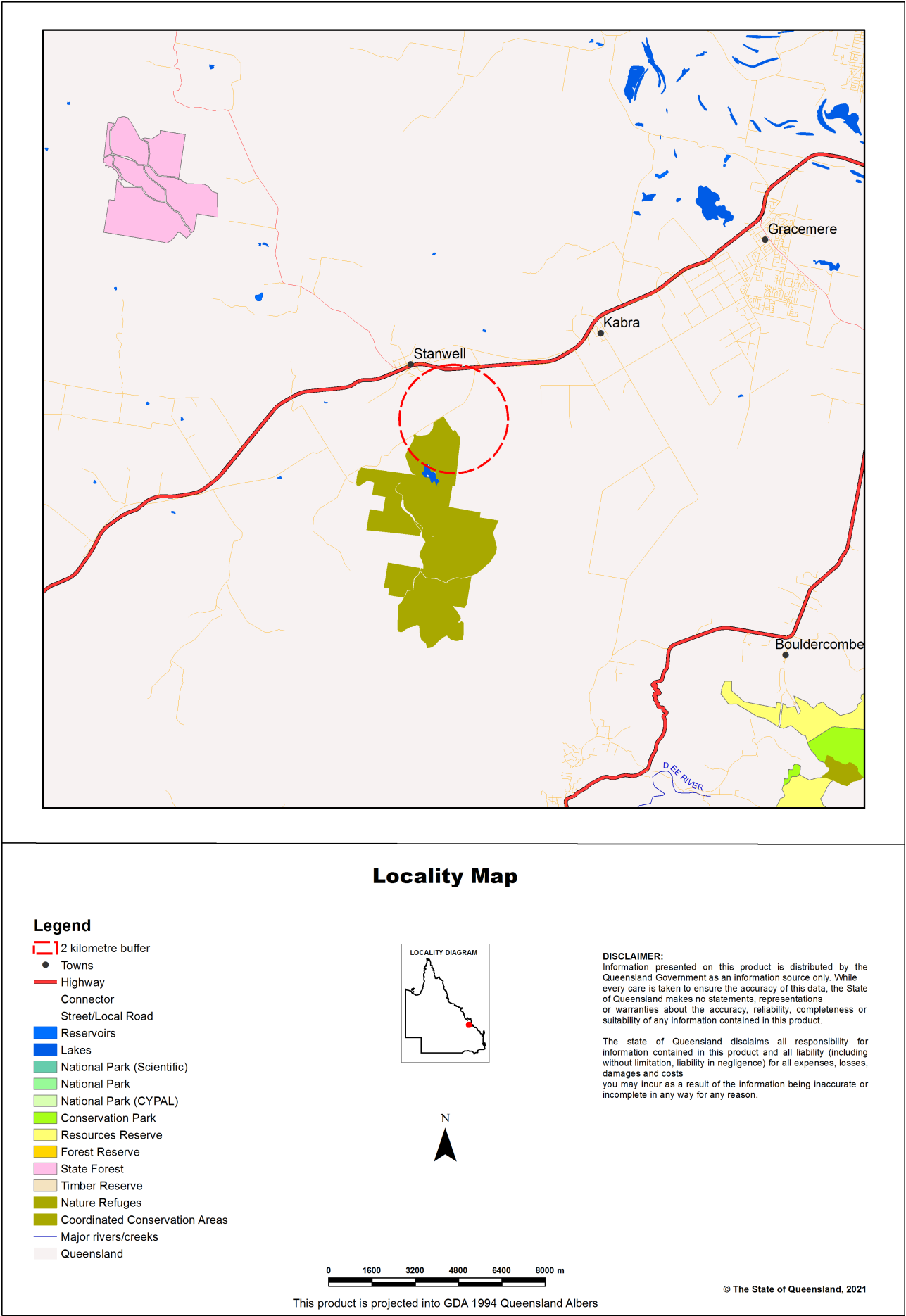
Benchmarks are based on a combination of quantitative and qualitative information and should be used as a guide only. Benchmarks are specific to one regional ecosystem vegetation community, however, the natural variability in structure and floristic composition under a range of climatic and natural disturbance regimes has been considered throughout the geographic extent of the regional ecosystem. Local reference sites should be used for this spatial and temporal (seasonal and annual) variability.

Table 7: List of remnant regional ecosystems within the AOI for which technical and biocondition benchmark descriptions are available

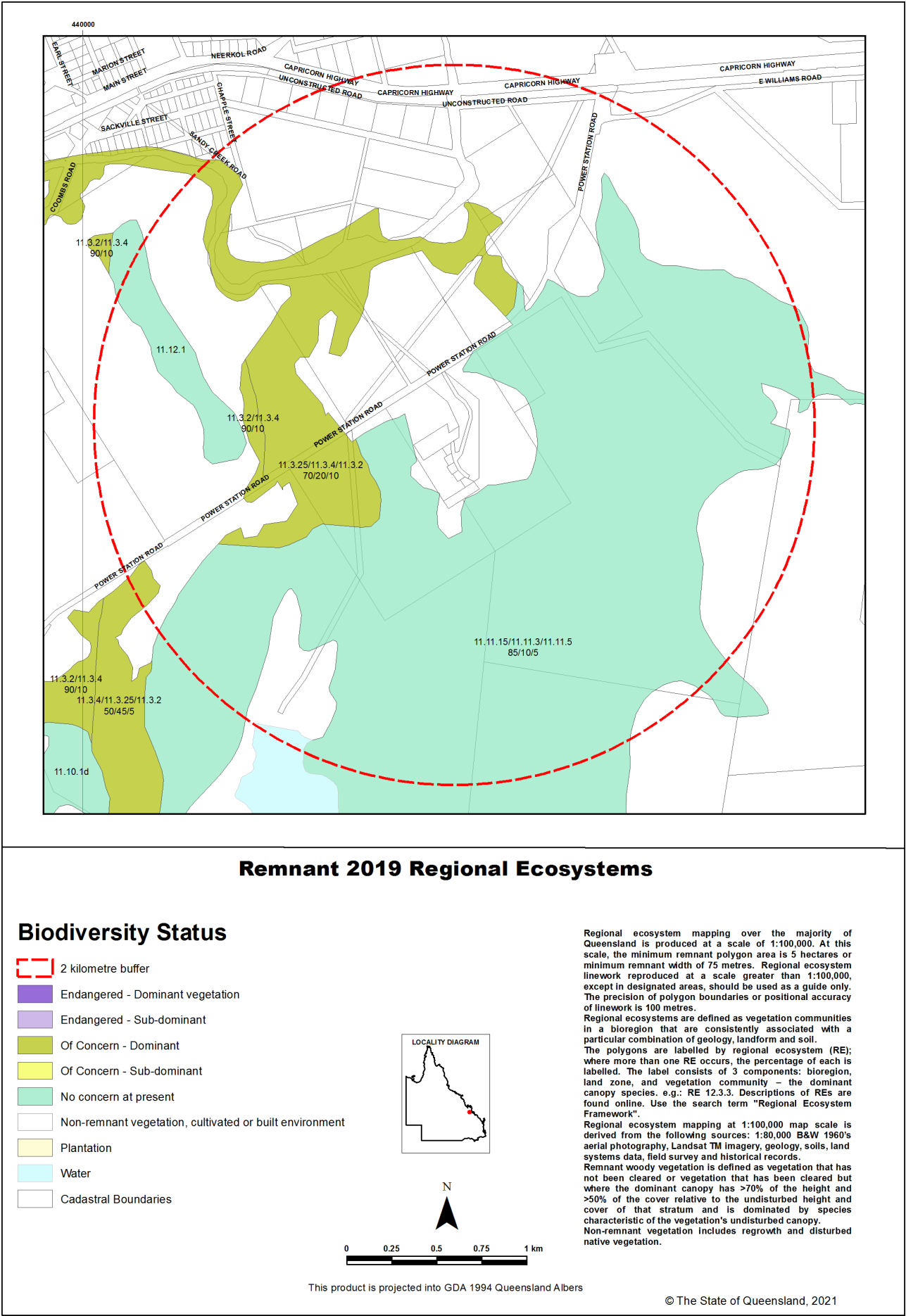
Regional ecosystems mapped as within the AOI	Technical Descriptions	Biocondition Benchmarks
11.11.15	Available	Available
11.11.3	Available	Not currently available
11.11.5	Available	Not currently available
11.12.1	Available	Available
11.3.2	Available	Available
11.3.25	Available	Available
11.3.4	Available	Available
non-remnant	Not currently available	Not currently available
water	Not currently available	Not currently available

Maps

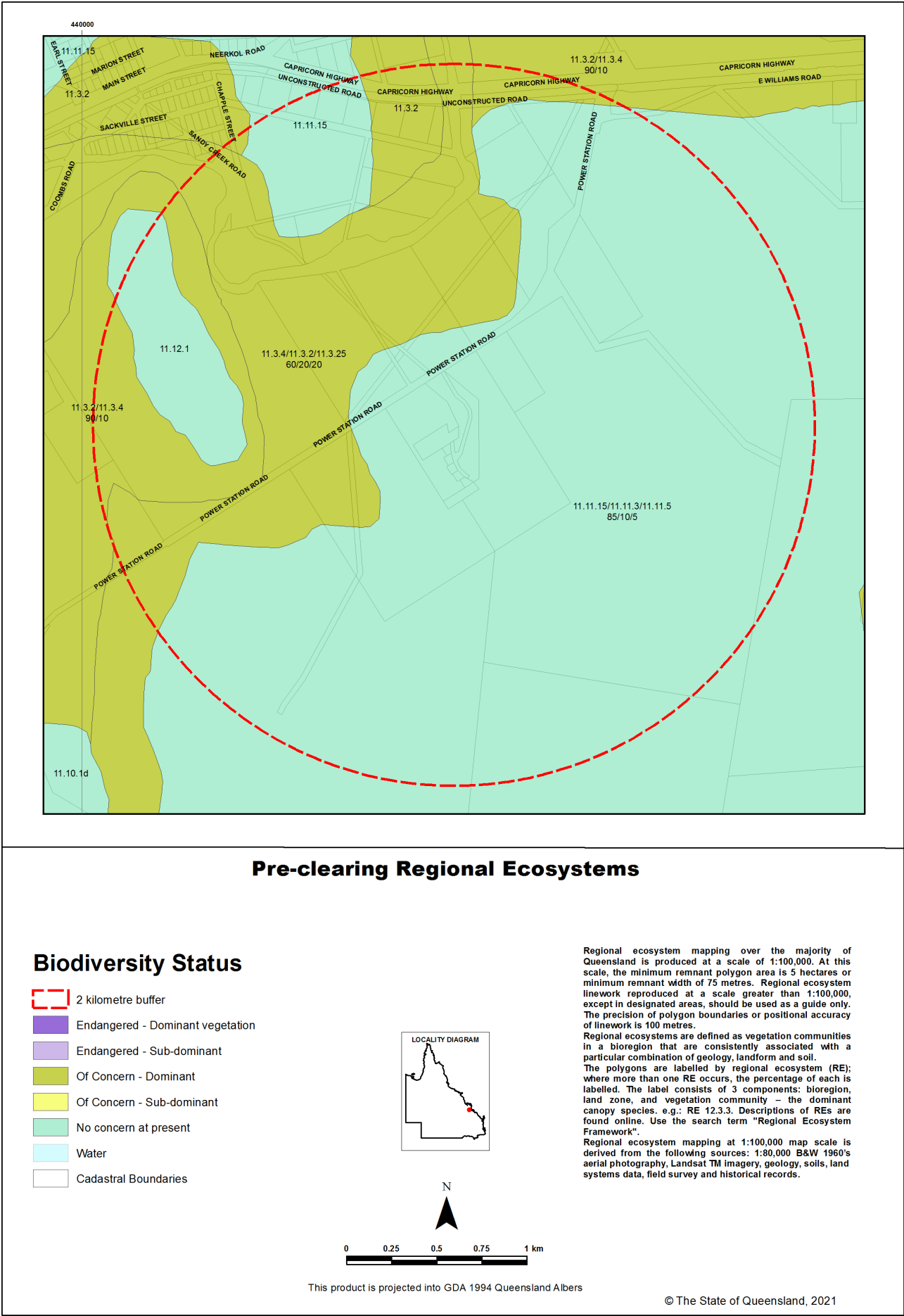
Map 1 - Location



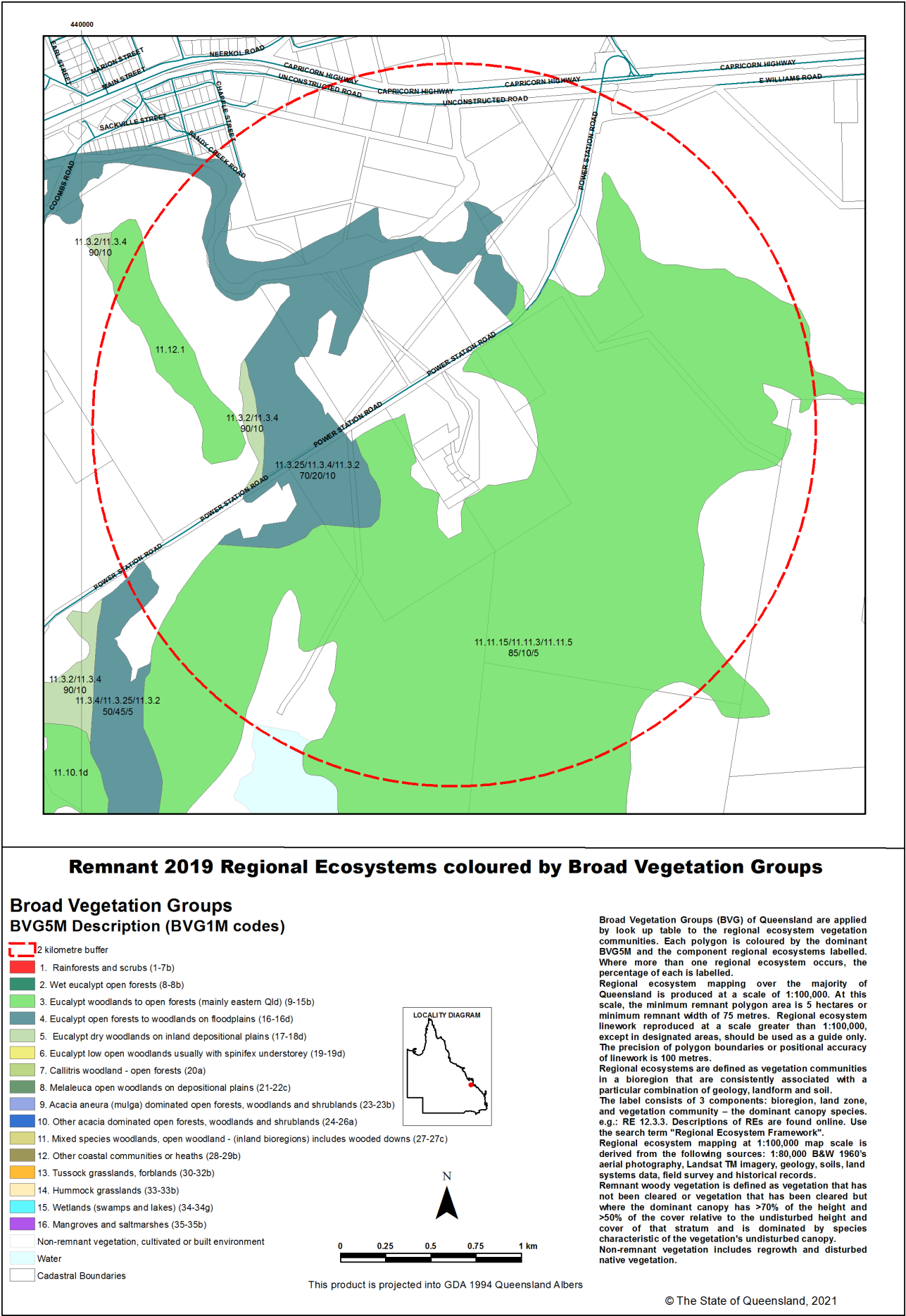
Map 2 - Remnant 2019 regional ecosystems



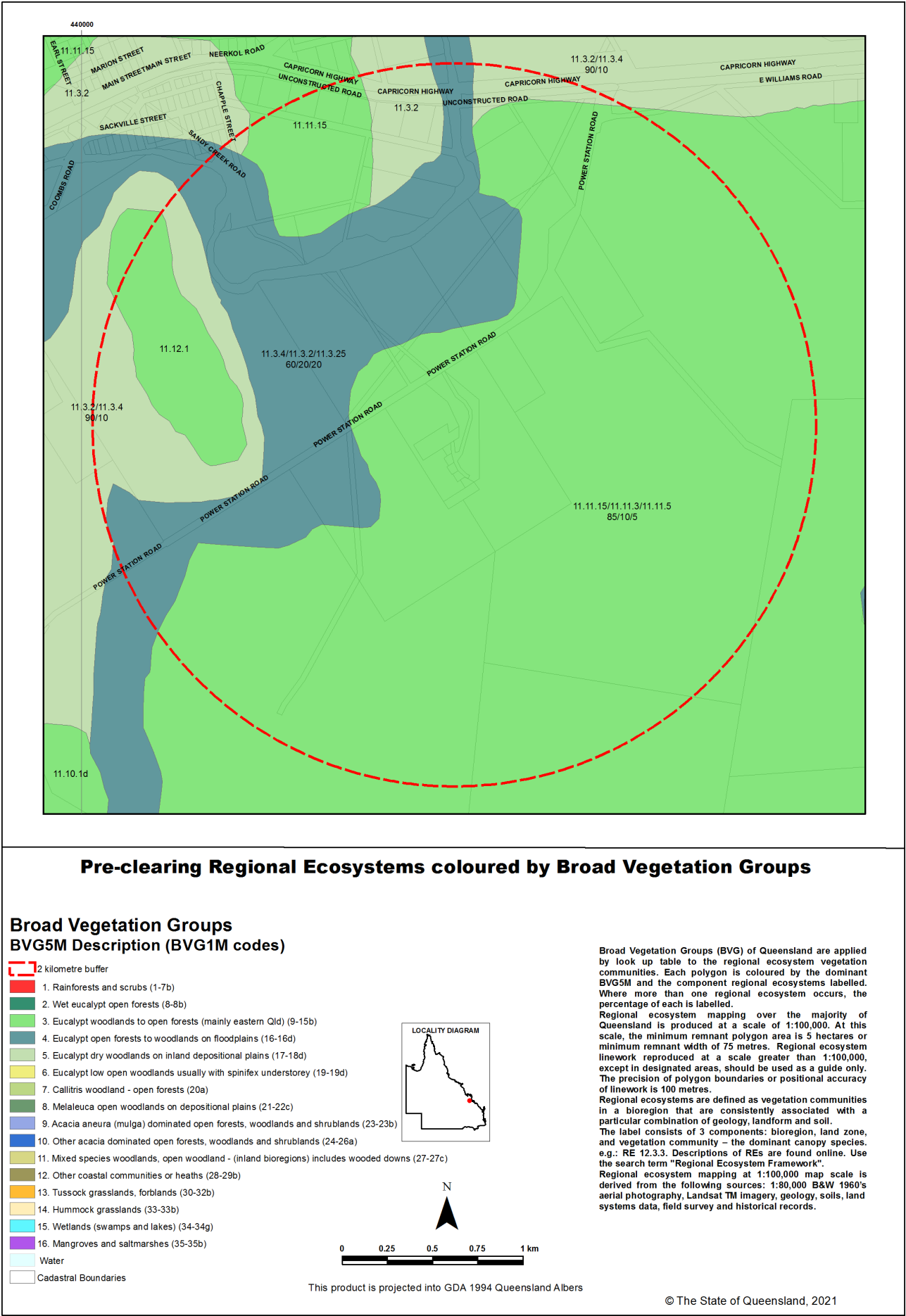
Map 3 - Pre-clearing regional ecosystems



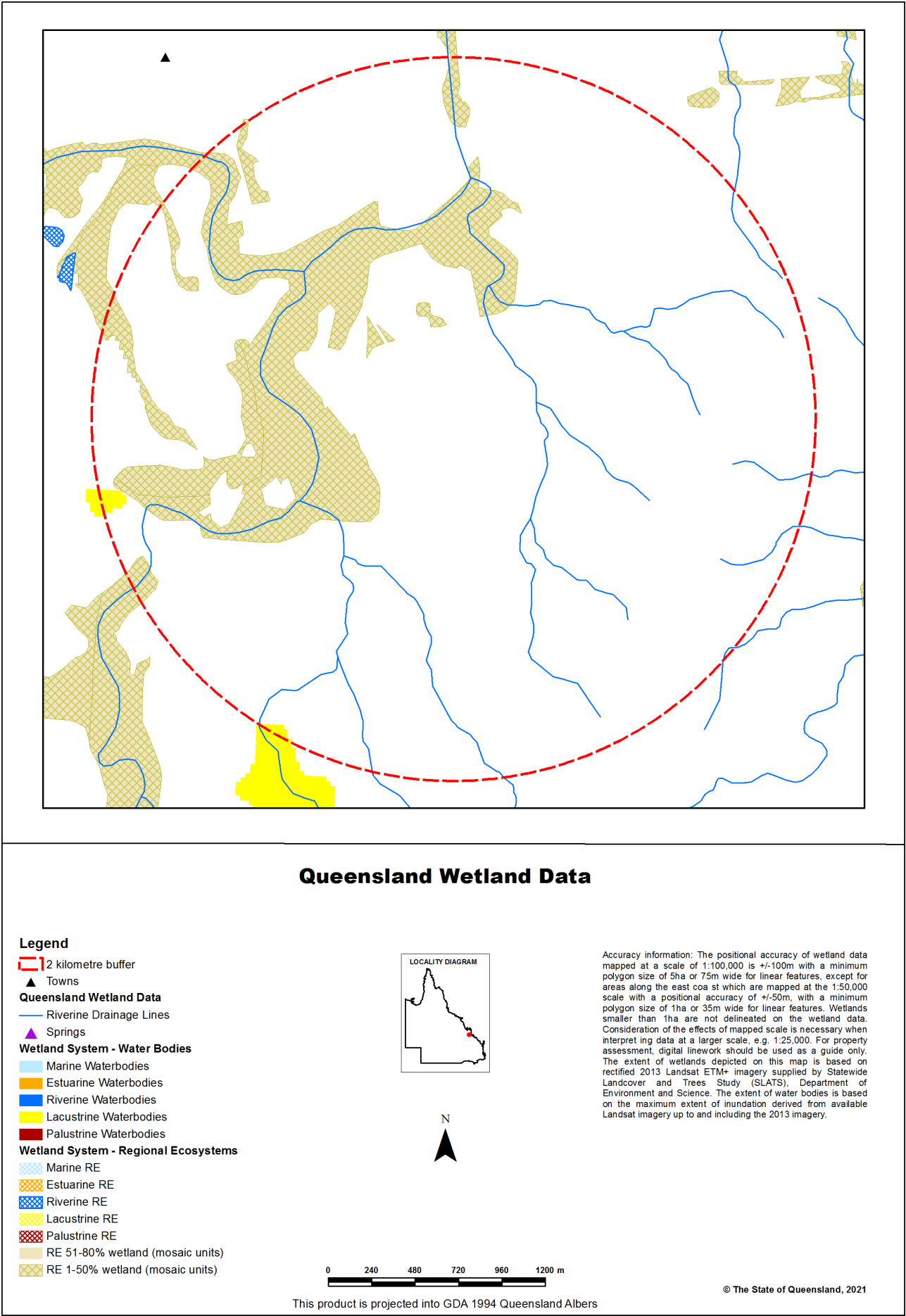
Map 4 - Remnant 2019 regional ecosystems by BVG (5M)



Map 5 - Pre-clearing regional ecosystems by BVG (5M)



Map 6 - Wetlands and waterways



Links and Other Information Sources

The Department of Environment and Science's Website -

<http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/>

provides further information on the regional ecosystem framework, including access to links to the Regional Ecosystem Database, Broad Vegetation Group Definitions, Regional Ecosystem and Land zone descriptions.

Descriptions of the broad vegetation groups of Queensland can be downloaded from:

<https://publications.qld.gov.au/dataset/redd/resource/>

The methodology for mapping regional ecosystems can be downloaded from:

<https://publications.qld.gov.au/dataset/redd/resource/>

Technical descriptions for regional ecosystems can be obtained from:

<http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/technical-descriptions/>

Benchmarks can be obtained from:

<http://www.qld.gov.au/environment/plants-animals/biodiversity/benchmarks/>

For further information associated with the remnant regional ecosystem dataset used by this report, refer to the metadata associated with the Biodiversity status of pre-clearing and Remnant Regional Ecosystems of Queensland dataset (version listed in **Appendix 1**) which is available through the Queensland Government Information System portal,

<http://dds.information.qld.gov.au/dds/>

The Queensland Globe is a mapping and data application. As an interactive online tool, Queensland Globe allows you to view and explore Queensland maps, imagery (including up-to-date satellite images) and other spatial data, including regional ecosystem mapping. To further view and explore regional ecosystems over an area of interest, access the Biota Globe (a component of the Queensland Globe). The Queensland Globe can be accessed via the following link:

<http://www.dnrm.qld.gov.au/mapping-data/queensland-globe>

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Neldner, V.J., Niehus, R.E., Wilson, B.A., McDonald, W.J.F., Ford, A.J. and Accad, A. (2019). The Vegetation of Queensland. Descriptions of Broad Vegetation Groups. Version 4.0. Queensland Herbarium, Department of Environment and Science.

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Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S., Butler, D.W., McDonald, W.J.F., Addicott, E.P. and Appelman, C.N. (2020). Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 5.1. Updated March 2020. Queensland Herbarium, Queensland Department of Environment and Science, Brisbane.

<https://publications.qld.gov.au/dataset/redd/resource/6dee78ab-c12c-4692-9842-b7257c2511e4>

Sattler, P.S. and Williams, R.D. (eds) (1999). *The Conservation Status of Queensland's Bioregional Ecosystems*. Environmental Protection Agency, Brisbane.

Appendices

Appendix 1 - Source Data

The dataset listed below is available for download from:

<http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/download/>

- Regional Ecosystem Description Database

The datasets listed below are available for download from:

<http://dds.information.qld.gov.au/dds/>

- Biodiversity status of pre-clearing and 2019 remnant regional ecosystems of Queensland
- Pre-clearing Vegetation Communities and Regional Ecosystems of Queensland
- Queensland Wetland Data Version - Wetland lines
- Queensland Wetland Data Version - Wetland points
- Queensland Wetland Data Version - Wetland areas

Appendix 2 - Acronyms and Abbreviations

AOI	- Area of Interest
GDA94	- Geocentric Datum of Australia 1994
GIS	- Geographic Information System
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
VMA	- <i>Vegetation Management Act 1999</i>

Appendix D – Community consultation plan table

Community consultation plan				
Objective	Engagement type	Proposed consultation frequency	Released information	How feedback/comments are considered
Inform community members of the intended rehabilitation activities at the site. Address concerns which community members may have regarding rehabilitation activities. Access local knowledge from community members regarding enhancements which could be made to proposed rehabilitation activities. Inform community members of any proposed changes to rehabilitation at the site.	Contact by mail/email to identified community members to determine interest and invite initial feedback/comments. Reply to feedback/comments from interested community members including the provision of further information as detailed in column 4 of this table where appropriate and invite further feedback/comment. Consideration will be given to further feedback/comments as detailed in column 5 of this table. Inform submitters of feedback/comments or actions taken as a result of the engagement process.	Every fifteen years.	Details of the approved rehabilitation plan. Details of any proposed changes to the approved rehabilitation plan. Details of comments or submissions from previous community consultation. Details of any actions/proposed actions resulting from comments or submissions from previous community consultation.	Is the source of feedback/comments considered to be a reliable source? Can the content of feedback/comments be verified using appropriate scientific principles? Are recommendations contained in feedback/comments likely to enhance rehabilitation outcomes? Are recommendations contained in feedback/comments likely to have a positive or negative impact on adjacent or downstream land uses and environmental values? Are recommendations contained in feedback/comments likely to be cost effective?

**Appendix E – Capricorn Stone Products - Rehabilitation Management Plan –
STEER Environmental Consulting, 20 January 2023**

Capricorn Stone Products PL Rehabilitation Management Plan



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STEER
ENVIRONMENTAL CONSULTING

Capricorn Stone Products Pty Ltd – Rehabilitation
Management Plan - Capricorn Sandstone Quarries, 227
Power Station Road, Stanwell 4702

Applicant Name: Capricorn Stone Products Pty Ltd

AR #:

Project #:

EA Application #:

Existing EA Permit #: EPML04041216

Report Prepared by: STEER Environmental Consulting

20 January 2023

Document Status

Report Type: Rehabilitation Management Plan

Project: Capricorn Sandstone Quarries, 227 Power Station Road Stanwell 4702

Client: Capricorn Stone Products Pty Ltd

Document Version	Date	Author	Checked	Approved
Final v3	20.01.2023	Phil Steer	TS (CSP)/PS	Phil Steer
Signed				

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3 Abbreviations

• CSP	-	Capricorn Stone Products Pty Ltd
• DES	-	Department of Environment and Science
• EA	-	Environmental Authority
• ERA	-	Environmentally Relevant Activity
• STEER EC	-	STEER Environmental Consulting
• ML	-	Mining Lease
• RMP	-	Rehabilitation Management Plan
• LFA	-	Landscape Function Analysis
• DBH	-	Diameter at Breast Height

4 Executive Summary

STEER Environmental Consulting (STEER EC) has been commissioned by Capricorn Stone Products Pty Ltd to prepare and submit a “Rehabilitation Management Plan” (RMP) for their operations on mining leases (ML) 7341 and 80102 at 227 Power Station Road Stanwell 4702.

The RMP has been prepared in order to comply with conditions C3 and C4, contained in environmental authority (EA) EPML04041216, which was granted by the Department of Environment and Science (DES) on 4 August 2016. This plan is also intended to comply with the ‘Rehabilitation requirements for mining resource activities guidelines’ (EM1122) as outlined in said Environmental Authority (EA) conditions.

The RMP details actions that will be undertaken at the cessation of mining activities, to appropriately rehabilitate the applicable land covered by ML 7341 and 80102 and EA EPML04041216.

5 Background

5.1 Proponent

Capricorn Stone Products Pty Ltd (CSP), operated by Capricorn Sandstone Quarries Pty Ltd, is a family owned business with over 50 years of experience in the sandstone mining industry. CSP supply a range of high quality sandstone products for commercial, residential, restoration and export markets from Capricorn Sandstone Quarries, Stanwell.

Capricorn Sandstone Quarries has a rich local history dating back to the 1800s. CSP reinstated operations at the Stanwell site in 1994. They have since been successful in consolidating their business model, with contracts to supply Regional Councils, State Governments and competitive international export markets, including China. Capricorn Sandstone Quarries was recognised as Trade Queensland's 2011 Central Queensland Exporter of the Year. In 2010 Capricorn Sandstone Quarries was recognised at "The Premier of Queensland's Export Awards" as the winner of the Tom Burns Award and finalist in the Regional Exporter Award and were also the 2010 Winner of the Trade Queensland Emerging Exporter of the Year Award.

CSP products have been integral in several iconic local heritage projects including Rockhampton Customs House, Rockhampton Post office and Rockhampton Technical College to name but a few.

Aside from their operations at Stanwell, CSP also has an administrative centre located on Gladstone Road, Rockhampton. CSP continually strives to improve its operations and expand its business opportunities where possible. CSP is a significant local business and employer, with a strong commitment to expanding its operations in the Rockhampton region.

(The information contained in this section has been sourced and adapted from the CSP website)

5.2 Site History

The discovery of high grade sandstone was made at Stanwell around 1867 with the first quarry being opened soon after by a Mr G Sanderson. Several historic buildings in Rockhampton are built from Stanwell sandstone including Customs House, Rockhampton Post Office, and the Roman Catholic Cathedral. The quarry was leased by Bishop Carney of Rockhampton during the 1880's in order to secure the necessary stone for the cathedral (see Figure 1). In those early days, liberating the large blocks from the mountain was achieved with bars and black powder and would have been a far more arduous task than it is today.



Figure 1. Workers at Stanwell Quarry, circa 1898, preparing stone for the Catholic Cathedral, Rockhampton. Image courtesy of State Library of Queensland.

When Roy Gough and his son Reece reopened the quarry in 1994 the blocks were cut with Fantini chainsaws, then drilled underneath to extract the blocks. CSP has come a long way since then with substantial investments in excavator mounted cutting wheels (see Figure 2). These have enabled CSP to significantly improve efficiency whilst dramatically reducing physical workloads on employees concurrently.



Figure 2. Excavator mounted stone saw.

6 Setting

6.1 Site Location and Surrounding Area

Capricorn Sandstone Quarries is located at 227 Power Station Road, Stanwell 4702, Lot 179 LN2465, Lot 159 LN2465, Lots 1-6 LIV40877, Lot 184 LIV40877 and Lot 252 SP275125 (see Appendix A). This is approximately 2.5 kilometres east of the Stanwell Power Station and approximately 2.3 kilometres south east of the township of Stanwell (see Figure 3), which is home to around 300 residents. The residents of the area are accustomed to the quarry being in the area as it has a history dating back to the 1800's. The local residents are also familiar with heavy industry in the area, with Stanwell Power Station being located approximately 2.2 kilometres south of Stanwell Township since 1996. Immediate uses surrounding the quarry are zoned for medium and high impact industry, and special industry, with special management area overlay existing over much of the surrounding area, including Capricorn Sandstone Quarries. Stanwell Power Station to the west is zoned special industry and land to the east is zoned as rural. Neerkol Creek is situated approximately 850 meters to the north and two small ephemeral tributaries are nearby, with one situated approximately 550 meters to the west and the other around 400 meters to the north east of the mine (see Figure 3).

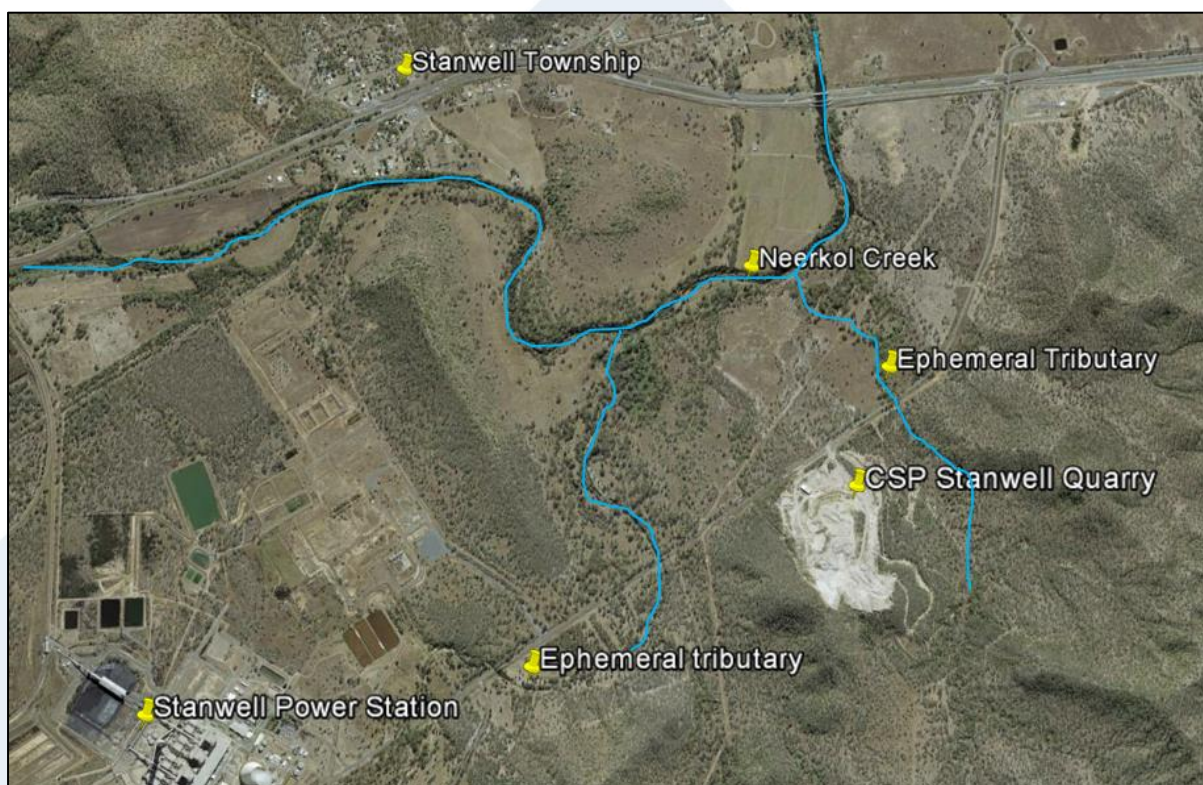


Figure 3. Position of Capricorn Sandstone Quarries in relation to Stanwell Power Station, Stanwell township, Neerkol Creek and two ephemeral creeks.

6.2 Regional Context

Capricorn Sandstone Quarries is located in the Fitzroy River Catchment, which makes up part of the Brigalow Belt Bioregion of Central Queensland.

Habitat in the surrounding area consists predominantly of open woodland to the east, north and south which is zoned primarily as non-remnant vegetation. Directly to the west is an elevated sandstone habitat which is zoned as non-remnant and remnant of least concern vegetation types.

Land use in the area consists of low value pasture, with some areas of sown pasture use. The surrounding area is also zoned for rural residential, medium impact industry, high impact industry and special industry under the Rockhampton Regional Council planning scheme (see Figure 4 and Appendix B). Much of the Stanwell corridor is also subject to special management area overlay.

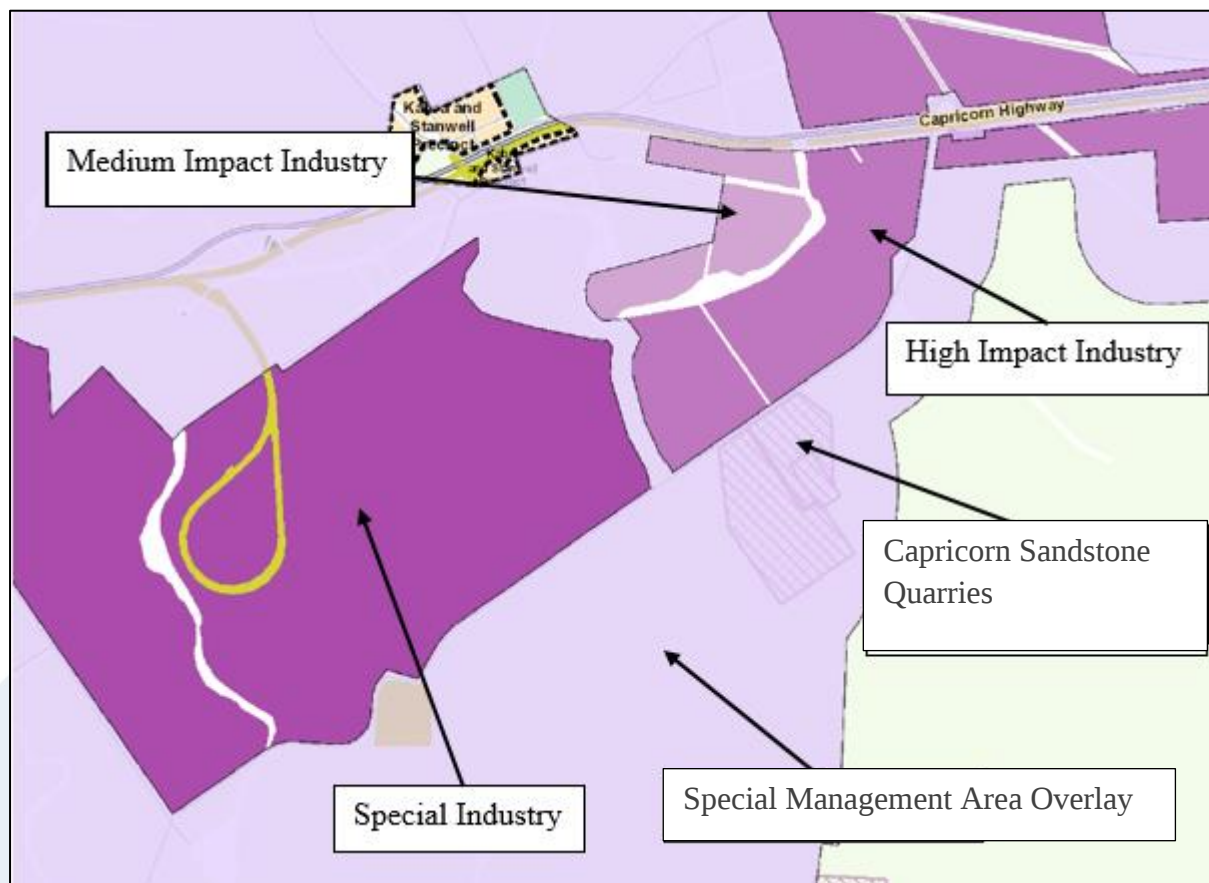


Figure 4. Industrial zoning in relation to Capricorn Sandstone Quarries.

6.3 Climate

The climate is classified as warm and temperate. The average rainfall is 773mm with the majority falling between October and March (see Figure 5). Average temperature ranges from 26.7 °C in January to 15.8 °C in July (see Figure 5).

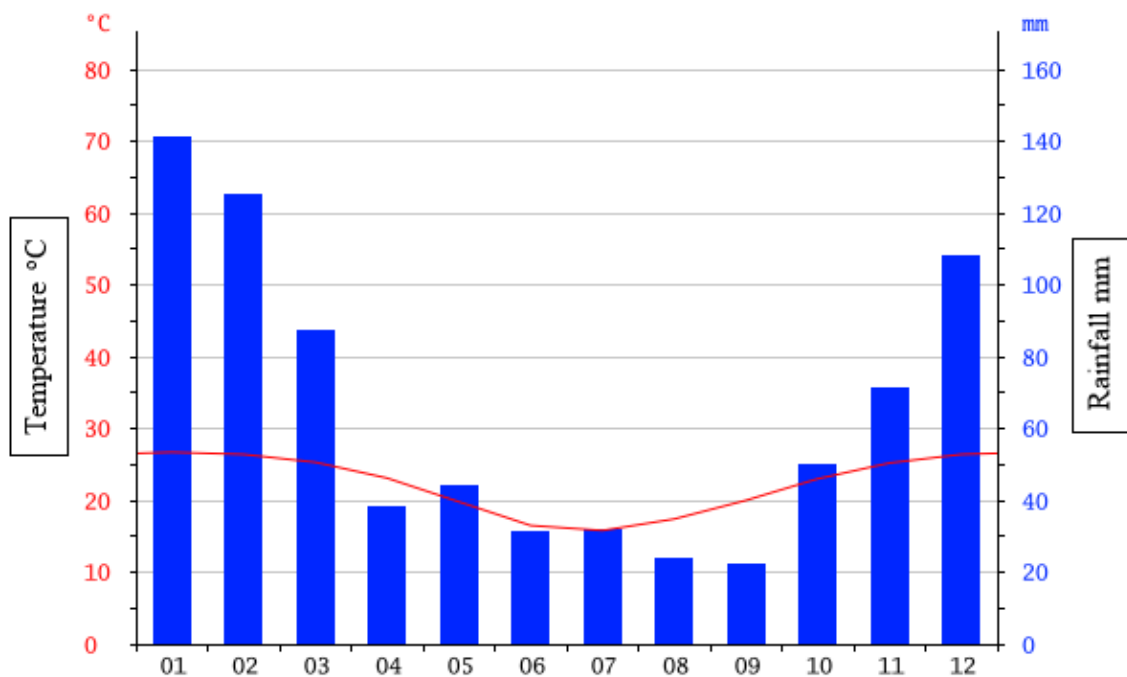


Figure 5. Average temperature and rainfall data for the Stanwell area.

6.4 Flooding susceptibility

The entire site of the mine is located in an elevated position on a sandstone outcrop and is therefore unlikely to be impacted in any significant manner by flooding. Consideration of the mine in relation to NRM Flood check mapping (<https://floodcheck.information.qld.gov.au/>) indicates no impacts from basin 1% AEP and only a very small potential impact on a single isolated area from basin extreme events (Fig. 6 & 7).

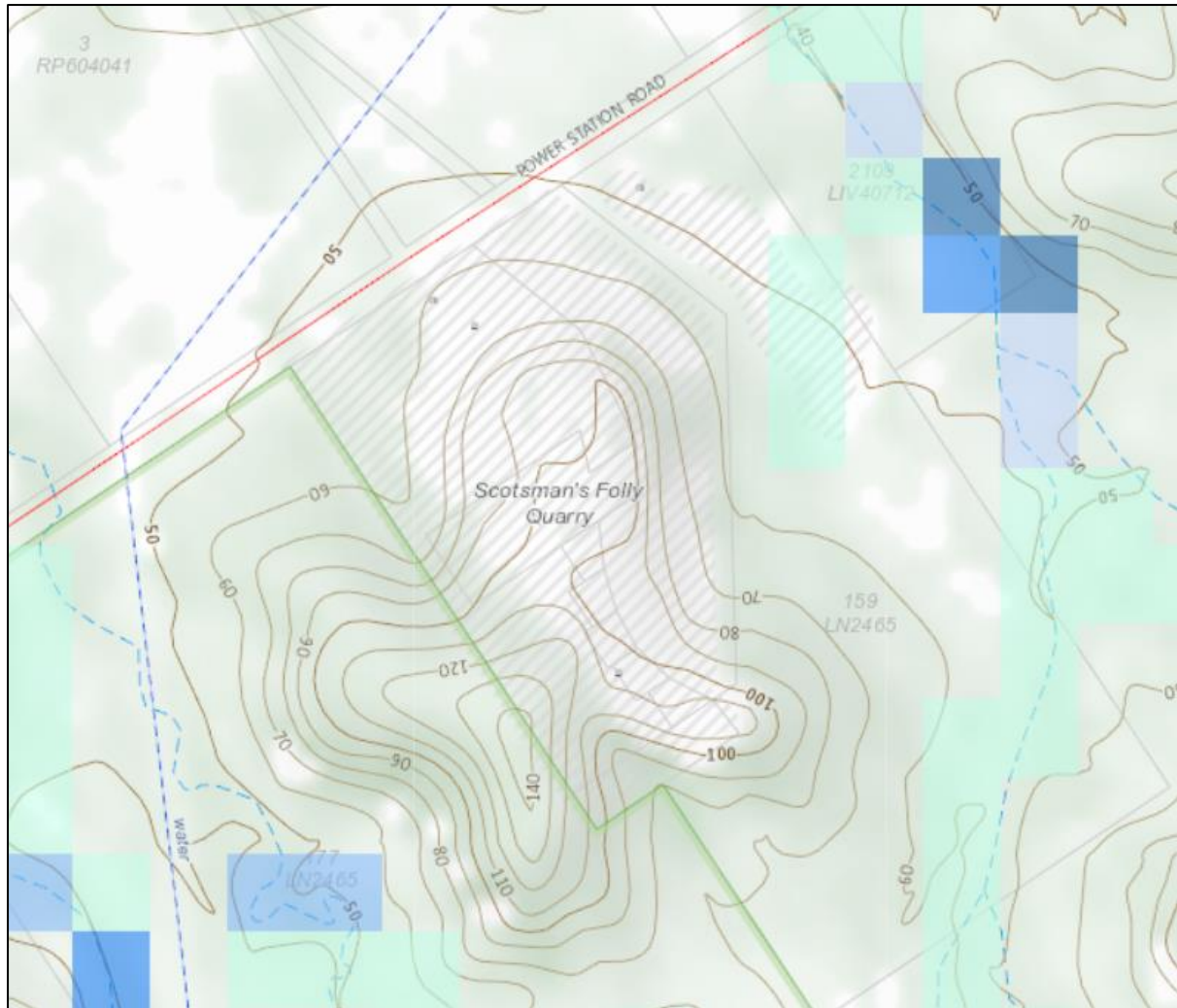


Figure 6. NRM Flood check mapping for Capricorn Sandstone Quarries from basin 1% AEP showing no impact.

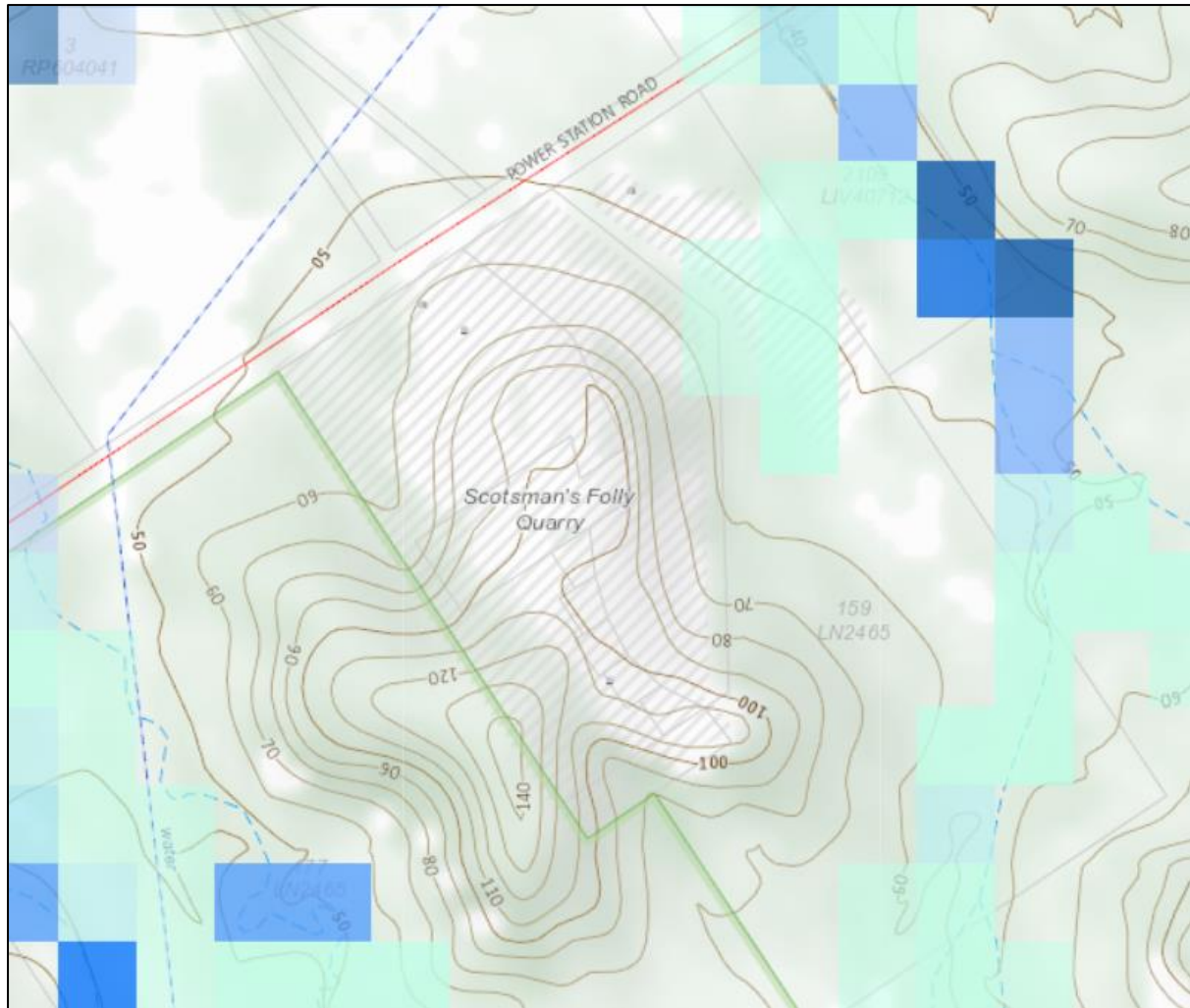


Figure 7. NRM Flood check mapping for Capricorn Sandstone Quarries from basin extreme events, showing very minor potential impact in one isolated area.

6.5 Soil

Soils in the region are dermosols, which are typically comprised of clay loam, silty loam or sandy loam formation. The soils in the area surrounding generally have a pH of between 7 and 7.5 and salinity is relatively low with values of between 0.1 and 0.15 ds/m. Water infiltration is considered moderate with a rate of 3 – 30ml/hr and drainage in the area is classified as imperfect¹.

7 Legislative Context of RMP

7.1 Environmental Protection Act 1994

Approval and operation of Capricorn Sandstone Quarries from an environmental management perspective is predominantly subject to:

- *Environmental Protection Act 1994*
 - *Environmental Protection Regulation 2008*
 - *Environmental Protection (Air) Policy 2008*
 - *Environmental Protection (Noise) Policy 2008*
 - *Environmental Protection (Water) Policy 2009*

The mining activity conducted by Capricorn Stone Products Pty Ltd at Capricorn Sandstone Quarries is defined as an environmentally relevant activity (ERA) under section 18 of the *Environmental Protection Act 1994* (EP Act), and further defined as a resource activity under section 107 of the EP Act. The tonnage of material that is extracted per year sits within 100,000-1,000,000 tonnes, and the facility is therefore operated under resource activity “ERA 20(b)”, which is defined as:

“Clay pit mining, dimension stone mining or mining gemstones (including the material from which gemstones are extracted) - if the activity involves mining a quantity of material of more than 100,000t but not more than 1,000,000t in a year.”

7.2 Environmental Authority

Section 426 of the EP Act requires that an ERA may only be conducted under the approval of an environmental authority (EA). Capricorn Stone Products Pty Ltd operates Capricorn Sandstone Quarries under EA EPML04041216, which was granted by the Department of Environment and Science (DES) on 4 August 2016. The EA contains conditions that require rehabilitation of the mine following the cessation of mining activities. The particular conditions that relate to rehabilitation are conditions C3 and C4.

This RMP has been prepared in order to comply with conditions C3 and C4. The RMP is also designed to comply with the ‘Rehabilitation requirements for mining resource activities guidelines’ (EM1122) as outlined in condition C3 of EA EPML04041216.

Table 1. EA EPML04041216 rehabilitation conditions.

Number	Condition
C3	Rehabilitation A Rehabilitation Management Plan (RMP) must be developed by an appropriately qualified person and must include at least the following; a) The post-mining land use; b) Rehabilitation must comply with the Guideline Resource Activities – Rehabilitation requirements for mining resource activities (EM1122); c) State the rehabilitation objectives proposed to achieve the rehabilitation goal of; i. Safe to humans and wildlife; ii. Non-polluting; iii. Stable; iv. Able to sustain a post mining land use; d) Describe the methods of rehabilitation needed to achieve the rehabilitation objectives and goals; e) State the completion criteria proposed to measure the success of rehabilitation objectives and goals.
C4	The RMP must be submitted to the administering authority by 9 November 2016.

8 Post Mining Land Use

Sandstone mining operations at Capricorn Sandstone Quarries have been occurring for well in excess of 100 years, and are expected to continue for at least a further 100 years. The “winnable” high quality sandstone is a relatively low extraction volume, high value material, and therefore extraction activities do not occur at a high rate when compared to other mining activities such as coal or mineral ore mining. The sandstone resource at the site is a highly valuable commodity which is extracted at an extremely slow rate when compared to common mining operations of minerals and coal. The most recent lidar investigation (2012) identified in excess of 4,897,000 m³ of winnable sandstone remaining in the ML area. This volume of sandstone equates to approximately 11,500,000 tonnes of sandstone. Annual extraction at the mine ranges 20,000-50,000 tonnes. Therefore, even at maximum extraction rates of 50,000 tonnes per annum the mine would have a life of 230 years. However, for discussion relating to the life of the mine a much more conservative figure of 80-100 years is generally used.

Sandstone from the mine is of extremely high quality and is in demand for new works and restoration of historic structures. It is fully expected that the mine will continue to operate on exactly the same footprint as it currently occupies for at least the next century.

Once the winnable sandstone resource has been exhausted, any remaining adjoining hillside will be battered to an appropriate gradient for safety and stability. This area is intended for post-mining use as habitat for rock wallabies which already inhabit the area and the existing mine overburden stockpiles. Note that Capricorn Sandstone Quarries may make application at a future date to conduct sandstone mining over an expanded area to include the entire hill. In this instance, the RMP would have to be adjusted to allow for the changed activity, and it would be likely that there would be no need for battering of the remaining hillside, as the hillside will have been extracted. However, this RMP only identifies rehabilitation requirement for currently approved activities.

Infrastructure areas on site are to be left unchanged for proposed future set-down and storage area, in accordance with a landholder agreement. The remaining infrastructure will be managed as per the site based management plan and with respect to any EA conditions which may be relevant at the time.

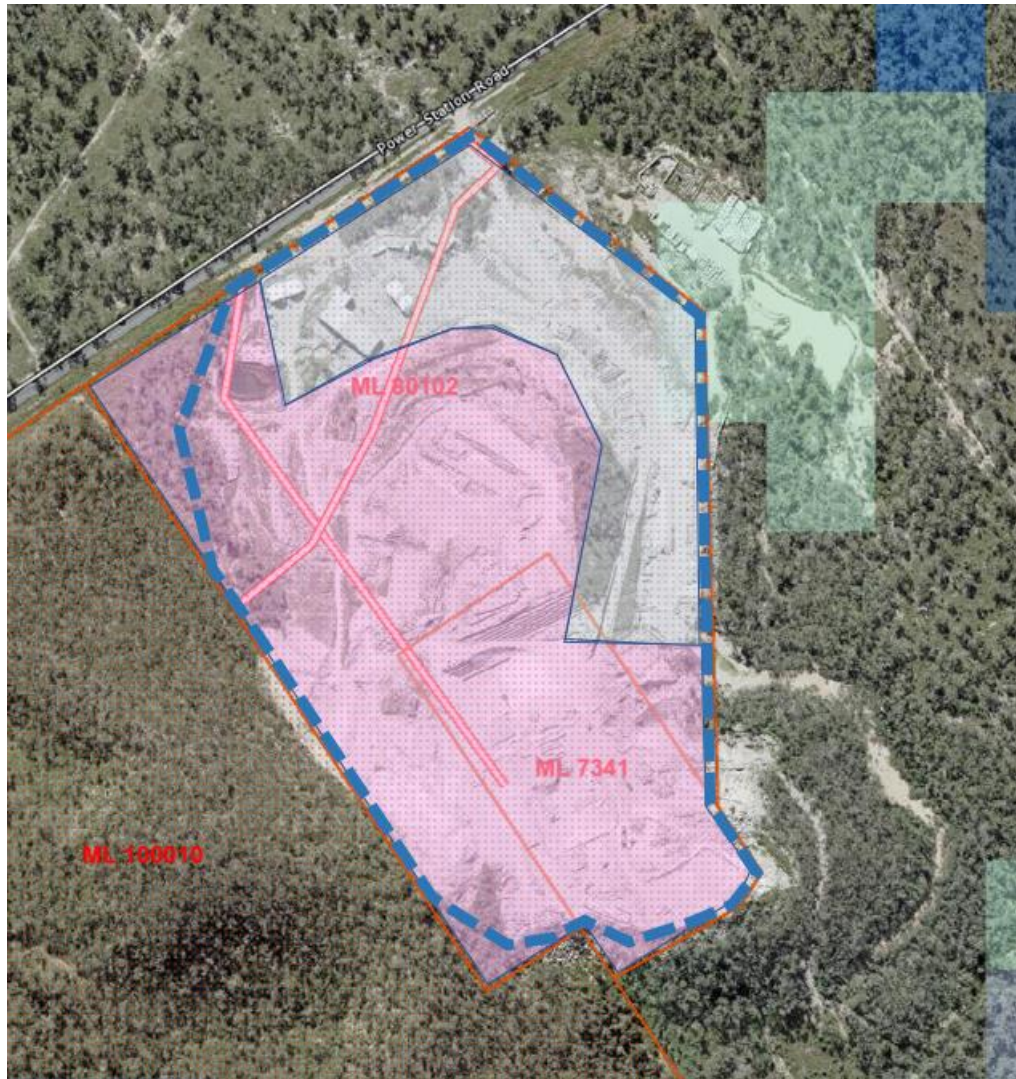
These areas include:

- Workshops
- Administration buildings
- Set down areas
- Internal roads

Remaining areas will be returned to a safe, stable, self-supporting system, which functionally resembles the surrounding area.

These post mining land use objectives will result in three distinct domains from a land use point of view (see Figures 8 & 9). The exact size and location of these areas is subject to change prior to the implementation of the RMP and may be subject to various approvals or regulations current at that time. The domains are:

- **RA1** - Battered rocky hillside to be rehabilitated to a safe, stable, self-sustaining ecosystem for habitat for local rock wallaby populations.
- **RA2** - Low plateau area of a similar landform to the surrounding area, to be rehabilitated to a safe stable self-sustaining ecosystem resembling the surrounding area.
- **RA3** - Set-down or storage area for personal landholder use or commercial activities (subject to Council approval), as per landholder agreement.



Legend:

Mining leases

Maximum footprint of disturbance

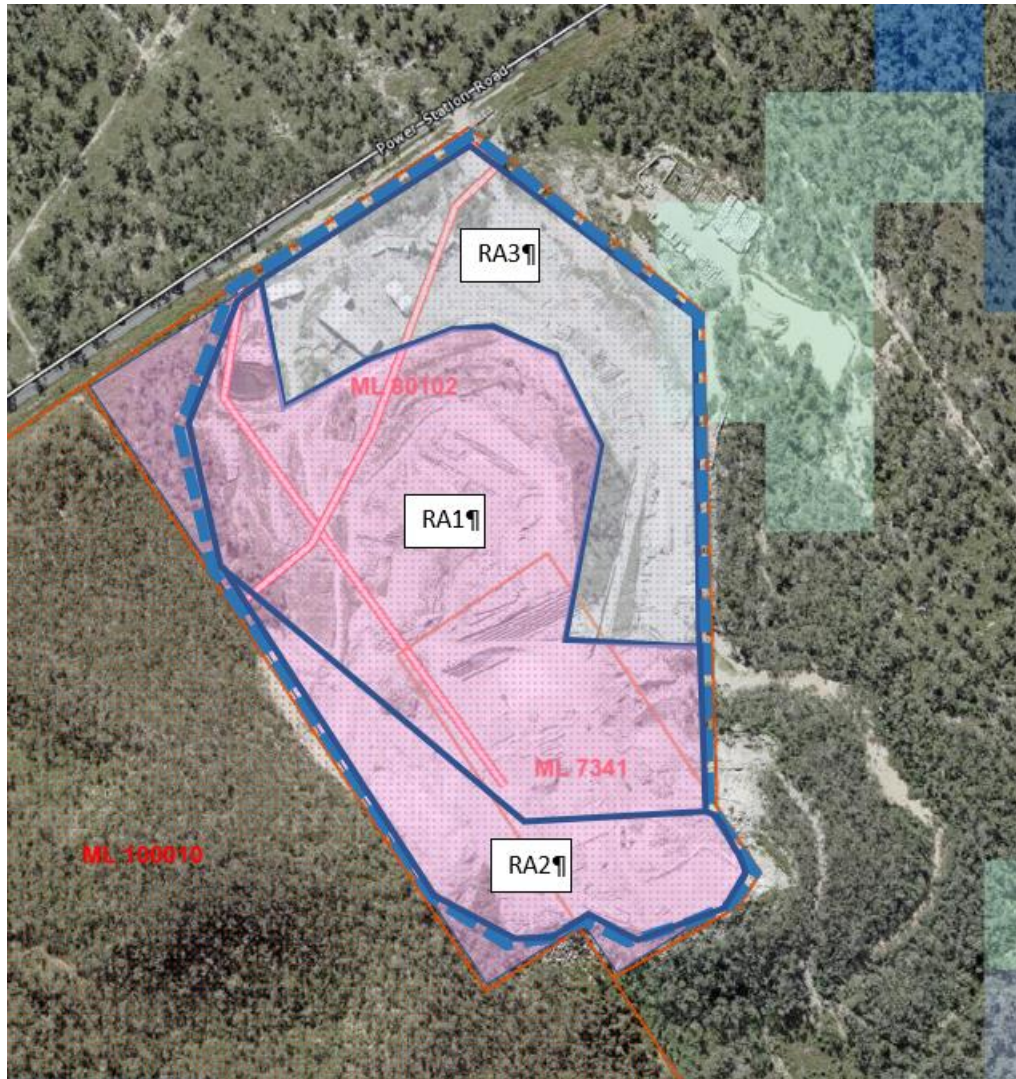
Flood plain extent

Native ecosystem (end use)

Future landholder use (end use)



Figure 8. Maximum footprint of disturbance and end land uses.



Legend:

Mining leases

Maximum footprint of disturbance

Flood plain extent

Native ecosystem (end use)

Future landholder use (end use)

Rehabilitation area (RA)



Figure 9. Maximum footprint of disturbance, end land uses and rehabilitation areas (RAs).

9 Rehabilitation Goals

DES has developed a guideline document to assist with rehabilitation of mine sites. This document is titled, “Rehabilitation requirements for mining resource activities” (EM1122 Version 2) and provides information on both progressive and final rehabilitation requirements for site specific resource projects operating in Queensland under the *Environmental Protection Act 1994*.

“Rehabilitation requirements for mining resource activities” introduces four rehabilitation goals that are to be achieved during rehabilitation of a mine site. The rehabilitation goals have been developed from the ESD policy framework, especially in relation to intergenerational equity; polluter pays principle, protection of biodiversity and maintenance of essential ecological processes.

The four general rehabilitation goals require rehabilitation of areas disturbed by mining to result in sites that are:

- Safe to humans and wildlife
- Non-polluting
- Stable
- Able to sustain an agreed post-mining land use.

Each of the four goals are addressed separately in the following sections.

9.1 Safe to Humans and Wildlife

This objective relates to the creation of a site which is safe for both humans and wildlife from both a physical injury and an environmental pollution point of view.

The vast majority of the site will be relatively level at the end of the mine’s operational life, with an estimated slope incline of less than 20° over most of the site, this is not expected to pose any foreseeable risk to humans or wildlife. There will be no voids created during the mining operations and thus, there will be no safety hazards due to void wall stability.

The battered slope on the western and south-western edge of the mining lease (see Figure 6), has the potential to be hazardous to humans and wildlife due to subsidence and rock falls. The final design and construction of the slope will be designed and overseen by a suitably qualified engineer to ensure the slope is stable and safe.

Sediment leaving the site due to erosion has the potential to cause harm to wildlife should it reach water bodies, as this may cause turbidity and eutrophication issues. Given the site’s distance from any major water bodies this is unlikely to be problematic. However, erosion control is not only important from the perspective of the health of the receiving environment, it is paramount to the success of rehabilitation efforts on site. With these issues in mind, erosion control measures will be implemented during the rehabilitation phase, and ongoing monitoring and remediation of any erosion issues will be implemented during the monitoring phase. Much of the erosion and sediment control measures that will be employed will be a continuation of the operational measures in place during the mine’s operational life.

The benign nature of the sandstone product and proximity of the resource to the surface, means that the mining process produces no pyritic acid forming waste rock or saline regolith. Furthermore, the benign nature of the sandstone material and mining processes employed produces no toxic tailings and requires no chemical additions. Given these points, there will be no residual hazard to humans or wildlife from acid, chemical or heavy metal contaminated leachate.

9.2 Non Polluting

As outlined in section 9.1, there are no acid, saline, heavy metal or chemically contaminated waste materials produced during extraction or processing. Therefore, there is no residual risk of pollution entering the receiving environment from any of these sources. The only source of potential pollution is from mobilised sediment leaving the site into the surrounding environment. With this in mind, counter erosion measures will be implemented during rehabilitation works and judicious monitoring and remediation of erosion issues will be carried out during the monitoring process. Sediment and erosion control structures such as swales, rock armouring, check dams and sedimentation dams will remain in place during the rehabilitation phase in order to prevent sediment leaving the site. The water collected in these dams will provide a water source for irrigation in order to promote the establishment of vegetation.

9.3 Stable Landscape

The goal in this instance is to restore the site to a state of physical and geological stability. Furthermore, this goal relates to the creation of a stable ecosystem capable of sustaining itself without ongoing human inputs.

The landscape will be rendered stable both physically and biologically with the use of revegetation and counter erosion techniques including contour banks, across slope revegetation and a judicious monitoring and remediation program. This will also include engineering techniques which will be required to stabilise the remaining sandstone hillside.

The areas which will be set aside for post-mining set-down or storage areas will be managed in accordance with general environmental duty, or any approval requirements (eg. Site based management plan, EA conditions) which may be in place at the time.

9.4 Ability to Sustain Post-Mining Land Use

The aim of this goal is to develop physical, chemical, biological and administrative systems, which are able to satisfy the expectations of all stakeholders. Stakeholders may include the administering government authority, landholders and downstream interests. This goal will be realised through carefully planned and executed rehabilitation techniques and also through long term monitoring of the rehabilitation site.

10 Rehabilitation

10.1 Rehabilitation Schedule

Mining operations at Capricorn Sandstone Quarries are somewhat unusual, in that they provide a high value but low volume commodity. The sandstone that is extracted on site is not a homogenous resource. The characteristics of the stone is highly variable across the site (see Figure 10) and demand for stone with certain features can vary significantly from a temporal point of view. This characteristic means that mining is not performed on a progressive basis, as consumer demand dictates when and where extraction is occurring on site. Essentially, this results in the entire site being active for the entire life of the mine. The non-progressive nature of mining activities on the site precludes progressive rehabilitation of the site. Rehabilitation of a dormant area only to reopen extractive activities at a later date would be both economically and environmentally irresponsible.

Capricorn Sandstone Quarries contains enough winnable material for all areas of the mine to remain viable for many decades to come, quite possibly in excess of 100 years, depending on demand. As a result of the longevity of the mine, no rehabilitation works are proposed to be required for a number of decades, and the site will be operated under stormwater, sediment and erosion control plans until the site is fully exhausted. At this point, and given the relatively small 23 hectare footprint, the entire site will be rehabilitated at the same time.



Figure 10. Variability of product across Capricorn Sandstone Quarries.

10.2 Rehabilitation Methods

10.2.1 Battered Hillside Rock Wallaby Habitat Domain

10.2.1.1 Re-Contouring

Preparation of the battered hillside rock wallaby habitat will occur during mining operations. Removal of sandstone product will occur in such a way that the remaining slope will take on a stepped/battered landform. This extraction procedure and landform preparation will be governed by plans which will be designed and overseen by a suitably qualified engineer. Sandstone overburden will also be used in this area to provide additional rock wallaby habitat and refuge during events such as bushfires.

10.2.2 Low Plateau Area Domain

10.2.2.1 Re-Contouring

Re-contouring of the low plateau area will begin as soon as all winnable material is exhausted. Low lying areas will be filled with coarsely crushed waste rock and the landscape reshaped to a form resembling the surrounding area, with respect to required slope length and angle. Re-contouring will include the construction of water management and erosion control structures such as drains and contour banks.

Stored topsoil will be mixed with locally sourced crushed sandstone to aid in water infiltration and structural properties. Crushed sandstone is in plentiful supply as a natural by-product of the extraction process. As the mine approaches the time to begin rehabilitation, suitable quantities of crushed sandstone will be stored. Topsoil stored for lengthy periods can be subject to degradation from nutrient leaching, loss of biological activity and organic matter resulting in poor fertility. Therefore, where required, stored topsoil will be ameliorated with organic matter to increase cation exchange capacity and fertilizer applied as required. Soil analysis to determine nutrient content and pH will be carried out and suitable remediation techniques will be applied as necessary. Prepared topsoil will then be spread across the site to a minimum depth of 200mm. For the duration of topsoiling works, accurate accounts of truck and scraper movements will be recorded to allow for an evaluation of topsoil placement to ensure evenness of spreading.

Prior to the onset of the wet season, seedbed preparation will take place. This will involve deep ripping to a depth of 300mm.

10.2.2.2 Seeding and Establishment of Tube Stock

Tube stock planting will be supported by watering where required, which will be enabled by the recycling of water held in the onsite water management dams. This will allow for the establishment of tree and shrub species before the onset of the wet season, will enhance the establishment of native species, thereby accelerating trends towards rehabilitation goals. This will also facilitate root penetration of the soil with the view to enhance soil stability and thus reduce erosion. Tube stock plantings will be in rows across gradient and with the contour of the site, to effectively reduce slope length and assist in the retention of soil and resources on the rehabilitation site (see Figure 11).

Immediately prior to the onset of the wet season and if rains are forecast, seeding will occur across all prepared areas. Given the small footprint of the site, seeding may be facilitated by hand held spreader. This will help to prevent compaction of soils from heavy machinery.

10.2.3 Set-Down and Storage Area Domain

10.2.3.1 Re-Contouring

Minimal re-contouring of the set-down and storage area will be undertaken. This area will be managed for continued use as basically hard stand areas under a landholder agreement.

Re-contouring of the set-down and storage area will predominantly focussed on the construction of water management and erosion control structures such as drains and contour banks.

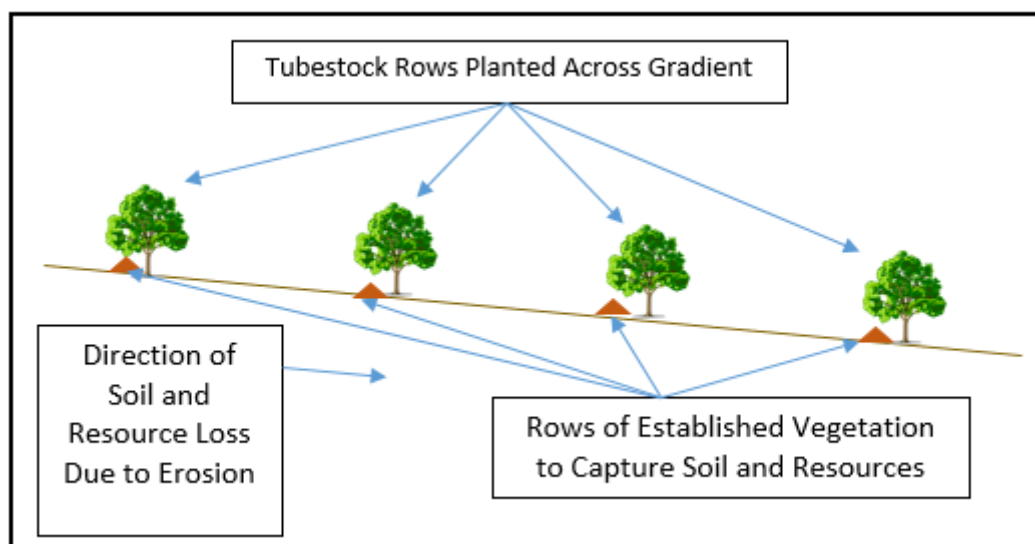


Figure 11. Across gradient rows of tube stock aimed at enhancing soil stability, reducing erosion and accelerating rehabilitation timeframes.

10.3 Revegetation Criteria

Revegetation for the post mine environment is highly dependent on the designated land use for the site. The designated post mine land use controls what species of plants are likely to colonise the area, as well as other target vegetation factors such as species diversity, abundance and dominance. For the areas where revegetation is proposed, the post mine land use is native ecosystem.

Native species which are established in the surrounding area should be used for the majority of the seed mix and for the propagation of tube stock. Tree, shrub and ground cover should be provided at

sufficient density to allow habitat value and structure to be retained. These areas should be self-functioning, with minimal inputs required after establishment to ensure healthy survival.

Revegetation criteria should be assessed against local reference sites that are to be used as benchmarks for final species diversity, abundance and dominance. Soil surface indicators will also require analysis in order to gain data for soil property comparison across reference and rehabilitation sites. Reference sites will be assessed using the principles of Landscape Function Analysis (LFA). This system uses a series of indicators including landscape organisation, which looks at the structures present in the landscape and how they interact to either retain or lose resources. LFA also considers a series of 11 soil surface indicators, the results of which are used to calculate three synthetic soil surface indices which show the sites ability to resist erosion, retain and store water and cycle nutrients in order to enhance and support plant growth (see Figure 12).

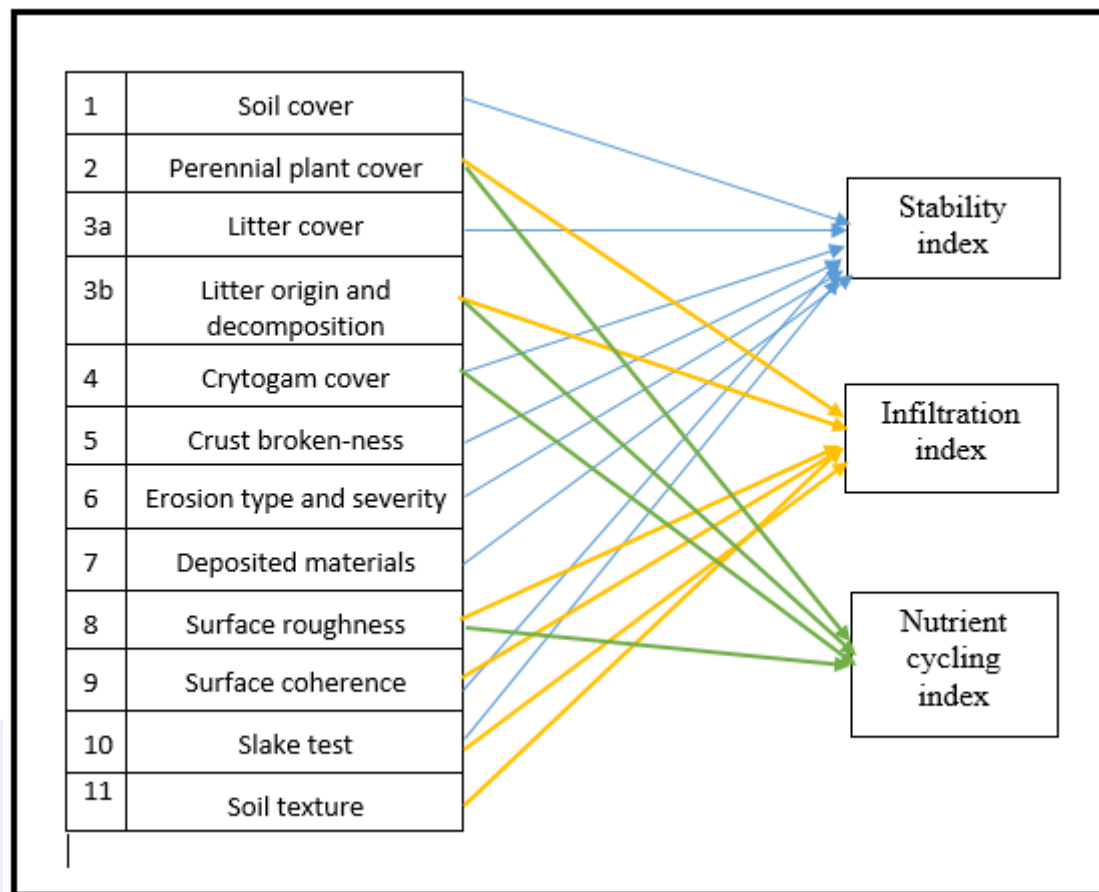


Figure 12. The 11 soil surface indicators and their relationship with the synthetic soil indices².

Initial flora investigations in the surrounding area have identified species which may be used as a preliminary seed mix and for the propagation of tube stock. As the mine is expected to continue active production for up to at least 100 years, reassessment of the surrounding flora and reference sites will be required to establish the exact species required.

Possible/likely species include:

Canopy/tree species:

- *Corymbia clarksoniana*
- *Corymbia erythrophloia*
- *Eucalyptus crebra*
- *Eucalyptus tereticornis*
- *Acacia excelsa*
- *Acacia salicina*

Herbaceous/understory species:

- *Sida rohlenae*
- *Jasminum didymium*
- *Senna artemisioides* subsp. *Artemisioides*
- *Desmodium brachypodium*
- *Evolvulus alsinoides*

Grass/groundcover species:

- *Eragrostis elongate*
- *Heteropogon contortus*
- *Themeda triandra*
- *Bothriochloa decipiens*
- *Dichanthium sericeum*

11 Monitoring

Monitoring rehabilitation success is an essential part of any rehabilitation program. Monitoring will consist of a Land Survey and Vegetation Survey to be conducted annually. Each of these are discussed below.

Monitoring will be conducted until the rehabilitation success criteria have been met (see Section 11.4 and Appendix C).

11.1 Land Survey

Rehabilitation areas will be inspected for erosion rills, erosion gullies and topsoil depth to determine their erosion rating (see Table 2). Two 50 m transects will be placed along the contour for every 5 ha of rehabilitated land. Transects will be placed across the contour of the benched domain.

Table 2. Erosion rating system.

Erosion Rating	Rills per Transect	Average Depth of Rills	Topsoil Depth	General Observations
0	0 - 3	< 10cm	> 90% of original depth	Generally little erosion. The majority of rills are only <10 cm depth.
1	2 - 6	< 20cm	>70% of original depth	Minimal instances of sheet-wash and gully erosion.
2	3 - 8	< 50cm	>50% of original depth	Minimal-moderate erosion occurring but limited to localised areas.
3	4 +	> 50cm	>40% of original depth	Moderate erosion occurring.
4	4 +	Any > 80cm depth	>30% of original depth	Heavy erosion occurring.

A general inspection of each slope for rills, gullies and washouts will be undertaken in addition to transect inspection. This can be accomplished by a walkover of the site. The purpose of this walkover is to document significant erosion that may be present outside of the transect area. Where a washout is encountered, an estimate will be made of its area. If multiple washouts are encountered, an estimate of the percentage of the rehabilitation area disturbed by washouts will then be made (i.e. 5%). Within the annual rehabilitation report the results of each 50m transect will be presented with additional areas of significant erosion documented. Surface inspection following significant rain events will be undertaken in order to identify erosion events and allow for remedial action to be taken

LFA analysis of soil surface indices will be performed concurrently along with the erosion inspection. The same transects will be suitable for this purpose and will contribute to the efficiency and cost effectiveness of the monitoring program.

For each rehabilitation area requiring monitoring, soil analyses are required to confirm factors outlined in the Completion Criteria. It is recommended that soil sampling must adopt the following methods as adapted from the Australian Soil and Land Survey Field Handbook³:

- One soil sampling site for each 5 ha inspected.
- At each soil sampling site, samples should be collected from 0cm, 10cm, 20cm and 50cm depth.
- Soil samples should be analysed for the following at a NATA accredited laboratory:
 - ph and electrical conductivity.
 - Nutrients (ammonia, total nitrogen and total phosphorous).
 - Cation exchange capacity.
 - Total organic matter and total organic carbon.

The ratio of carbon (total organic carbon) to nitrogen (total nitrogen, percentage by weight) is useful to determine the capacity of the soil to support microbial populations. Comparison to reference site data will determine when conditions are suitable and meet the surrounding areas.

LFA and soil analysis will be carried out at both the rehabilitation and reference sites. Over time this will provide sufficient data sets to perform detailed statistical comparisons between the sites. This

analysis will allow the identification of soil chemistry and soil surface indices trends either towards or away from rehabilitation goals.

11.2 Vegetation Survey

Within each 5ha of rehabilitation area a 50m by 10m belt transect must be sighted. Each belt transect will be surveyed as follows:

- Ten random quadrats (1m²) analysing overall vegetation cover, percentage of dry matter cover, percentage of vegetation cover and groundcover species composition.
- Trees/shrubs identified to a species level, approximated for height, measured for diameter at breast height (DBH) and counted for species abundance.

This information will be required to assess the Completion Criteria (see Appendix C). Any signs of adverse health conditions will be noted. Fauna use of the rehabilitation areas will also be noted. All vegetation surveys will be completed in accordance with the Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland⁴ (or appropriate similar reference documents).

11.3 Reference Sites

Reference sites for monitoring will be established to assess how rehabilitation is progressing for the mine in relation to localised vegetation. These reference sites are used as benchmarks for rehabilitation success. Two reference sites will be established in areas that are unlikely to be affected by mining. The suitability of these sites will be verified in the field for their appropriateness as reference sites. All reference sites will be assessed using the same methods to those adopted for rehabilitation sites.

Potential reference sites have been identified in Figure 13 and their specific locations are described as:

- Potential Reference Site A = Lat. -23.5019 and Long. 150.3398.
- Potential Reference Site B = Lat. -23.5024 and Long. 150.3490.

These potential reference sites will be evaluated for suitability at an appropriate time in the future, closer to activation of rehabilitation actions.



Figure 13. Potential rehabilitation reference sites.

11.4 Rehabilitation Success Criteria

Rehabilitation success criteria for the rehabilitation site are contained in Appendix C.

12 Rehabilitation Plan Administration

12.1 Implementation and Maintenance of the Rehabilitation Plan

Capricorn Stone Products Pty Ltd, as the EA holder has sole and full responsibility for ensuring full implementation of this Rehabilitation Management Plan, including:

- That the post mine land use objective and final rehabilitation occurs across the site in accordance with the RMP.
- Monitoring and maintenance of rehabilitated landforms as constructed in accordance with the RMP is the responsibility of the EA holder until they meet the success criteria.

12.2 Performance and Review of the Rehabilitation Plan

It is recommended that this RMP is reviewed and audited with each Plan of Operations submission. Any changes in operational practices must be incorporated into the rehabilitation plan and communicated to employees and contractors on-site. As operation of the mine progresses and closure of the mine is approached, it is vital that the RMP is carefully reviewed.

The following criteria will be used to determine if the RMP is effective.

- Rehabilitated areas are safe to humans and wildlife.
- Post mine land uses are non-polluting.
- Post mine land uses are stable.
- Able to sustain the agreed mining land use.

12.3 Responsibilities

Responsibilities of all personnel associated with the site towards the effective management of rehabilitated areas are outlined in Table 3.

Table 3. Responsibilities under RMP.

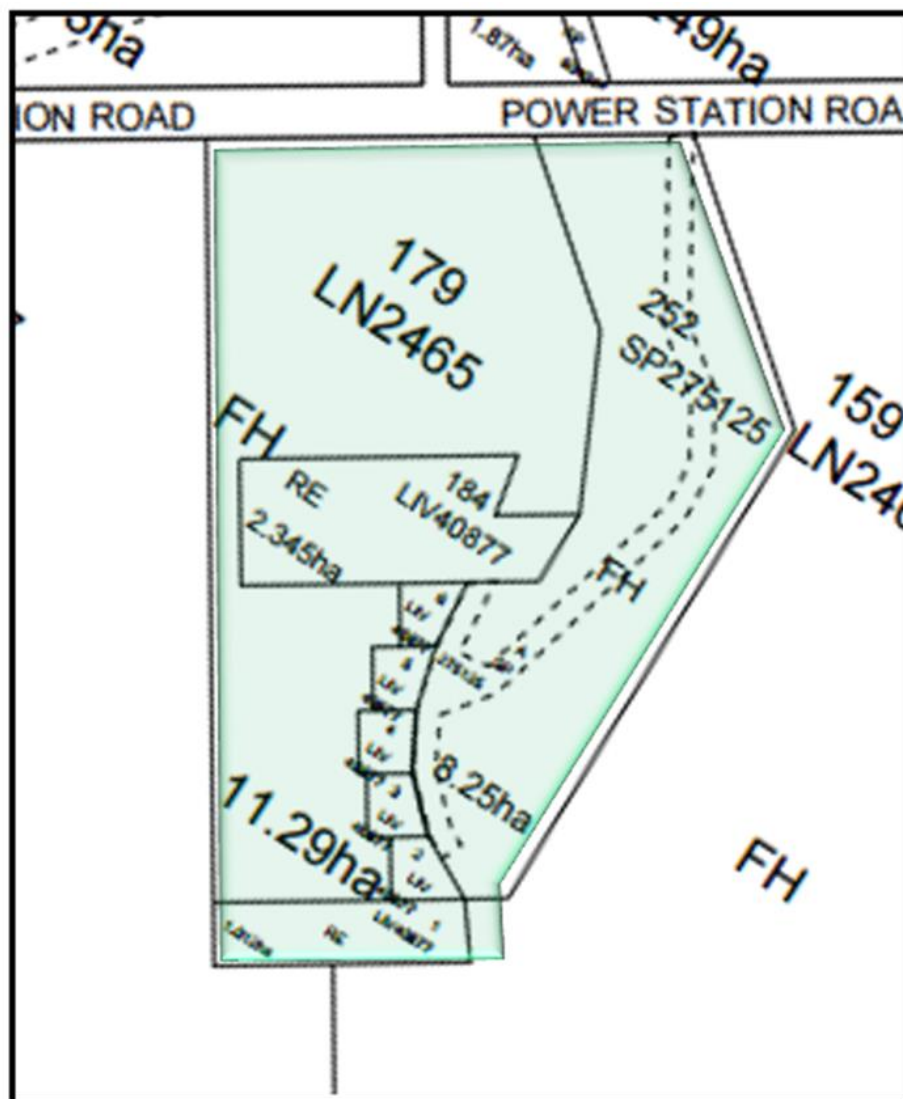
Personnel	Responsibilities
Capricorn Stone Products Pty Ltd Senior Executive	• Shall ensure that a formal review of this RMP is made with each Plan of Operations submission. • Shall ensure that adequate resources and direction are available for this RMP to be further developed (where required) and effectively implemented. • Shall ensure appropriate communication of the RMP to all applicable mine staff.
All Supervisors	• Shall ensure that the RMP outline is followed. • Shall recommend or act on recommendations to rectify any deficiencies found in this RMP.
Mine Workers and Contractors	• Shall comply with this RMP and ensure rehabilitation management issues are adequately dealt with.

12.4 Reporting

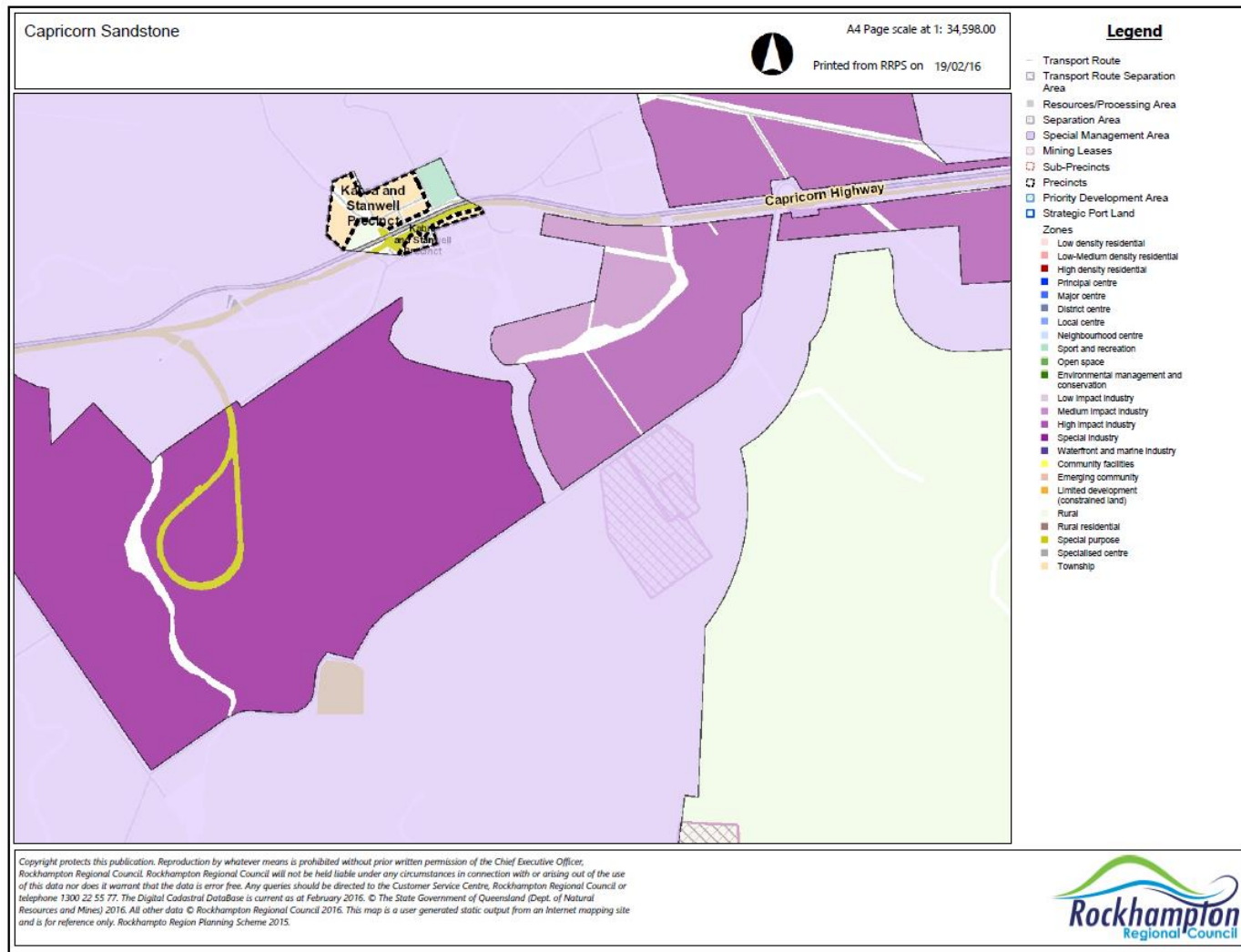
Monitoring of rehabilitated areas will be undertaken in accordance with section 8 of this report. This will involve annual site inspections and reporting for the first three years after the completion of initial rehabilitation work, and every five years thereafter until rehabilitation success criteria are met. This monitoring schedule is indicative of a best case scenario situation and may require alteration in accordance with site requirements.

13 Appendices

13.1 Appendix A – Land parcels covered by ML 7341 and 80102 (Approximate).



13.2 Appendix B – Surrounding Land Uses



13.3 Appendix C – Rehabilitation Success Criteria

Mine Site Rehabilitation Goal	Mine Site Rehabilitation Objective	Rehabilitation Indicators	Rehabilitation Completion Criteria	Evidence of Compliance to be Supplied with Completion Criteria
Long Term Safety	Quarry/mine floor remains safe for humans and animals now and in the future.	Slopes are suitable for human and/or animal traffic.	Certification in rehabilitation report that slopes are safe and risk of future failure is determined to be acceptable.	Geotechnical assessment and certification by a suitably qualified person to determine slip hazard and stability of batters.
		Erosion ratings are suitable for long term safety.	Erosion ratings (as adopted by the erosion rating system) are less than or equal to 2 (as defined in Table 2) at all rehabilitation transects undertaken.	Evidenced in inspections of rehabilitation.
Non-Polluting	Erosion controlled to prevent sediment from entering waterways.	Erosion ratings represent sufficient soil stability to indicate a safe level of sediment loss.	Certification that erosion ratings represent sufficient soil stability to indicate a safe level of sediment loss.	Certification that erosion ratings represent sufficient soil stability to indicate a safe level of sediment loss.
Stable	Topsoil is stable and resistant to erosion.	Erosion rates.	Erosion rates measured or modelled using suitable modelling methods such as RUSLE and are no higher than 50% that of the surrounding environment.	Certification report comparing erosion losses (measured or modelled) from the rehabilitation site with surrounding environment.
		Erosion indicators such as rills, gullies and washouts are minimal.	Erosion ratings for inspection transects (minimum 50m each transect) are less than or equal to 2.	Rehabilitation report or final rehabilitation report outlining erosion ratings on site.

			Areas where washout occur do not exceed 5% of the total rehabilitation area of the site.	Analysis from ground inspections outlined in final rehabilitation report.
			Each individual washout does not exceed 100m ² .	
	Functional erosion structures.	Erosion structures are fit for purpose.	Inspection and certification of erosion and water control structures such as contour banks.	Certification from a suitably qualified person showing structures are fit for purpose after mine closure. Certification evidenced in final rehabilitation report.
	Vegetation cover.	Vegetation cover, percentage and type.	Total ground cover (i.e. grasses) must not be below 70%.	On ground rehabilitation inspection, outlined in final rehabilitation report.
Sustainable Land Use	Soil properties that support and will continue to support the desired final land use.	Chemical properties of topsoil and soil profiles that are within the root zone of proposed vegetation.	pH range of soil is between 5.0 and 9.0 to at least 0.3m.	On ground rehabilitation inspection, outlined in final rehabilitation report.
			Evidence that nutrient and organic matter cycling is occurring (this can be provided by continued sampling for organic carbon and nitrogen for a period of 3 years).	On ground rehabilitation inspection, outlined in final rehabilitation report.
			Cation exchange capacity greater than 10meq/100g.	On ground rehabilitation inspection, outlined in final rehabilitation report.
			Root zone salinity is less than 0.6 dS/m (in a 1:5 soil mixture)	On ground rehabilitation inspection, outlined in final rehabilitation report.
	Vegetation is suitable for the post mining land use.	Physical parameters of the soil.	Topsoil is >150mm thick across all vegetated areas.	On ground rehabilitation inspection, outlined in final rehabilitation report.

			Erosion ratings (as adopted by the erosion rating system) are less than or equal to 2 (as defined in Table 2)	On ground rehabilitation inspection, outlined in final rehabilitation report.
		Vegetation diversity.	Weed prevalence and occurrence is no greater than the pre-mining land use	On ground rehabilitation inspection, outlined in final rehabilitation report.
			An appropriate shrub density within 1 standard deviation of an appropriate reference site measured in shrubs per ha occurs across the rehabilitation site.	On ground rehabilitation inspection, outlined in final rehabilitation report.

13.4 Appendix D – References

1. Australian Government Department of Agriculture Fisheries and Forestry 2016, Australian Soil Resource Information System, viewed 20 October 2016, <http://www.asris.csiro.au/index.html>
2. Tongway, D, J & Ludwig, J, A 2011, Restoring Disturbed Landscapes, Island Press, Washington.
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4. Neldner, V, J, Wilson, B, A, Thompson, E, J and Dillewaard, H, A 2005, Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland. Version 3.1. Updated September 2005. Queensland Herbarium, Environmental Protection Agency, Brisbane, 128 pp.

Appendix F – Landholder Agreement

CAPRICORN STONE PRODUCTS

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24 November 2021

RE: Landholder Agreement – Rehabilitation Requirements for EPML04041216, Capricorn Stone Products Pty Ltd, Stanwell QLD.

This Landholder Agreement relates to the activities being conducted under Environmental Authority (EA) EPML04041216 on ML7341 and ML80102, located at 227 Power Station Road, Stanwell 4702.

The activities being undertaken under EA EPML04041216 are conducted by Capricorn Stone Products Pty Ltd.

The majority of the land under the authority of EA EPML04041216 is freehold, owned by Capricorn Stone Products Pty Ltd.

In the circumstances that Capricorn Stone Products Pty Ltd (as the EA holder) cease mining and extraction activities under the authority of EA EPML04041216, Capricorn Stone Products Pty Ltd (as the landholder) agree to accept land covered by the authority of EA EPML04041216 back in accordance with the items detailed in the following sections.

Areas to be retained by landholder

The areas to be retained on site by the landholder post mining for potential future industrial use without additional rehabilitation are as follows:

- Lay down areas.
- Administration building, process buildings (and equipment), staff amenities.
- Water management infrastructure (on site dams).
- Access roads to be left in-situ for the purpose of access around the site including to a number of internal Lots on Plan which are reserve parcels and unallocated state land and to facilitate access for rehabilitation activities.

The location of these areas can be seen in Figure 1. The yellow polygons Lay down areas, the blue polygons are the onsite dams, and the purple polygons are the administration, processing and staff amenity buildings, and the red lines are internal roads.

The size of the area to be retained by the landholder post mining for potential future industrial use without additional rehabilitation is approximately 7.90 ha.



Figure 1. Areas and locations of infrastructure to be retained by the landholder. Yellow polygons are set down areas, blue polygons are dams, purple polygons are administration, workshop, processing and staff amenities and red lines are roads

Signed: 

Name: Reece Gough

Position: Director

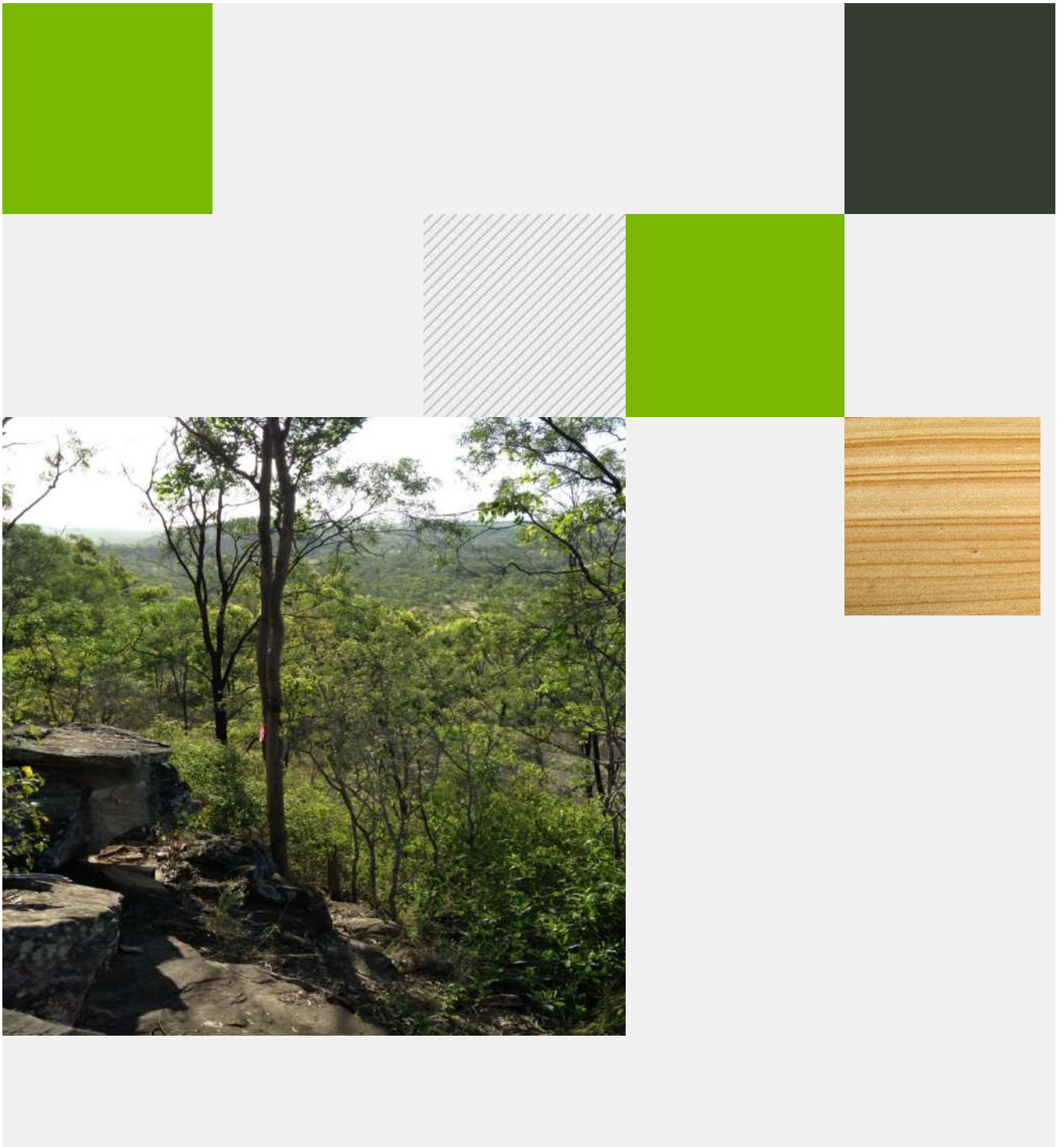
Date: 24 November 2021

Capricorn Stone Products Pty Ltd (as EA holder and landholder)

PMLU – Rehabilitation Area Risk Assessment						
Risk Identified	Source of Risk	Ability to Control	Consequences	Cumulative Affect	Control Measures	Level of Risk to achieving Rehabilitation Milestones
Lack of substrate	Erosion from Stormwater	High	Vegetation does not establish	Rehabilitation milestone not achieved Unable to sustain post mining land use	See RMP for erosion management See RMP for monitoring requirements	Low
			Loss of pioneer species	Rehabilitation milestone not achieved Unable to sustain post mining land use	See RMP for erosion management See RMP for monitoring requirements	Low
			Loss of propagules, organic matter, nutrients and soil microorganism	Rehabilitation milestone not achieved Unable to sustain post mining land use	See RMP for erosion management See RMP for monitoring requirements	Low
Moisture deficit	Low rainfall	Low	Vegetation does not establish	Rehabilitation milestone not achieved Unable to sustain post mining land use	See RMP for water retention strategy.	Medium
					See RMP for watering requirements	
	Loss of water from site due to runoff	High	Vegetation does not establish	Rehabilitation milestone not achieved Unable to sustain post mining land use	See RMP for land contouring strategy	Low
					See RMP for watering requirements	
Suitable species do not colonise	Inappropriate species planted	High	Vegetation community does not resemble reference site	Rehabilitation milestone not achieved Unable to sustain post mining land use	Ensure suitably qualified personnel undertake initial assessment of reference sites	Low
	Inappropriate species planted		Vegetation community does not resemble reference site	Rehabilitation milestone not achieved Unable to sustain post mining land use	Ensure suitably qualified personnel source plants	Low

PMLU – Rehabilitation Area Risk Assessment						
Risk Identified	Source of Risk	Ability to Control	Consequences	Cumulative Affect	Control Measures	Level of Risk to achieving Rehabilitation Milestones
	Inappropriate placement of plants	High	Vegetation community does not resemble reference site	Rehabilitation milestone not achieved Unable to sustain post mining land use	Ensure suitably qualified personnel undertake landscape design	Low
			Vegetation community does not resemble reference site	Rehabilitation milestone not achieved Unable to sustain post mining land use	Ensure suitably qualified personnel undertake planting	
Unstable landform	Erosion from Stormwater	High	Vegetative species unable to effectively colonise	Rehabilitation milestone not achieved Unable to sustain post mining land use	See RMP for erosion management	Low
Unsafe to humans and wildlife	Voids, pits or sheer walls in final design	High	Does not meet rehabilitation criteria	Rehabilitation milestone not achieved Unable to sustain post mining land use	No voids, pits or sheer walls in final design	Low
	Slope on western side unstable	High	Does not meet rehabilitation criteria	Rehabilitation milestone not achieved Unable to sustain post mining land use	Qualified engineer to design final slope	Low
Non polluting	Contamination of environmental values from chemicals used onsite	High	Does not meet rehabilitation criteria	Rehabilitation milestone not achieved Unable to sustain post mining land use	No chemical processes used onsite	Low
	Contamination of environmental values from acid forming rock waste dumps and acid sulphate soils drainage	High	Does not meet rehabilitation criteria	Rehabilitation milestone not achieved Unable to sustain post mining land use	The activity does not interact with acid forming rock or acid sulphate soils	Low
	Contamination of environmental values from interaction with saline aquifers	High	Does not meet rehabilitation criteria	Rehabilitation milestone not achieved Unable to sustain post mining land use	The activity does not interact with saline aquifers	Low

PMLU – Landholder Agreement Area Risk Assessment						
Risk Identified	Source of Risk	Ability to Control	Consequences	Cumulative Affect	Control Measures	Level of Risk to achieving Rehabilitation Milestones
Unstable Landscape	Erosion from Stormwater	High	Area not suitable for future industry	Unable to sustain post mining land use	Erosion control measures continue to operate during post mining land use	Low
Unsafe to humans and wildlife	Buildings and equipment not maintained	High	Injury to humans and wildlife	Unable to sustain post mining land use	Future industry operated as per site management plans and applicable legislation	Low
Pollution of surrounding environmental values	Future industrial activities	High	Environmental harm	Unable to sustain post mining land use	Future industry operated as per site management plans and applicable legislation	Low



**Ecological Assessment
Supporting Information Report
Capricorn Stone Products Pty Ltd**

**27 August 2014
Revision: 2
Reference: 241736**

Document control record

Document prepared by:

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Reference 241736
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Executive Summary

Capricorn Stone Products Pty Ltd (Capricorn Stone, the proponent) owns and operates a sandstone quarry situated near Stanwell, approximately 25 km west of Rockhampton, Queensland, and proposes to submit a Mining Lease Application (MLA) to extend operations into the lot adjacent to the west (the Project). This land is owned by Stanwell Power and forms part of the Stanwell Power Station Nature Refuge (SPSNR), which is a class of protected area under the *Nature Conservation Act 1992* (NC Act). The Capricorn Stone Ecological Assessment involved detailed desktop and field investigations to determine what, if any, environmental constraints to the proposed MLA exist.

The desktop assessment identified threatened species potentially occurring at the site. These were three threatened flora species and twenty-three threatened fauna species listed under the provisions of the NC Act, along with six threatened flora and fifteen threatened fauna species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Targeted surveys for these threatened species were undertaken over five consecutive nights in May 2014, following guidelines published under state and federal legislation.

This ecological assessment also involved a critical appraisal of the proposed MLA's potential impacts on the significant cultural and natural resources and values of the SPSNR, and the proposed MLA's alignment with the proposed management intent and use of that area.

While no state or federally-listed threatened species were recorded during field investigations, the following matters are relevant:

- Suitable habitat exists within the proposed MLA for two state-listed threatened species (powerful owl and brigalow scaly-foot). Both species have been recorded in previous surveys within close proximity to the proposed MLA, in similar habitat. The proposed MLA will impact approximately 22.14 hectares of powerful owl and brigalow scaly-foot foraging habitat
- The proposed MLA occurs within the Stanwell Power Station Nature Refuge, which is a class of protected area under the NC Act. The values of the nature refuge that are likely to be impacted by the proposed MLA include:
 - Approximately 22.14 hectares of remnant open eucalypt forest on skeletal granitic or sedimentary soils
 - Approximately 22.14 hectares of habitat suitable to the koala – although the value of this habitat is diminished by the absence of this species, and its apparent inability to naturally recolonise the area
 - Approximately 0.5 hectares of softwood scrub (semi-evergreen vine thicket)
- The proposed MLA is inconsistent with the following management intent of the Stanwell Power Station Nature Refuge, to the extent only that the proposed MLA will reduce the area available for the following activities within the SPSNR by 22.14 hectares, which is the disturbance footprint:
 - limited pedestrian access for environmental education
 - limited cattle grazing by an adjoining land-holder to reduce fuel loads
 - environmental research and monitoring
 - the collection of seeds from plants

- 
- The proposed MLA is also inconsistent with the management intent of maintaining the area's softwood scrubs in a natural condition, particularly by controlling the impact of fire on the area, to the extent that a patch of approximately 0.5 hectares will be cleared. This represents roughly 1.5% of the softwood scrubs that are present within the Nature Refuge
 - No significant impact on any matters of national environmental significance are likely, and therefore no referral under the EPBC Act is required

It is expected that the proponent would qualify for vegetation clearing permit exemptions under the *Vegetation Management Act 1999* and NC Act.

It is recommended that the proponent prepares a Species Management Program for approval under the NC Act, to address the likely tampering with animal breeding places and impacts on native fauna species that will occur as a result of the proposed MLA.

1 Introduction

1.1 Background and Project Description

Capricorn Stone Products Pty Ltd (Capricorn Stone, the proponent) owns and operates a sandstone quarry situated near Stanwell, approximately 25 km west of Rockhampton, Queensland. The proponent currently mines dimension sandstone on the lots immediately adjacent to the east and north of the Project under the current Mining Lease Application (MLA 80102).

Capricorn Stone proposes to submit a Mining Lease Application (the proposed MLA) for the purpose of extending the mining operations to the west of the current operations, into the adjacent Lots to the south and west.

1.2 Study area

The proposed MLA is located on Lot 177 on CP LN2465, and also part of Lot 1 on LIV40877. Lot 177 on CP LN2465 occurs on leasehold land, within the county of Livingstone and parish of Stanwell. The lessee of Lot 177 on CP LN2465 is Stanwell Corporation Limited A.C.N. 078 848 674. A land tenure search for this parcel was provided to Aurecon by the client and is included as Appendix H. The proponent is not the owner of Lot 1 on LIV40877, and Aurecon was advised by the client that this parcel has been offered by Department of Natural Resources and Mines (DNRM) Deed of Grant upon extinguishment of Native Title (M. Day, pers. comm).

The boundary of the proposed MLA is shown in red in Figure 1. While the total area of the proposed MLA is 43.39 hectares, the disturbance footprint will be confined to the sandstone hill, and all operations (e.g. access tracks, laydown areas and stock pile areas) will remain within the existing disturbed areas. In other words, no disturbance to the lower slopes and plains and alluvial areas is anticipated to occur on Lot 177 on CP LN2465. The estimated disturbance footprint within the proposed MLA is 22.14 hectares, as shown in Figure 1. This area was calculated following the topographic contours of the hill that is currently being mined (i.e. the extent of the resource).

There is an existing Nature Refuge Agreement over the entirety of Lot 177 on CP LN2465 – the ‘Stanwell Power Station Nature Refuge’ (SPSNR), which was gazetted in October 2006. A Nature Refuge is a class of protected area under the *Nature Conservation Act 1992*. The SPSNR extends over Lot 177 on CP LN2465, as well as Lot 44 on SP140243, with a total area of 635.96 hectares. Thus, in context, the proposed MLA will disturb approximately 3.5% of the Nature Refuge. The broader context, including the Stanwell Power Station and the entirety of the Stanwell Power Station Nature Refuge is shown in Figure 2.

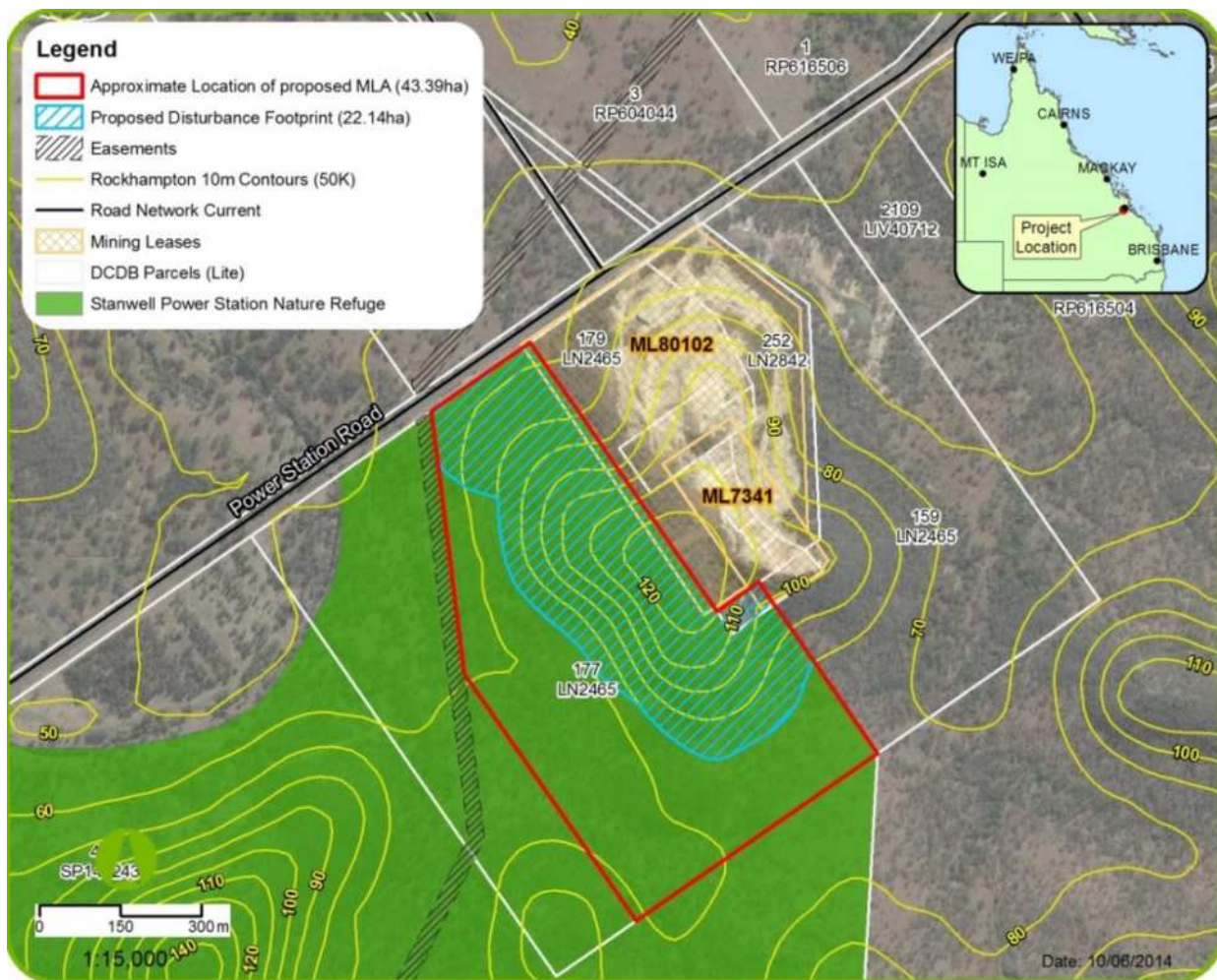


Figure 1: Locality Map

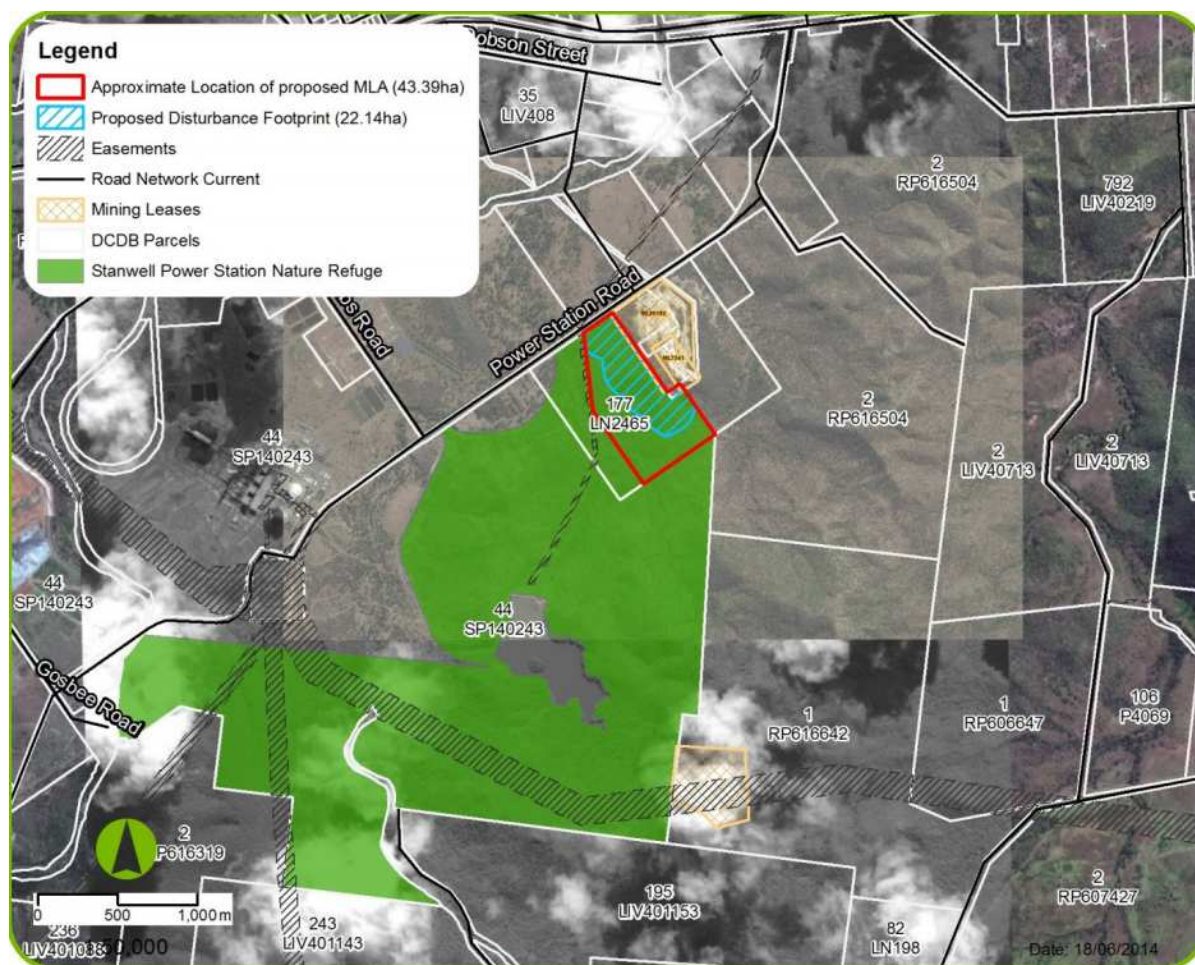


Figure 2: Broader context of the Stanwell Power Station Nature Refuge

1.3 Purpose of this Report

The purpose of this report is to provide an ecological assessment of the environment in which the proposed MLA is to be located. It will present a critical appraisal of the environmental values of the land that will be disturbed, including an assessment of the likely impacts to conservation-significant flora, fauna and/or ecological communities. This report also provides a summary of the environmental approvals that may be triggered under state and federal legislation by the proposed activity.

2 Methodology

2.1 Desktop Methodology

Prior to commencing the field inspection, a review of available desktop resources such as vegetation mapping and imagery was undertaken in order to assess the distribution and type of vegetation likely to be present. This also informs the likelihood of suitable habitat being present for threatened fauna species identified as potentially occurring within the area.

The proposed MLA was added as a data layer in the mapping program ArcGIS along with other spatial datasets, including:

- Regulated Vegetation Management Mapping, version 1
- Regional Ecosystem Mapping, version 8
- High Risk Flora Survey Trigger Map
- Geology Mapping at 1:100,000
- Topographic Mapping at 1:50,000
- Aerial Photography – Digital Globe (2010)
- Cadastral and Mining Lease Boundaries (2014)
- Watercourse Mapping, version 1.3, at 1:100,000
- Essential Habitat Mapping, version 4
- HERBRECs Records

A review of non-spatial data was also undertaken including:

- EPBC Protected Matters Search Tool (PMST)
- Wildlife Online Search
- Reports of previous studies undertaken in the area (Melzer 1994, 1998 and 1999)

Once the field inspection was completed, this desktop information was used in conjunction with field-collected data to assess the potential ecological constraints that may be relevant to the proposed development.

2.2 Field Methodology

2.2.1 Vegetation Survey

The vegetation survey was carried out using a random meander technique (Cropper 1993) and timed as per *DEHP Flora survey guidelines – Protected Plants* (DEHP, 2014). The proposed MLA is not within a High Risk area on the Protected Plants EVNT Flora Survey Trigger Map. The nearest mapped High Risk area occurs approximately 200 metres to the south as seen in Figure 3 below. However, EVNT flora species have been recorded within a 5km radius of the proposed MLA (refer PMST report in Appendix D and Wildlife Online report in Appendix C), and so the comprehensive flora survey methodology was adopted.

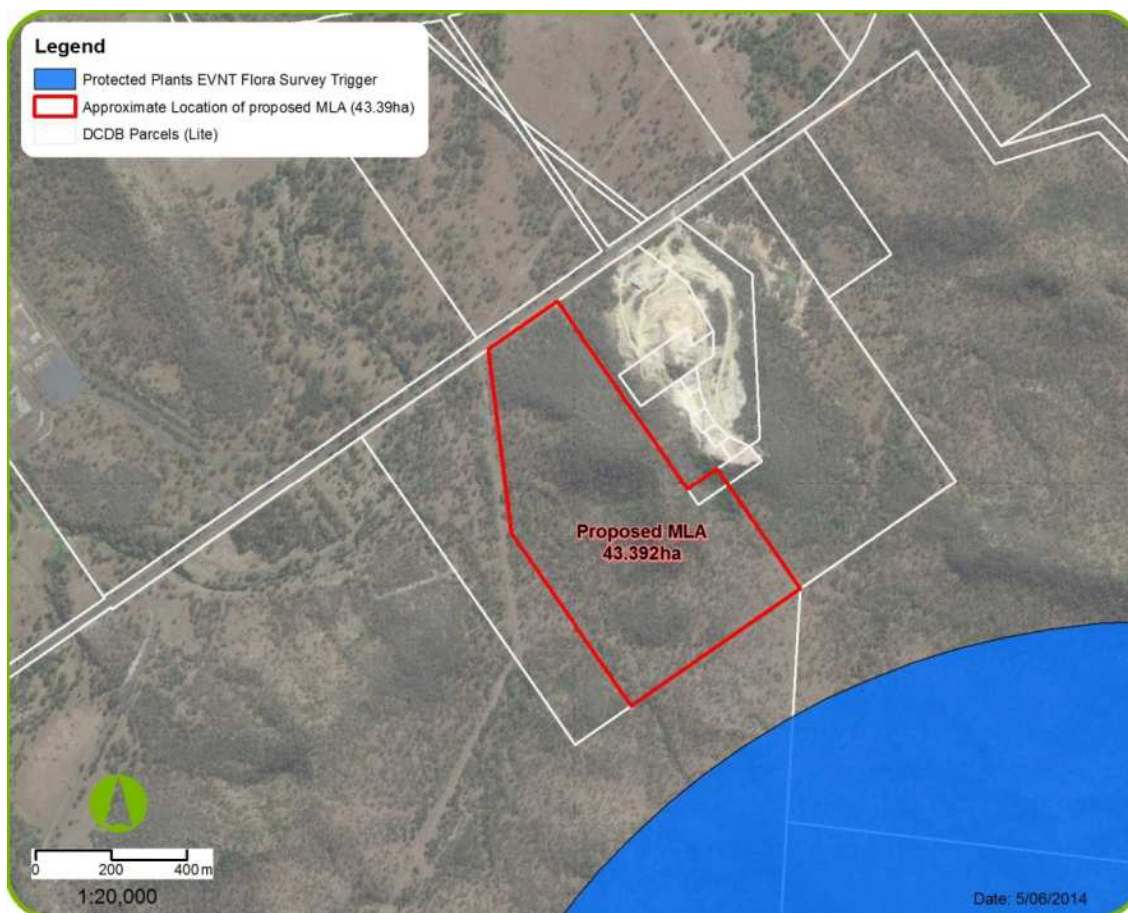


Figure 3: Protected Plants EVNT Flora Survey Trigger map for the proposed MLA

Observations were recorded on the vegetation species and structure to allow comparison with the Regional Ecosystem (RE) Mapping and Regional Ecosystem Description Database (REDD). Landscape type, soil, aspect and geology were also recorded. Separate lists of all observed flora species and a description of vegetation community structure were recorded at each site. In the instance that a particular flora species was not able to be identified, a sample was taken, pressed and sent to the Queensland Herbarium for identification.

Particular attention was paid to areas of mapped Of Concern REs and areas which may fulfil the criteria for Threatened Ecological Communities (TECs) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). In the field, a vegetation survey site was established in each distinctive vegetation community and a comprehensive species list was compiled. Targeted searches were also undertaken to detect endangered, vulnerable or near-threatened (EVNT) flora under the *Nature Conservation Act 1992* (NC Act) or the EPBC Act.

The location of important points such as RE boundary mapping errors, sample collection locations and the location of representative sites for vegetation survey site photographs were recorded via GPS on a Garmin GPS map 76S or Trimble Juno SB (2010) handheld unit.

2.2.2 Fauna Survey

2.2.2.1 Previous surveys in context

The area in the vicinity of Stanwell Power Station has historically been surveyed extensively, and the flora and fauna assemblages have been well inventoried. Relevant reports that have been prepared previously and reviewed as a part of this project include:

- Melzer, A. (1994) *Evaluation of the proposed Stanwell Power Station Nature Refuge*. Central Queensland Environmental Surveys, Rockhampton, Qld
- Melzer, A. (1998) *Vegetation of the Stanwell Power Station. A report to Stanwell Corporation*. Central Queensland University, Rockhampton, Qld
- Melzer, A. (1999) *Terrestrial fauna of the Stanwell Power Station. A report to Stanwell Corporation*. Central Queensland University, Rockhampton, Qld

As the vegetation and fauna habitat value of the proposed MLA is largely contiguous with that surveyed above, it is expected that common and/or widespread species recorded previously will also be present within the proposed MLA. Therefore, fauna survey methodology was designed not to take an inventory of species present, but to specifically target threatened species identified as potentially occurring within the area.

2.2.2.2 Survey guidelines for target species

The complete list of threatened fauna species identified from desktop searches as potentially occurring within the proposed MLA is provided in Table 11, but in summary, includes:

- Eleven bird species, including one nocturnal owl and twelve diurnal species
- Nine reptile species, including five snakes, three lizards and one turtle
- Five mammal species, including three echolocating microbat species, the koala (*Phascolarctos cinereus*) and the northern quoll (*Dasyurus hallucatus*)

The survey methodology was consistent with guidelines published under the EPBC Act for the detection of the target threatened fauna, including:

- *Survey Guidelines for Australia's threatened reptiles. EPBC Act survey guidelines 6.6* (DSEWPac, 2011a)
- *Survey guidelines for Australia's threatened mammals. EPBC Act survey guidelines 6.5* (DSEWPac, 2011b)
- *Survey guidelines for Australia's threatened bats. EPBC Act survey guidelines 6.1* (DSEWPac, 2011d)
- *Survey guidelines for Australia's threatened birds. EPBC Act survey guidelines 6.2* (DSEWPac, 2011c)
- *Draft EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)*. (Department of the Environment, 2013)
- *Environment Protection and Biodiversity Conservation Act 1999 referral guidelines for the endangered northern quoll Dasyurus hallucatus. EPBC Act policy statement 3.25.* (DSEWPac, 2011e)
- Survey guidelines under individual Species Profile and Threats Database (SPRAT) listings

2.2.2.3 Qualifications, permits and approvals

All fauna survey work was carried out by suitably experienced ecologists with appropriate skills in the identification and handling of native wildlife. The flora surveys were also co-ordinated and led by an ecologist with twelve years' experience in conducting botanical surveys, including the identification of EVNT species, with professional qualifications in plant identification and the taxonomy of Queensland flora.

Field surveys were conducted in accordance with the *Animal Care and Protection Act 2001*, under Scientific Purposes Permit WISP14453114 and Animal Ethics Approval CA 2012/05/607. Detailed CVs of personnel undertaking the field survey are provided in Appendix E.

2.2.2.4 Survey timing

The field survey was undertaken in mid-May 2014. The timing was selected to ensure the greatest detectability of target species, while still having regard to the life history traits of threatened fauna. As a large component of the field survey involved trapping for northern quoll, it was important to time the survey outside of the quoll's breeding season, which is June to December, to prevent disruption to the breeding success of this endangered species. The powerful owl is also a large, territorial bird which responds vigorously to calls of other birds in its territory, so it was important to stage the survey outside of the peak in this species' breeding activity, which occurs mid-winter. While optimal timing for the threatened reptiles would be in the hotter, wetter months of the year, this survey timing was still appropriate given the warm days (around 26°C) and relatively mild nights (17°C).

With the exception of *Bulbophyllum globuliforme* (Hoop Pine Orchid), none of the target threatened flora species were herbaceous or annual reproducers, so the survey timing for these was less critical. This particular species grows only on Hoop Pine (*Araucaria cunninghamii*), which was not present in the proposed MLA, so was not an important factor in survey timing.

2.2.2.5 Weather data

Weather observations during field survey work are presented in Table 1. Information regarding temperature, rainfall and relative humidity were derived from published data from the Australian Bureau of Meteorology's nearest weather station to the project area at Rockhampton Aero (station 039083), which is located approximately 30 km north-east of the proposed MLA (Bureau of Meteorology, 2014).

Table 1: Weather observations at the time of field survey

Weather observations at the time of field survey							
Date	Min temp (°C)	Max temp (°C)	Rain (mm)	Relative Humidity (%)	Cloud cover 8 th	Moon phase	Wind
			previous 24hr to 9am	at 3pm	at 8pm	0=new 4=full	at 8pm. 1=light 3=strong
12/05/2014	18.4	26.2	0	55	7	3	1
13/05/2014	18.3	26.7	0	48	1	3	2
14/05/2014	17.0	26.3	0	50	5	4	2
15/05/2014	17.7	26.7	0	51	3	4	2
16/05/2014	17.2	26.3	0	38	5	4	3
17/05/2014	17.4	26.5	0	46	1	3	3

Conditions at Stanwell and Rockhampton had been relatively dry in the month preceding field work, with a total of 69.2 mm of rain falling in April 2014. February and March had total rainfall results of 225.2 mm and 247.8 mm respectively.

2.2.2.6 Fauna survey locations

Field surveys were undertaken over five consecutive nights between 12 and 17 May 2014. An initial site scout was undertaken on 12 May 2014. This reconnaissance work involved driving all available access tracks within the proposed MLA, assessing access from the Capricorn Stone quarry to the east, and walking through areas inaccessible by four-wheel drive vehicle. The purpose of the site scout was to identify areas of suitable habitat for the target EVNT species, such as:

- Rocky areas and/or caves, suitable for denning and shelter for the northern quoll, and roosting of microbats
- The abundance and distribution of koala food trees and koala habitat trees
- Riparian areas with large eucalypt trees in close proximity, suitable for nesting of the red goshawk
- The abundance and distribution of hollow-bearing trees and those with an abundance of peeling bark, suitable for roosting of the powerful owl and microbats
- The abundance and distribution of grasslands and grassy woodlands suitable for foraging of granivorous birds (e.g. finches)
- Any areas of high habitat value for the target reptiles such as abundant log piles, leaf litter, cracking soils, surface rock and gilgai depressions

Areas accessed during the site scout are shown in Figure 4.

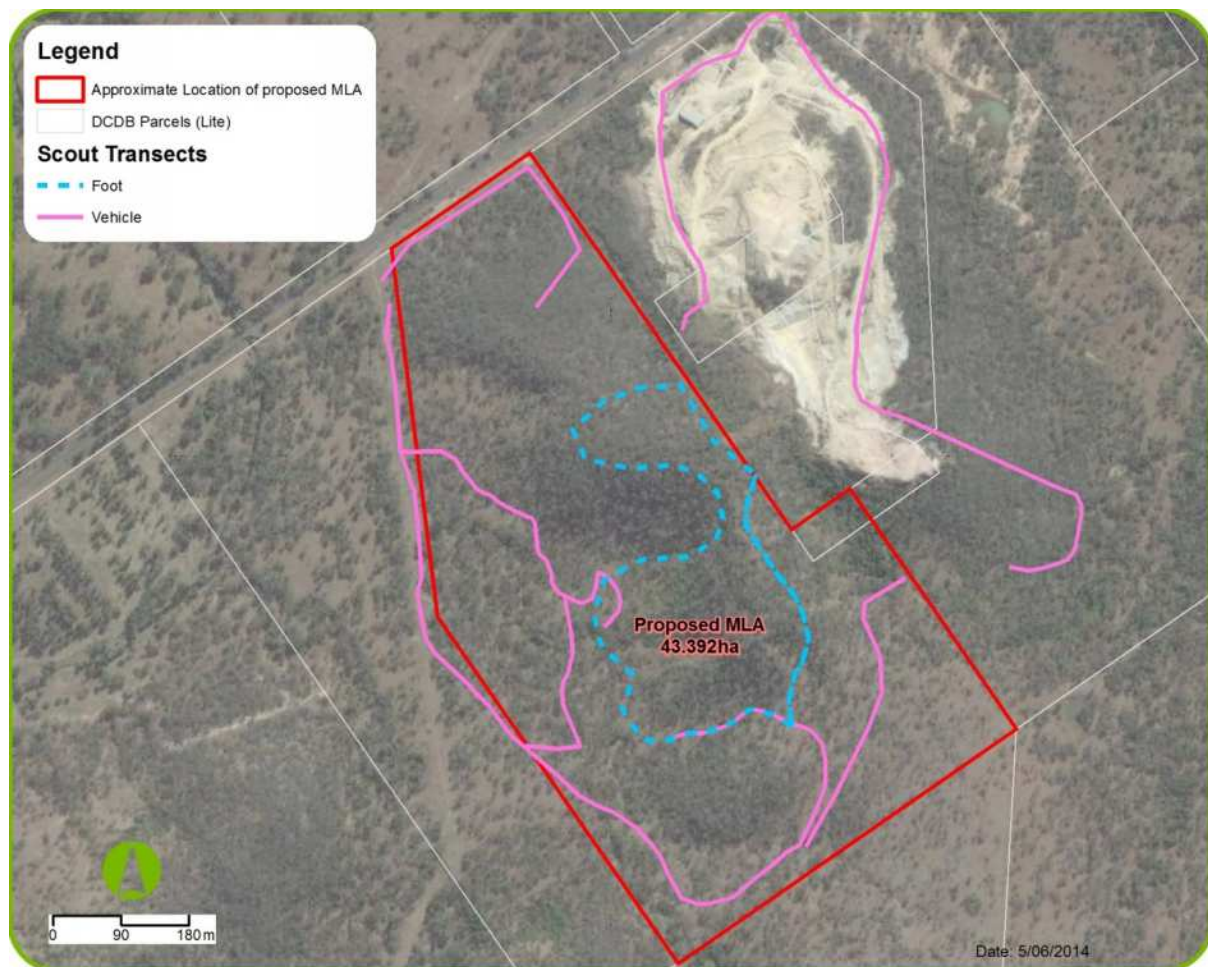


Figure 4: Areas that were scouted to determine EVNT species habitat suitability, on foot and via four-wheel drive vehicle

The vegetation and habitat characteristics within the proposed MLA could be stratified into two broad landscape units:

- elevated areas with sandstone scarps, rocky outcrops and steep to moderate-gradient rocky slopes
- flat to undulating lower slopes and alluvial plains.

This distinction within the proposed MLA is shown in Figure 5.

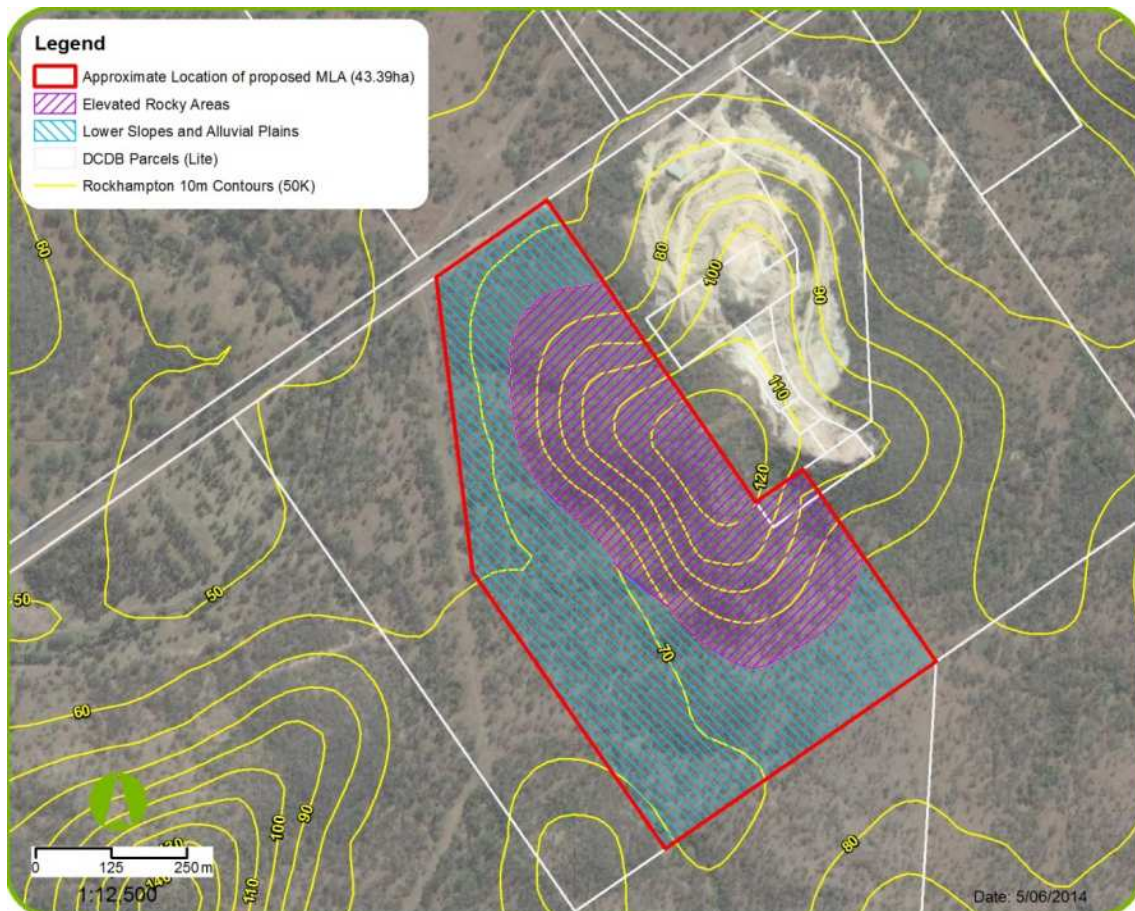


Figure 5: The proposed MLA contains two broad landscape types; elevated rocky areas and lower slopes and alluvial plains

The elevated rocky areas contained high quality denning and shelter habitat for the northern quoll, particularly around the top of the hill currently being mined, which is shown as the 120 metre topography contour in Figure 5. Habitat quality was highest on the eastern side, with an abundance of rocky crevices, overhangs and boulder piles, and where infestation of the weeds, Lantana (*Lantana camara*) and Rubber Vine (*Cryptostegia grandiflora*) was less severe (Figure 6).



Figure 6: High quality denning and shelter habitat was present on the elevated slopes within the proposed MLA

This area was subject to targeted survey for northern quoll, with 5 infrared cameras, 11 large Elliott traps and 23 quoll-sized wire cages deployed around rocky denning habitat and along the easterly-aspect sandstone slope. Cameras were deployed for 4 consecutive nights, while cages and Elliott traps were set for 3 nights.

The lower slopes and alluvial plains contained suitable foraging habitat for northern quoll, and this area was also trapped, using 22 wire cages and 3 infrared cameras for 3 consecutive nights. Small Elliott traps were also deployed in the lower elevation sites, targeting small ground-dwelling mammals.

There were small areas of alluvial eucalypt open woodland near the western boundary within the proposed MLA, which were dominated by *Eucalyptus tereticornis* (Queensland Blue Gum) to a height of 25 to 30 metres (refer Figure 7). These areas provided the highest quality koala habitat, and targeted searches for koala were concentrated in this area. The alluvial plains were also the most likely area to support red goshawk nesting trees, as this species is generally recorded as nesting in the largest tree within 1 km of permanent water.

A small patch of softwood scrub (semi-evergreen vine thicket) measuring approximately 0.5 hectares was present on the eastern boundary of the proposed MLA, and this was searched for signs of the black-breasted button quail (*Turnix melanogaster*), which is known to occupy this habitat type.



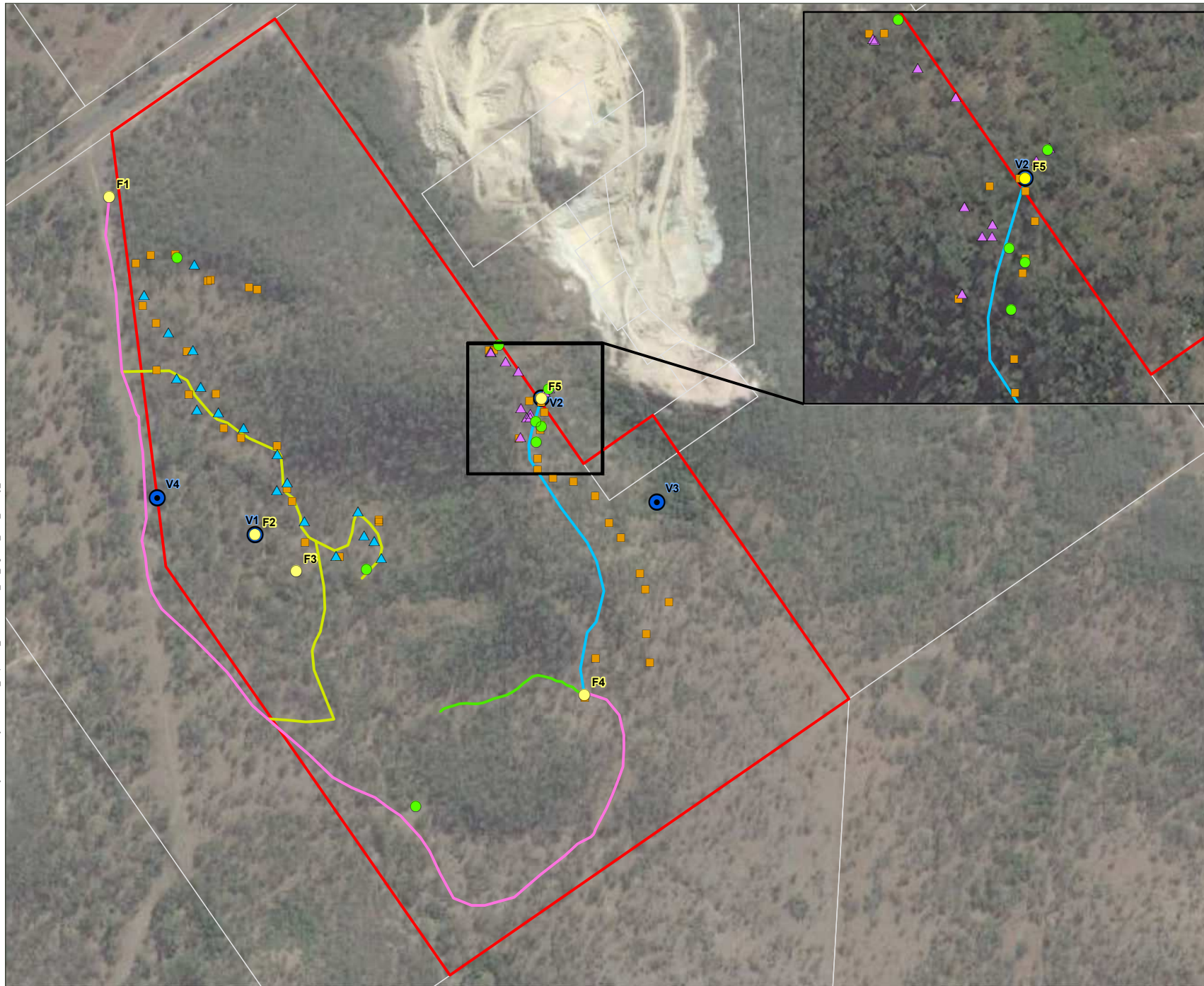
Figure 7: The alluvial plains supported open eucalypt woodland that constitutes suitable habitat for koala

2.2.2.7 Fauna survey methodology

The fauna survey methodology is presented in Figure 8 and involved the use of the following:

- Large Elliott traps, wire cages, infrared cameras, spotlighting and scat searches to detect northern quoll
- Limited use of small Elliott traps to detect small terrestrial mammals
- Infrared cameras to detect arboreal mammals and reptiles
- Spotlighting and call playback to detect owls, reptiles and arboreal mammals
- Anabat surveys to detect echolocating microbats
- Active diurnal and nocturnal herpetofauna searches to detect reptiles
- Active tree searches for signs of koala, red goshawk and powerful owl
- Early morning and late afternoon bird surveys

More detail on each method is provided in the following sections.



Legend

- ▭ Approximate Location of proposed MLA
- ▭ DCDB Parcels (Lite)
- Fauna Survey Sites
- Vegetation Survey Sites
- Trap Sites**
 - ▲ Elliott Trap Small
 - ▲ Elliott Trap Large
 - Cage
 - Infrared Camera
- Spotlight Transects**
 - T1
 - T2
 - T3
 - T4

Source: Imagery - Digital Globe

Date: 18/06/2014

Version: 1



A4 scale: 1:6,000
0 65 130 Metres

Job No: 241736
Coordinate System: GDA 1994 MGA Zone 56

2.2.2.7.1 Elliott, cage and infrared camera trapping

The total area of the proposed MLA is approximately 43 hectares. Within this area, there were two broad trapping sites – one in the elevated rocky scarps and one in the alluvial plain and lower slopes. The target species for this trapping effort was northern quoll, and the suitable denning habitat was generally linear in nature, with rock outcrops along the contours of the hill. In the elevated area containing rocky habitat, wire cage traps measuring 20 cm x 20 cm x 60 cm were spaced 25 m apart along the hill slope, and baited with either tinned sardines or fresh chicken necks. In the vicinity of vegetation site 2 (see inset of Figure 8), there was abundance of rock crevices and shelters. Trapping effort was concentrated in this area, as it contained the best quality denning habitat in the proposed MLA. A total of 5 infrared cameras were deployed, along with 11 large Elliott traps (15 cm x 15 cm x 45 cm) and 23 wire cage traps. The large Elliott traps were baited with a universal bait mixture of oats, peanut butter and honey, with tinned sardines in oil mixed in. The cameras were set during the initial site scout, and so were operational for four nights. Traps were set the following day, and used for three consecutive nights. All traps were set in the late afternoon and cleared within two hours of sunrise. Bait was removed in the morning and traps were left closed during the day. Fresh bait was used each day.

In the alluvial plains and lower slopes, trapping was concentrated along drainage lines, as these are likely to be frequented by northern quoll while foraging (Oakwood, 2008). Traps were deployed in these areas on Wednesday 14 May 2014, and used for three consecutive nights. Wire cages were alternated with small-sized Elliott traps baited with universal bait mixture and placed 25 metres apart along drainage lines. The small Elliott traps were used to capture any incidental small terrestrial mammals. Three infrared cameras (camera 6, 7 and 8 in Figure 8) were trained on trees in the lower slopes and plains that showed signs of use by arboreal fauna. The survey effort and location of trapping activity is presented in Table 2.

Table 2: Details of trapping effort and locations

Site	Trap type and number of survey nights						Trap-nights
	Elliott	Nights	Cage	Nights	Camera	Nights	
Elevated rocky areas	11	3	23	3	5	4	122
Lower slopes and plains	18	3	22	3	3	3	129
Total effort (trap-nights)	87		135		29		251

2.2.2.7.2 Spotlighting

Spotlighting was undertaken in the early morning (pre-dawn) or at night. A combination of methods was used, including vehicle transects, surveys on foot and point survey locations, the latter of which were also the subject of owl call playback and Anabat surveys. Handheld 50W spotlights were used, and species identification confirmed using high resolution binoculars. A description of the spotlighting effort is provided in Table 3. Spotlighting survey locations and transects are shown in Figure 8.

Table 3: Details of spotlighting survey effort and locations

Date/Time	Site	Site description	Person hours
13/05/14 05:30 – 06:00	F2	<i>E. tereticornis</i> open woodland on alluvial plain	1.0
13/05/14 18:15 – 19:00	F5, T4	<i>E. crebra</i> /Acacia <i>rhodoxylon</i> woodland on sandstone scarp and slope	1.5

Date/Time	Site	Site description	Person hours
14/05/14 05:15 – 06:00	T1, T3	<i>E. tereticornis</i> open woodland on alluvial plain/ <i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises	1.5
14/05/14 18:00 – 20:15	T1, T2, F3, F4	<i>E. tereticornis</i> open woodland on alluvial plain/ <i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises	4.5
Total effort			8.5

2.2.2.7.3 Owl call playback

Call playback involves the broadcast of nocturnal bird (e.g. owl) calls from a loudspeaker for a period of time, followed by a period of silence, during which time field personnel listen for a response call and watch for fly-overs or bird movement. This process is repeated for a pre-determined period of time. At each call playback location in this survey, calls were broadcast for three minutes followed by three minutes of listening, and repeated three times.

Ninox strenua (powerful owl) was the only threatened owl species identified as potentially occurring within the proposed MLA. This species favours mature forest with abundant large tree hollows for roosting and nesting, which occurred infrequently in the project area. The continuous intact forest present is considered suitable hunting habitat, as this large, territorial bird has a large home range and is known from the area, having been recorded approximately 1.8 km to the west at Quarry Creek in a survey undertaken by Central Queensland University in 1999. While *N. strenua* was the target species of call playback surveys and played at all locations, another common species, the barking owl (*Ninox connivens*) was also played to attempt to illicit a response from any owl species that may be in the vicinity.

A description of the owl call playback effort is provided in Table 4 and survey locations are shown in Figure 8.

Table 4: Details of owl call playback survey effort and locations

Date/Time	Site	Site description	Calls played	Duration (hours)	Response
13/05/14 18:30 – 19:00	F4	<i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises	Powerful Owl Barking Owl	0.5	nil
14/05/14 18:00 – 20:15	F3, F4	<i>E. tereticornis</i> open woodland on alluvial plain/ <i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises	Powerful Owl	1.0	nil
Total effort				1.5	

2.2.2.7.4 Insectivorous echolocating bat (Anabat) surveys

All Australian insectivorous bats (microbats) use echolocation to assist with navigation and foraging. Each species produces a distinctive call signature when viewed through call analysis software, which can be used to identify the animal with reasonable accuracy. An Anabat SD2 bat call recorder (Titley Scientific) was used to conduct insectivorous bat surveys at a number of locations across the proposed MLA. At least 30 minutes of passive or active call recording was undertaken by suitably experienced ecologists at each site. Passive monitoring involved leaving the Anabat device overnight to record any bat activity that may occur. Bats were also actively monitored, using spotlights to

observe any animal in flight that may have been detected by the Anabat. This method allowed the observation of distinctive physical characteristics such as colour and size as well as flight behaviour which improved the reliability of identification. Active monitoring was employed in areas considered most likely to support the listed threatened bat species (refer Table 11) due to an abundance of mature trees with hollows or rocky crevices and caves, which may be utilised for nesting and roosting. A description of the microbat survey effort is provided in Table 5. Microbat survey locations are shown in Figure 8. A report containing the Anabat data analysis is provided as Appendix F.

Table 5: Details of microbat survey effort and locations

Date/Time	Site	Site description	Survey type	Survey effort (hours)
13/05/14 05:45 – 06:40	F2	<i>E. tereticornis</i> open woodland on alluvial plain	Active	1.0
13/05/14 18:30 – 14/05/14 06:00	F4	<i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises	Passive	11.5
14/05/14 17:45 – 19:05	F3	<i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises	Active	1.25
14/05/14 19:50 – 20:05	F4	<i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises	Active	0.25
14/05/14 20:15 – 15/05/14 06:05	F1	<i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises	Passive	10.0
15/05/14 17:45 – 16/05/14 08:00	F5	<i>E. crebra</i> / <i>Acacia rhodoxylon</i> woodland on sandstone scarp and slope	Passive	14.25
Total effort				38.25

2.2.2.7.5 Active herpetofauna searches

Diurnal hand searches were undertaken at a number of locations across the proposed MLA. Reptile microhabitats such as rocks, fallen timber, leaf litter, bark, debris and decorticated bark on live and dead trees were searched manually. Care was taken to minimise disturbance by replacing habitat features once searched. Particular attention was placed on searching for distinctive reptile signs, such as latrine sites of *Egernia rugosa* (yakka skink), and in turning over and replacing surface rock in search for *Paradelma orientalis* (brigalow scaly-foot). A description of the herpetofauna survey effort is provided in Table 6 and survey locations are shown in Figure 8.

Table 6: Details of active herpetofauna search survey effort and locations

Date/Time	Site	Site description	Comment	Survey effort (hours)
12/05/14 13:00 – 15:30	Scout on foot	<i>E. crebra</i> /Acacia rhodoxylon woodland on sandstone scarp and slope	Opportunistic microhabitat searches while walking transect	5.0
15/05/14 08:20 – 09:15	T4	<i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises	Active search by two people	2.0
14/05/14 07:30 – 08:00	T3	<i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises	Active search by two people	1.0
16/05/14 15:30 – 16:00	F2	<i>E. tereticornis</i> open woodland on alluvial plain	Active search by two people	1.0
15/05/14 16:00 – 16:30	F4	<i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises	Active search by two people	1.0
Total effort				10.0

2.2.2.7.6 Diurnal bird surveys

Bird species lists were prepared for the two broad landscape types within the proposed MLA (elevated rocky areas and lower slopes and alluvial plains). Each zone was surveyed a minimum of two times; once each in the early morning and late afternoon. The early morning survey was timed to coincide with the dawn chorus. Survey methodology included a minimum of 30 minutes spent observing birds and listening for calls. All birds seen either foraging within the site or in the instance of raptors, flying over, were recorded. Those heard were located and positively identified. Records were confirmed using high-powered binoculars where necessary.

2.2.2.7.7 Active tree searches

In addition to the nocturnal spotlighting described in section 2.2.2.7.2, active searches of suitable trees were undertaken for signs of target species, including powerful owl, koala and red goshawk. Suitable trees are described as individuals of the genera *Eucalyptus*, *Corymbia*, *Angophora*, *Melaleuca* or *Lophostemon* over 4 metres in height (EPA, 2006). These were visually scanned for roosting/resting animals, as well as indirect signs, including:

- The characteristic white wash (excrement) left by powerful owl on roosting or nesting trees
- Regurgitated pellets of owls and raptors, usually containing hair and fragments of bone
- Faecal scats of the koala around the base of trees
- Scratches left on the trunk of trees (especially smooth bark species such as *Eucalyptus tereticornis*) by the koala
- Red goshawk nests – typically very large (0.6 – 1.2 m across) in trees over 20 m tall

Active tree searches were undertaken during the initial site scout, where transects were covered on foot and via light vehicle. During these transects, two personnel scanned trees for 50 m either side of the transect, visually searching for animals, and investigating more closely any large trees (e.g. over 20 m in height and diameter at breast height of more than 40 cm) for scratches, pellets and scats. The transects covered in the initial site scout are described in Table 7 and shown in Figure 4. Follow up

searches for live animals were repeated twice daily, each time the traps were set and checked (i.e. along T1, T2 and T4).

Table 7: Details of distance and location of active tree search transects

Transect	Distance (m)	Site description
Scout on foot	1624	<i>E. crebra</i> /Acacia <i>rhodoxylon</i> woodland on sandstone scarp and slope, <i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises
Purple Road (Capricorn Stone Quarry)	1247	<i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises
Yellow Road (Capricorn Stone Quarry)	339	<i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises
Transect along northern boundary of proposed MLA	298	<i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises, <i>A. rhodoxylon</i> regrowth
Transect through south east corner of proposed MLA	415	Microphyll vine forest on sedimentary rocks (semi-evergreen vine thicket)
T1	1315	<i>E. tereticornis</i> open woodland on alluvial plain, <i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises
T2	775	<i>E. tereticornis</i> open woodland on alluvial plain, <i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises
T3	177	<i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises
T4	364	<i>E. crebra</i> /Acacia <i>rhodoxylon</i> woodland on sandstone scarp and slope
Total effort	6554	

A summary of the survey effort for all methods is presented in Table 8.

Table 8: Summary of survey effort for all methods

Survey type	Target species	Total survey effort
Elliott, cage and camera trapping	Northern quoll, koala	251 trap-nights
Spotlighting	Northern quoll, koala, powerful owl, reptiles, microbats	8.5 person-hours
Call playback	Powerful owl	1.5 hours
Insectivorous echolocating bat (Anabat) surveys	Little pied bat, large-eared pied bat, south-eastern long-eared bat	38.25 hours
Active herpetofauna searches	All listed threatened reptiles, excluding Fitzroy River turtle	10.0 person-hours
Diurnal bird surveys	All listed threatened birds, except powerful owl	8 person-hours
Active tree searches	Koala, powerful owl, red goshawk	6.5 km of transects

3 Ecological Assessment – Flora

3.1 Vegetation Mapping

3.1.1 Existing mapping

Recent changes to Queensland's vegetation management laws took effect in December 2013, which saw the introduction of Regulated Vegetation Management Maps to determine the requirements that apply to an area. The vegetation categories on the map are as follows:

- Category A (red): areas subject to compliance notices, offsets and voluntary decisions
- Category B (dark blue): remnant vegetation
- Category C (light blue): high-value regrowth vegetation
- Category R (yellow): regrowth vegetation within 50m of a watercourses in priority reef catchment areas
- Category X (white): areas not regulated under the *Vegetation Management Act 1999*.

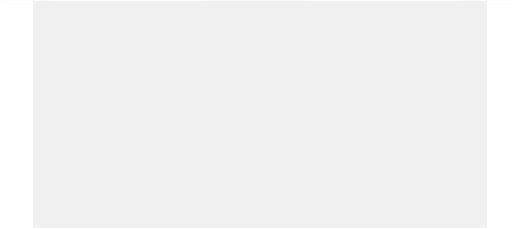
Figure 9 displays the Regulated Vegetation Management Mapping for the proposed development area showing that the majority of the area is remnant vegetation (Category B) with small portions of non-remnant vegetation (Category X).

The Regulated Vegetation Management Mapping is underlain by the Regional Ecosystem (RE) mapping which is developed and administered by the Department of Environment Heritage Protection (DEHP). This RE mapping categorises vegetation as remnant or non-remnant vegetation. Remnant vegetation is further divided into the following categories:

- Endangered
- Of Concern
- Least Concern

Figure 10 displays the RE mapping for the proposed MLA which includes small areas of non-remnant vegetation, and remnant Least Concern REs 11.11.15/11.11.3/11.11.5 and Of Concern REs 11.3.25/11.3.4/11.3.2.

Table 9 outlines the descriptions for each RE.



Legend

- Approximate Location of proposed MLA
- DCDB Parcels (Lite)
- RVM Category - Version 1.0**
- Category B - Remnant Vegetation
- Category X - Non Remnant Vegetation

Notes:

Date: 18/06/2014

Version: 1

Author: ZoniaRA \\aurecon.info\shares\AUMKY\Projects\GIS\Projects\241736_Capricorn_Stone\241736_ER_Figure8_RVM.mxd 12/06/2014 16:26



A3 scale: 1:5,000

0 40 80 160 Metres

Job No: 241736

Coordinate System: GDA 1994 MGA Zone 56

Capricorn Stone Ecological Assessment

Figure 9: Regulated Vegetation Management Mapping for the proposed MLA

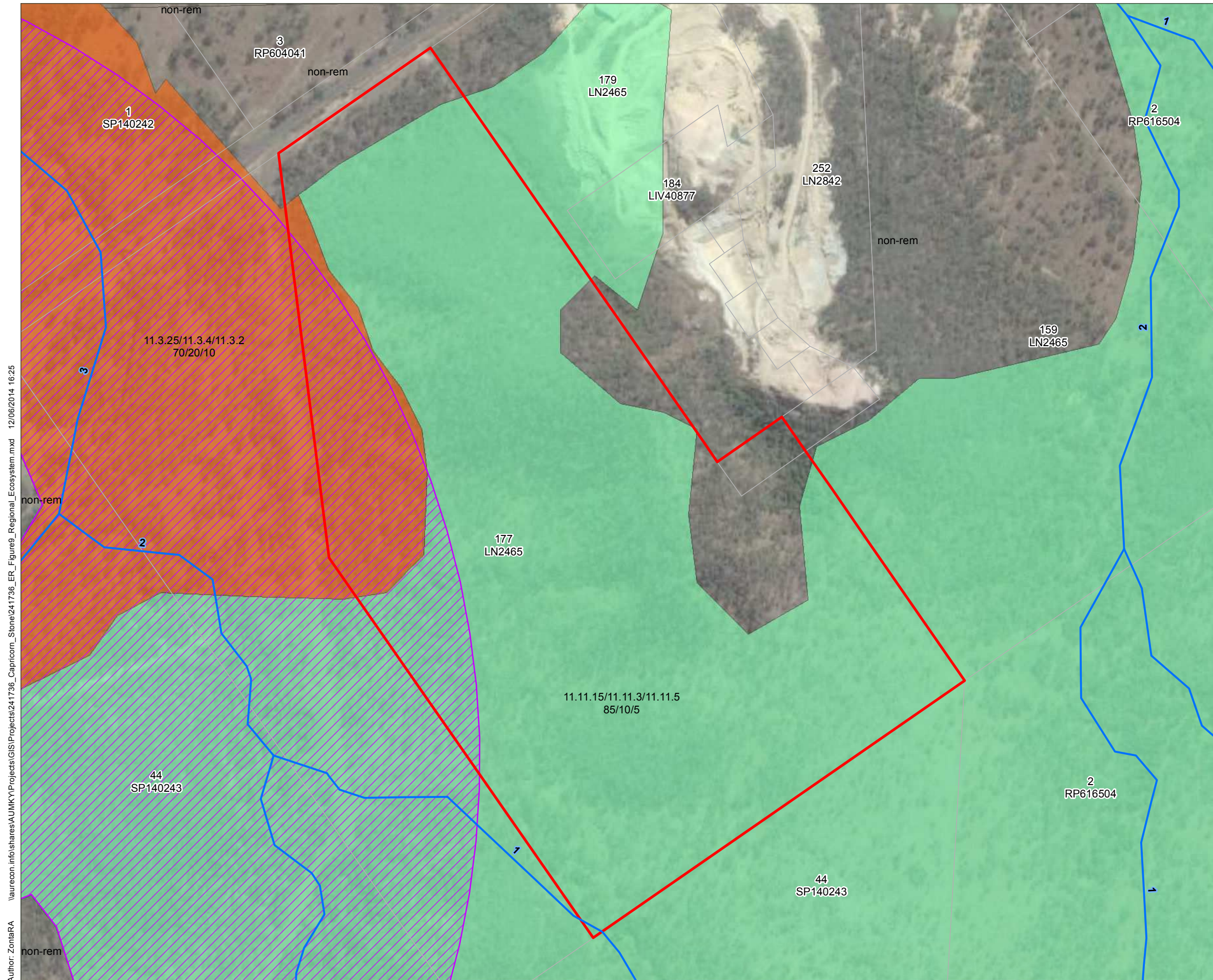
Legend

- Vegetation management watercourse - v1.3
- Approximate Location of proposed MLA
- DCDB Parcels (Lite)
- Essential Habitat Version 4 (Category A or B)
- RVM - Regional Ecosystem v8.0**
- Non Remnant
- Remnant Least Concern
- Remnant Of Concern

Source: Imagery - Digital Globe

Date: 18/06/2014

Version: 1



Author: ZonitaRA \\aurecon.info\shares\AUMKY\Projects\GIS\Projects\241736_Capricorn_Stone\241736_ER_Figure9_Regional_Ecosystem.mxd 12/06/2014 16:25



A3 scale: 1:4,668

0 37.5 75 150 Metres

Job No: 241736

Coordinate System: GDA 1994 MGA Zone 56

Capricorn Stone Ecological Assessment

Figure 10: Regional Ecosystem Mapping for the proposed MLA

Table 9: Regional Ecosystem short description

Regional Ecosystem	Short Description	VM Act Status
11.11.3	<i>Corymbia citriodora</i> , <i>Eucalyptus crebra</i> , <i>E. acmenoides</i> open forest on old sedimentary rocks with varying degrees of metamorphism and folding. Coastal ranges	Least Concern
11.11.5	Microphyll vine forest +/- <i>Araucaria cunninghamii</i> on old sedimentary rocks with varying degrees of metamorphism and folding	Least Concern
11.11.15	<i>Eucalyptus crebra</i> woodland on deformed and metamorphosed sediments and interbedded volcanics	Least Concern
11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains	Of Concern
11.3.4	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. woodland on alluvial plains	Of Concern
11.3.25	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	Least Concern

3.1.2 Field verification of RE mapping

Vegetation survey sites were established at four locations across the MLA as shown in Figure 8, and survey data is provided in Appendix B. In the elevated rocky areas (i.e. above the 80 m contour shown on Figure 5), the vegetation is characterised by *Eucalyptus crebra*/*Acacia rhodoxylon* co-dominant woodland consistent with RE 11.11.1, which has a VMA status of Least Concern. The lower slopes and undulating hills are characterised by *E. crebra* woodland interspersed with *Corymbia citriodora*, *C. erythrophloia* and *C. clarksoniana*, and is consistent with RE 11.11.15.

One small patch of semi-evergreen vine thicket (SEVT) was observed on the eastern boundary of Lot 177 on LN 2465 and adjacent to Lot 1 on LIV 40877 (refer Figure 11). This patch measures approximately 0.535 hectares in total. However, 0.263 hectares of the patch is mapped as Category X on the Regulated Vegetation Management Mapping, and 0.272 hectares is mapped as part of the mixed polygon of remnant Least Concern REs 11.11.15/11.11.3/11.11.5. The vegetation in this patch is consistent with RE 11.11.5, which is Least Concern under the VMA.

An area of mixed polygon of Of Concern RE 11.3.25/11.3.4/11.3.2 is mapped in the western portion of the proposed MLA. The boundary of the alluvial soils is incorrect, being mapped approximately 120 metres too far east than is actually present. The approximate boundary of the alluvial portion is shown in Figure 11. The vegetation in this area is characterised by open woodland dominated by *E. tereticornis* on sandy soils, consistent with Of Concern RE 11.3.4. The Of Concern vegetation (both mapped and actual) is outside of the disturbance footprint within the proposed MLA, as shown in Figure 11. In summary, the project proposes to disturb a total of 22.14 hectares of vegetation, which is comprised of the following components:

- 16.87 hectares of Category B (remnant) vegetation, all of which is mapped as Least Concern
- 5.28 hectares of Category X (unregulated) vegetation

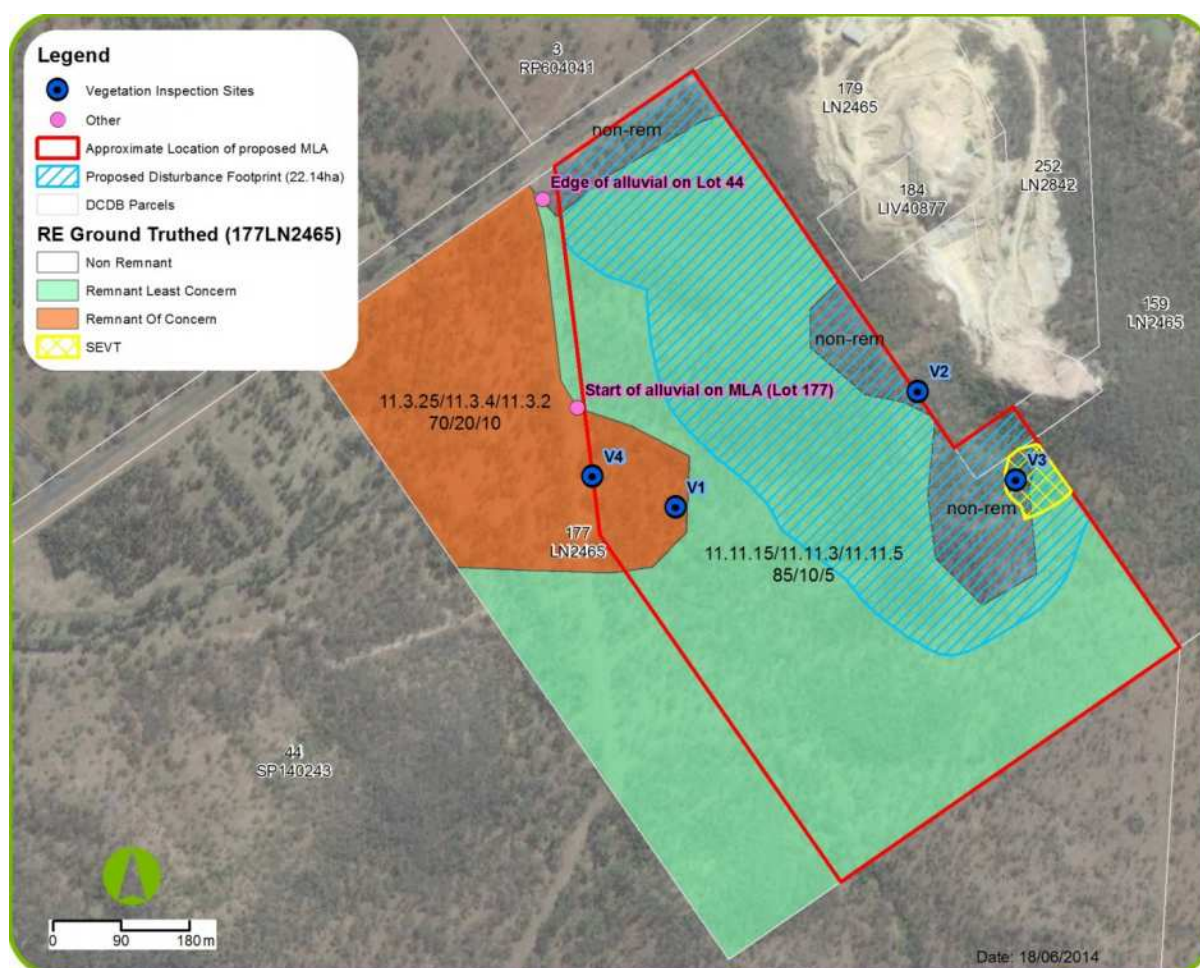


Figure 11: Regional Ecosystem - Ground Truthed Layer

3.2 Threatened Flora Species

3.2.1 Wildlife Online Search

An initial search of the Wildlife Online database (QLD) identified 140 flora species that have been recorded within the search area, which was within a 5km radius of the proposed MLA. Three of these are listed threatened species (endangered, vulnerable or near-threatened) under the NC Act, and twenty-four are introduced (non-native) species. These species, along with those listed under the EPBC Act (see Section 3.2.2) are presented in Table 10. The Wildlife Online Search Report is included at Appendix C. None of the threatened flora species listed under the provisions of the NC Act were recorded within the proposed MLA.

Table 10: Threatened flora species listed under the NC Act and EPBC Act potentially occurring within the proposed MLA

Species	Common name	NC Act status	EPBC Act status
<i>Bulbophyllum globuliforme</i>	Miniature Moss-orchid	NT	V
<i>Cossinia australiana</i>	Cossinia	E	E
<i>Cycas megacarpa</i>	Cycad	E	E
<i>Cycas ophiolitica</i>	Marlborough Blue	E	E
<i>Desmodium macrocarpum</i>	Large-podded Trefoil	NT	Not listed

Species	Common name	NC Act status	EPBC Act status
<i>Eucalyptus raveretiana</i>	Black Ironbox	V	V
<i>Streblus pendulinus</i>	Siah's Backbone	Not listed	E

3.2.2 EPBC listed flora species

The PMST search that was undertaken for the search area, which was within a 5km radius of the proposed MLA, identified 6 listed threatened flora species as potentially occurring. These are shown in Table 10. None of the listed species were recorded within the proposed MLA.

3.2.3 Field survey results

No threatened species listed under the provisions of the NC Act or EPBC Act were recorded during field investigations. Full flora species lists are provided as Appendix B.

3.3 Threatened ecological communities

An ecological community is a group of plants, animals and other organisms that naturally occur together and interact in a unique habitat. An ecological community becomes threatened when it is at risk of extinction. That is, the natural composition and function of the ecological community has been significantly depleted across its full range (Department of Environment, 2014). A number of communities are listed as Threatened Ecological Communities (TECs) under the EPBC Act, and their listing identifies the synonymous RE under the VMA.

Two listed TECs were identified as potentially occurring within the proposed MLA, as shown in the PMST report at Appendix D. They are:

- Coolibah-Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions
- Weeping Myall Woodlands

None of the REs that align with the Coolibah-Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions TEC are mapped within the proposed MLA. Field investigations confirmed that this TEC is not present.

The Weeping Myall Woodlands TEC is identified as occurring within RE 11.3.2, and this RE is mapped as part of a mixed polygon (11.3.25/11.3.4/11.3.2) in the north-west portion of the proposed MLA. However, the Weeping Myall Woodlands TEC was not present, and the area mapped was consistent with Of Concern RE 11.3.4 (see section 3.1.2 for more detail).

Semi evergreen vine thicket (SEVT) of the Brigalow Belt and Nandewar Bioregions is also a listed EPBC TEC and a small patch of a SEVT community was observed in the proposed MLA (as described in section 3.1.2). However, the Commonwealth species profile for SEVT communities specifically states that SEVT occurring within RE 11.11.5 is not included in the listed ecological community and therefore this area is not a TEC.

No other TECs are synonymous with REs that are mapped within the proposed MLA, and none were actually present.

4 Ecological Assessment – Fauna

4.1 Essential Habitat Mapping

Essential Habitat Mapping (Version 4) produced by DEHP was reviewed during the desktop assessment, which showed that Essential Habitat is mapped over a portion of Lot 177 LN2465 within the proposed MLA. The mapping is a result of a squatter pigeon (*Geophaps scripta scripta*) record to the west of the MLA which has been buffered by approximately 1km. This species is listed as Vulnerable under the NC Act. The area of mapped Essential Habitat falls outside of the disturbance footprint, as shown in Figure 12.

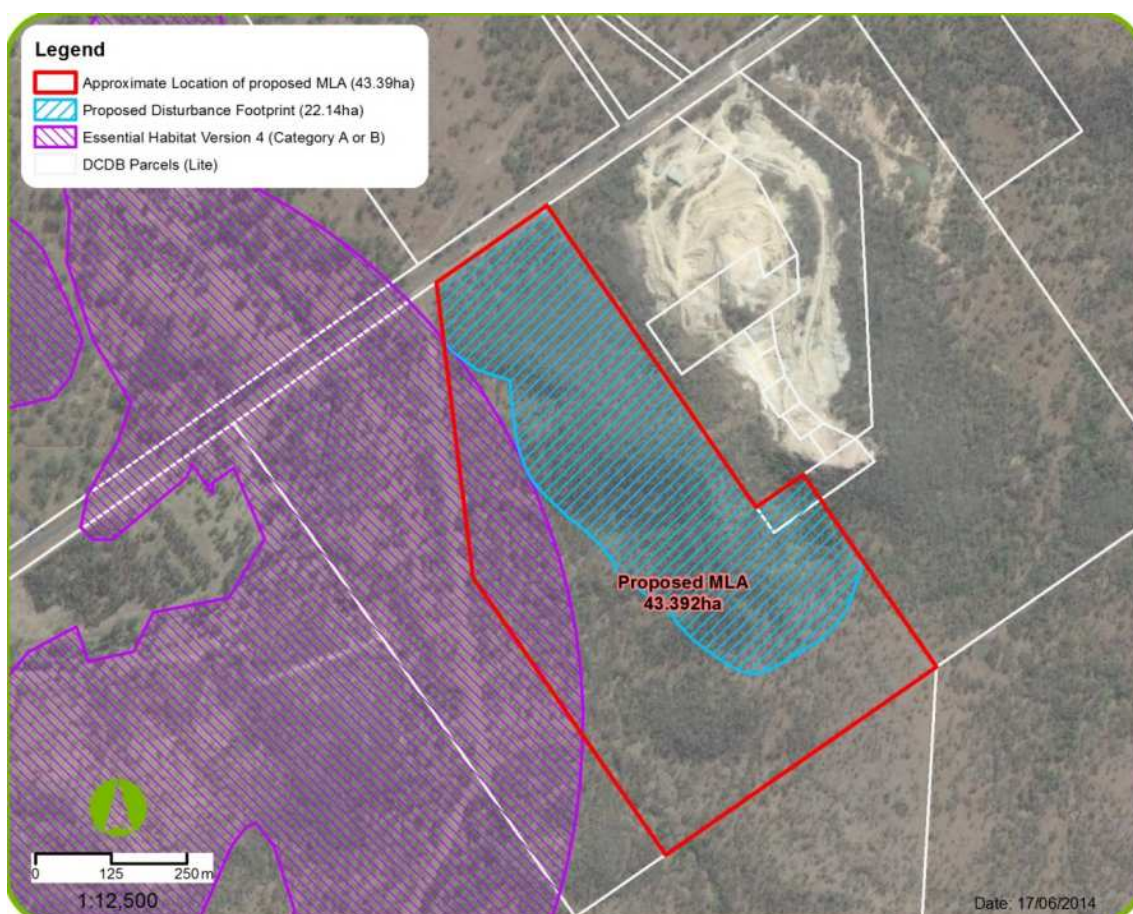


Figure 12: Essential habitat is mapped to the west of the disturbance footprint within the proposed MLA

4.2 Threatened Fauna Species

4.2.1 Field survey results

A total of 59 vertebrate fauna species were recorded during field investigations. This consisted of 37 birds, 6 reptiles and 16 mammals. A complete list of fauna species observed is presented as Appendix A. None of the recorded species are listed as threatened under the provisions of the EPBC Act or NC Act. One bird species, the rainbow bee-eater (*Merops ornatus*) which is listed under the EPBC Act as migratory, was seen and heard regularly across the proposed MLA. This is discussed further in section 4.2.4. Migratory species are also listed as Special Least Concern under the NC Act. One other Special Least Concern species, the echidna (*Tachyglossus aculeatus*), was recorded within the proposed MLA. Restrictions surrounding these species are discussed in the legislative requirements section of this report.

Even though a fauna species may not have been recorded within the proposed MLA during this survey, that result on its own does not necessarily preclude a potential impact to the species. Some species are cryptic and difficult to detect, even when present. Thus, a range of information has been assessed to determine whether a significant impact to each species is likely to occur as a result of the proposed MLA. This is based on the following factors:

- Whether suitable habitat for the species is present within the MLA
- Any recent or historical records of the species, and their proximity to the proposed MLA
- The nature and significance of the potential impact (i.e. loss of breeding or foraging habitat and the extent of the area affected)

4.2.2 Wildlife Online Search

An initial search of the Wildlife Online database (QLD) identified 265 fauna species that have been recorded within the search area. Five of these are listed threatened species (endangered, vulnerable or near-threatened) under the NC Act, and ten are introduced (non-native) species. The Wildlife Online database does not identify threatened species potentially occurring within a given area; rather it only lists species that have actually been recorded in the search area in previous studies. Thus, a further eighteen listed threatened species were identified as potentially occurring within the proposed MLA, as the area is within their geographic distribution and suitable habitat was considered likely to be present from desktop assessment. These species, along with those listed under the EPBC Act (see Section 4.2.3) are presented in Table 11. The database search results are included as Appendix C.

Table 11: Threatened fauna species listed under the NC Act and EPBC Act potentially occurring within the proposed MLA

Species	Common name	NC Act status	EPBC Act status
Birds			
<i>Accipiter novaehollandiae</i>	Grey goshawk	Near-threatened	Not listed
<i>Calyptrorhynchus lathamii</i>	Glossy black-cockatoo	Vulnerable	Not listed
<i>Erythrotriorchis radiatus</i>	Red goshawk	Endangered	Vulnerable
<i>Geophaps scripta scripta</i>	Squatter pigeon (southern)	Vulnerable	Vulnerable
<i>Lophoictinia isura</i>	Square-tailed kite	Near-threatened	Not listed
<i>Melithreptus gularis</i>	Black-chinned honeyeater	Near-threatened	Not listed
<i>Neochmia ruficauda ruficauda</i>	Star finch (eastern), star finch (southern)	Endangered	Endangered
<i>Ninox strenua</i>	Powerful owl	Vulnerable	Not listed
<i>Poephila cincta cincta</i>	Black-throated finch (southern)	Endangered	Endangered
<i>Rostratula australis</i>	Australian painted snipe	Vulnerable	Endangered
<i>Turnix melanogaster</i>	Black-breasted button-quail	Vulnerable	Vulnerable
Mammals			
<i>Chalinolobus dwyeri</i>	Large-eared pied bat	Vulnerable	Vulnerable
<i>Chalinolobus picatus</i>	Little pied bat	Near-threatened	Not listed
<i>Dasyurus hallucatus</i>	Northern quoll	Not listed	Endangered
<i>Nyctophilus corbeni</i>	South-eastern long-eared bat	Vulnerable	Vulnerable
<i>Phascogale cinerea</i> (combined populations of QLD, NSW and the ACT)	Koala	Not listed	Vulnerable
Reptiles			
<i>Acanthopis antarcticus</i>	Common death adder	Near-threatened	Not listed
<i>Delma torquata</i>	Collared delma	Vulnerable	Vulnerable
<i>Denisonia maculata</i>	Ornamental snake	Vulnerable	Vulnerable
<i>Egernia rugosa</i>	Yakka skink	Vulnerable	Vulnerable
<i>Furina barnardi</i>	Yellow-naped Snake	Near-threatened	Not listed
<i>Furina dunmali</i>	Dunmall's snake	Vulnerable	Vulnerable
<i>Hemiaspis damelii</i>	Grey snake	Endangered	Not listed
<i>Paradelma orientalis</i>	Brigalow scaly-foot	Vulnerable	Not listed
<i>Rheodytes leukops</i>	Fitzroy river turtle	Vulnerable	Vulnerable

The NC Act listed species that are also listed under the EPBC Act are subjected to a significant impact test, which is presented in section 4.2.3. The likelihood of occurrence and the potential impact to threatened species listed only under the NC Act are discussed further in Table 12.

Table 12: Significant impact test for NC Act-listed fauna identified as potentially occurring within the proposed MLA

Species	Common name	NC Act status	Likelihood of occurrence	Significant impact likely?	Justification
Birds					
<i>Accipiter novaehollandiae</i>	Grey Goshawk	Near-threatened	Unlikely	No	- The grey goshawk is found in most forest types, especially tall closed forests, including rainforests. The vegetation within the proposed MLA is considered to be too open to provide important habitat for the grey goshawk - This species was recorded in the Stanwell Power Station Environmental Impact Assessment (date unknown but included as an appendix in Melzer (1994)), but was not recorded in subsequent surveys, or in this survey. The nearest record is from 15 km east of the proposed MLA - Due to the paucity of suitable habitat this species is considered unlikely to occur within the proposed MLA and thus a significant impact on this species is unlikely
<i>Calyptorhynchus lathami</i>	Glossy Black-cockatoo	Vulnerable	Unlikely	No	- The glossy black-cockatoo feeds almost exclusively on the seeds of <i>Casuarina</i> trees, so these are an important habitat feature determining the distribution of the Glossy Black-cockatoo. <i>Casuarina</i> were present in very low abundance in the proposed MLA, and confined to the drainage line in the western portion, which is outside the disturbance footprint - This species was not recorded in previous surveys, nor in this survey. However, there is one record of this species within a 5km radius of the proposed MLA (see Wildlife Online Report, Appendix C) - Due to the paucity of suitable habitat this species is considered unlikely to occur within the proposed MLA and thus a significant impact on this species is unlikely

Species	Common name	NC Act status	Likelihood of occurrence	Significant impact likely?	Justification
<i>Lophoictinia isura</i>	Square-tailed Kite	Near-threatened	Unlikely	No	- The square-tailed kite is widespread but relatively rare. It inhabits open eucalypt forests and woodlands, often where there is a broken canopy, but also ranges into nearby open habitats. Suitable habitat for the square-tailed kite occurs in the more open areas in the western portion of the proposed MLA, which is outside of the disturbance footprint - This species was not recorded in this survey or previous surveys in the SPSNR, but was recorded 10km to the south in 2011 by Birdlife Australia (Atlas of Living Australia, online) - Due to the paucity of suitable habitat this species is considered unlikely to occur within the proposed MLA and thus a significant impact on this species is unlikely
<i>Melithreptus gularis</i>	Black-chinned Honeyeater	Near-threatened	Unlikely	No	- The black-chinned honeyeater is found in the upper levels of open eucalypt forests and woodlands dominated by box and ironbark eucalypts - This species was not recorded in this survey, but was recorded in the Stanwell Power Station Environmental Impact Assessment (date unknown but included as an appendix in Melzer (1994)), near a water body. It has also been recorded 10km to the south in 1999 by Birdlife Australia (Atlas of Living Australia, online) - It is unlikely that this species would occur within the proposed MLA, as there are no historical records within the vicinity, and the nearest record is from different habitat with permanent water, which does not occur in the proposed MLA. Therefore a significant impact on an this species is unlikely
<i>Ninox strenua</i>	Powerful Owl	Vulnerable	Likely	No	- The powerful owl is a large bird requiring extensive tracts of continuous forest for hunting and roosting, with a home range of 400 – 4000 ha. It feeds primarily on arboreal possums and gliders, and so requires an abundance of prey species within its home range. This owl uses mature trees with very large hollows (up to 1m wide) for nesting, and its prey species are also hollow-dependent, so this is an important habitat feature for this species - This species was recorded 1.8km to the west of the proposed MLA at Quarry Creek in a previous survey (Melzer, 1999). It was not recorded within the proposed MLA during this survey,

Species	Common name	NC Act status	Likelihood of occurrence	Significant impact likely?	Justification
					and no evidence of its' presence (e.g. whitewash on roost trees, regurgitated pellets) was found ■ The proposed MLA contains no trees with large enough hollows to support nesting of the powerful owl, however the entire area contains vegetation that would provide suitable hunting resources. Two glider and one possum species were recorded during spotlighting in this survey; previous studies also report a further two species and an overall abundance of arboreal mammal fauna ■ While the powerful owl was not recorded during this survey, given the close proximity to a relatively recent record, and the presence of suitable foraging habitat, it is expected that the species would utilise the area for hunting, at least intermittently. Further, environmental conditions were not ideal during this survey, being windy, which reduces the likelihood of the owl hearing and responding to the broadcast call, and likewise the listener detecting a response call ■ The area of powerful owl foraging habitat within the proposed MLA that would be affected is the entire disturbance footprint, which is 22.14 hectares ■ The only anticipated impact to this species as a result of the proposed MLA is loss of foraging habitat, as the disturbance footprint does not support breeding habitat. The area to be removed may only constitute the loss of between 5.5 and 0.5% of habitat of the home range of a breeding pair of birds (if present)
Mammals					
<i>Chalinolobus picatus</i>	Little Pied Bat	Near-threatened	Unlikely	No	■ The little pied bat occurs in a variety of dry open woodlands, usually in close proximity to water. It utilises tree hollows, caves, mineshafts and possibly abandoned buildings for roosting ■ It has not been recorded in previous surveys within the SPSNR, or in this survey within the proposed MLA , and the nearest record is from 80 km to the south west of the proposed MLA ■ It is unlikely that this species would occur within the proposed MLA, due to the paucity of records in the vicinity, and its preference for drier communities further inland. It is not therefore considered that the proposed MLA would have a significant impact on this species

Species	Common name	NC Act status	Likelihood of occurrence	Significant impact likely?	Justification
Reptiles					
<i>Acanthophis antarcticus</i>	Common Death Adder	Near-threatened	Unlikely	No	- The common death adder is found in a wide variety of habitats in association with deep leaf litter, including rainforests, wet sclerophyll forests, woodland, grasslands, chenopod dominated shrublands, and coastal heathlands - It has not been recorded in previous surveys within the SPSNR, or in this survey within the proposed MLA, and the nearest record is from approximately 30 km south of Rockhampton - This species is not considered likely to occur in the proposed MLA, due to the paucity of records in the vicinity, and limited habitat value. Therefore a significant impact on the species as a result of the proposed MLA is considered unlikely
<i>Furina barnardi</i>	Yellow-naped Snake	Near-threatened	Unlikely	No	- The yellow-naped snake favours open woodland and grassland - This species has not been recorded in previous surveys within the SPSNR, or in this survey within the proposed MLA, and the nearest record is from approximately 40 km to the north - Given the paucity of records and limited amount of suitable habitat (restricted to the western portion of the proposed MLA, which is outside of the disturbance footprint), this species is considered unlikely to occur in the proposed MLA, and the project is therefore not expected to have a significant impact on this species
<i>Hemiaspis damelii</i>	Grey Snake	Endangered	Unlikely	No	- The grey snake favours woodlands, usually on heavier, cracking clay soils, particularly in association with water bodies or in areas with small gullies and ditches. It shelters under rocks, logs and other debris as well as in soil cracks - There is no suitable habitat present within the proposed MLA so a significant impact to this species is unlikely
<i>Paradelma orientalis</i>	Brigalow Scaly-foot	Vulnerable	Likely	No	- This species is found on sandstone ridges in woodlands and vine thickets, and in open forests and woodlands, especially ironbark, cypress pine, brigalow, bull oak, spotted gum and vine scrubs - There is suitable habitat for this species in the elevated rocky areas that constitute all of the disturbance footprint within the proposed MLA (i.e. 22.14 ha)

Species	Common name	NC Act status	Likelihood of occurrence	Significant impact likely?	Justification
					■ This species was recorded 2.2 km southwest of the proposed MLA in a previous survey of the SPSNR (Melzer, 1999), in Rosewood/Ironbark forest, which is the same habitat that occurs in the elevated scarps within the disturbance footprint. There is at least one other historical record of the species within 5km of the proposed MLA (see Wildlife Online Report, Appendix C) ■ This species was not recorded in this survey, but it is considered likely to occur within the proposed MLA due to the presence of suitable habitat and its presence in identical habitat in very close proximity to the project area. It is expected that the result of this survey was a false absence for the following reasons: ■ The Brigalow reptiles are difficult to detect, and the EPBC referral guidelines¹ recommend the use of a range of survey techniques to detect the Brigalow scaly-foot. Only two methods were employed during this survey (active herpetofauna searches and spotlighting) due to resourcing and time constraints of the field survey. The specimen that was recorded in the 1999 survey was captured in a pitfall trap ■ The EPBC referral guidelines also recommend that if the targeted species is not detected using all of the recommended survey techniques, at least one replicate survey should be conducted. This was not possible within the constraints of this project ■ The proposed MLA occurs at the northern extremity of a large patch (approximately 175,000 ha) of continuous remnant vegetation that is known to support brigalow scaly-foot (derived from the modelled distribution of this species in the EPBC draft referral guidelines). The proportion of this habitat that will be affected in this project constitutes less than 0.001% of important brigalow scaly-foot habitat, and as such is not considered likely to have a significant impact on this species

¹ *Paradelma orientalis* has been recently de-listed as a threatened species under the EPBC Act, however the referral guidelines may still be used to inform what is important habitat for the species, and what may constitute a significant impact

4.2.3 EPBC listed threatened fauna species

The Protected Matters Search Tool (PMST) database search within a 5km radius of the proposed MLA returned fifteen threatened fauna species listed as endangered or vulnerable under the EPBC Act which may potentially occur within the area. These are listed in Table 11 and the PMST Report is included at Appendix D.

Under the EPBC Act an action requires approval from the federal environment minister if the action has, will have, or is likely to have, a significant impact on a matter of national environmental significance (MNES). The MNES Significant impact guidelines (1.1 and 1.2) provide 'self-assessment' criteria to assist in determining if a referral is required.

The significant impact criteria for different categories of threatened species are varied as outlined below.

Critically endangered and endangered species

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

- Lead to a long-term decrease in the size of a population
- Reduce the area of occupancy of the species
- Fragment an existing population into two or more populations
- Adversely affect habitat critical to the survival of a species
- Disrupt the breeding cycle of a 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 invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat
- Introduce disease that may cause the species to decline, or
- Interfere with the recovery of the species.

Vulnerable species

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- Lead to a long-term decrease in the size of an important population of a species
- Reduce the area of occupancy of an important population
- Fragment an existing important population into two or more populations
- Adversely affect habitat critical to the survival of a species
- Disrupt the breeding cycle of an important population
- Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
- Introduce disease that may cause the species to decline, or
- Interfere substantially with the recovery of the species.



A significant impact test using the relevant guidelines is applied to each threatened species in **Error!**
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Table 13: EPBC Significant Impact test for MNES (fauna) identified as potentially occurring within the proposed MLA

Species	Common name	EPBC Act status	Likelihood of occurrence	Significant impact likely?	Justification
Birds					
<i>Erythrotriorchis radiatus</i>	Red Goshawk	Vulnerable	Unlikely	No	- The species has not been recorded in the area previously, and was not recorded in this survey. The nearest record is from south of Rockhampton, approximately 25km to the east, but this record is from 1955 - There is no permanent water within 1km of the proposed MLA, which is a requirement for this species - All large trees in riparian areas over 20m in height were searched for red goshawk nests, and none were present
<i>Geophaps scripta scripta</i>	Squatter Pigeon (southern)	Vulnerable	Likely	No	- The squatter pigeon (southern) was recorded within the proposed MLA in the CQU survey of 1999, and at eight other sites in the vicinity in the same survey. It was recorded at four sites in the Stanwell Power Station Environmental Impact Assessment (unknown date but referenced in Melzer (1994)), and during the 2007 survey of the SPSNR (Melzer, 2007). This species is locally common - The species was not recorded in this survey, but suitable habitat is present in the open woodland in the western portion of the proposed MLA, and it is expected that it would occur, at least intermittently. However, the suitable habitat is outside of the disturbance footprint, so no significant impact to this species is expected - Any animals that may utilise the area not considered to be part of an important² population
<i>Neochmia ruficauda ruficauda</i>	Star Finch (eastern), Star Finch (southern)	Endangered	Unlikely	No	The species is not known from the area, was not recorded in previous surveys and not recorded in this survey. The nearest contemporary record is from near

² An important population is defined under the EPBC Act as 'a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range

Species	Common name	EPBC Act status	Likelihood of occurrence	Significant impact likely?	Justification
					Rockhampton, approximately 25km to the east of the proposed MLA No habitat critical to the survival of the species (i.e. grasslands and grassy woodlands) will be impacted
<i>Poephila cincta cincta</i>	Black-throated Finch (southern)	Endangered	Unlikely	No	- The species has not been recorded in the Rockhampton area since 1988-89, was not recorded in previous surveys and not recorded in this survey - No habitat critical to the survival of the species (i.e. grasslands and grassy woodlands) will be impacted
<i>Rostratula australis</i>	Australian Painted Snipe	Endangered	Unlikely	No	There is no suitable habitat (permanent wetlands) in the proposed MLA to support this species
<i>Turnix melanogaster</i>	Black-breasted Button-quail	Vulnerable	Unlikely	No	- There is one small patch of suitable habitat (SEVT, approx. 0.5 ha) present in the proposed MLA, which is isolated and heavily disturbed by weeds; it was searched for signs of this species and none were found - The species was not recorded in previous surveys or in this survey, and the nearest known record is from approximately 20km to the east, near Gracemere
Mammals					
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Vulnerable	Unlikely		- The species has not been recorded in the area, and was not recorded in Anabat sessions in this survey. The nearest known record is from approximately 200 km to the southwest in Expedition National Park - The proposed MLA is not within an area affecting an important population of this species - While the proposed MLA does contain suitable habitat for this species (rocky sandstone areas) it does not support habitat considered important for breeding (i.e. arch caves with dome roofs)
<i>Dasyurus hallucatus</i>	Northern Quoll	Endangered	Unlikely		There are anecdotal records of this species from Stanwell Power Station and suitable denning habitat occurs within the proposed MLA, however the site was

Species	Common name	EPBC Act status	Likelihood of occurrence	Significant impact likely?	Justification
					trapped extensively using a range of methods and no animals were recorded There is no evidence of historical or current presence of the species within the proposed MLA, therefore it is highly probable that this species is absent and consequently no significant impact to an important population would occur as a result of the action
<i>Nyctophilus corbeni</i>	South-eastern Long-eared Bat	Vulnerable	Unlikely		The species has not been recorded in the area, and while one <i>Nyctophilus</i> species was recorded during Anabat sessions in this survey, it is impossible to distinguish <i>Nyctophilus</i> species from Anabat recordings. There are five <i>Nyctophilus</i> species within the geographic range of the proposed MLA, and it is highly unlikely that the call could be attributed to the very rare listed <i>Nyctophilus</i>. The nearest known record is from approximately 200 km to the southwest in Expedition National Park in 1968
<i>Phascolarctos cinereus</i> (combined populations of Qld, NSW and the ACT)	Koala	Vulnerable	Unlikely		- This species has not been recorded from the area since it was extirpated due to hunting, disease and habitat destruction in the 1930s (A. Melzer pers. comm.) - A number of individuals were historically translocated to the SPSNR, however none survived due to predation by Wedge-tailed Eagles (A. Melzer, pers. comm) - There is a small area of high quality koala habitat within the proposed MLA, however all suitable trees were searched for signs of koala and none were found - A significant impact test was applied as per EPBC referral guidelines for the species (refer Appendix E), and it is recommended that there is no need to refer the action
Reptiles					
<i>Delma torquata</i>	Collared Delma	Vulnerable	Unlikely	No	- This species inhabits eucalypt-dominated woodlands and open forests within land zones 3, 9 and 10. Of these, only land zone 3 (river and creek flats) occurs within the proposed MLA, and this area is outside of the disturbance footprint of the project - This species has not been recorded in the SPSNR and the nearest record is

Species	Common name	EPBC Act status	Likelihood of occurrence	Significant impact likely?	Justification
					approximately 45 km to the south Under the EPBC draft Brigalow Reptiles referral guidelines, an action only needs to be referred under the EPBC Act if the action is likely to have a <i>significant impact</i> on an <i>important habitat</i> of this species. An important habitat of the Collared Delma is defined as suitable habitat within the known or likely distribution of the species. The proposed MLA falls outside of this region, and so the suitable habitat that is present is not considered <i>important habitat</i> for this species. Therefore, the action does not need to be referred
<i>Denisonia maculata</i>	Ornamental Snake	Vulnerable	Unlikely	No	- This species favours woodlands and open forests with deep-cracking clay soils, especially those with gilgai formations – no suitable habitat is present within the proposed MLA - The species has not been recorded in the SPSNR and the nearest record is approximately 20 km to the east near Gracemere - Under the EPBC draft Brigalow Reptiles referral guidelines, an action only needs to be referred under the EPBC Act if the action is likely to have a <i>significant impact</i> on an <i>important habitat</i> of this species. An important habitat of the Ornamental Snake is defined as containing gilgai depressions and mounds. None are present, and so the proposed MLA does not contain important habitat for this species, and the action would not need to be referred
<i>Egernia rugosa</i>	Yakka Skink	Vulnerable	Unlikely	No	- This species inhabits a wide variety of vegetation types within land zones 3, 4, 5, 7, 9 and 10. Of these, only land zone 3 (river and creek flats) occurs within the proposed MLA, and this area is outside of the disturbance footprint of the project - The species has not been recorded in the SPSNR and the nearest record is approximately 60km west of the proposed MLA - Under the EPBC draft Brigalow Reptiles referral guidelines, an action only needs to be referred under the EPBC Act if the action is likely to have a <i>significant impact</i> on an <i>important habitat</i> of this species. An important habitat of the Yakka Skink is defined as:

Species	Common name	EPBC Act status	Likelihood of occurrence	Significant impact likely?	Justification
					- Any contiguous patch of suitable habitat, particularly remnant vegetation, where a colony is known or identified - Any microhabitat where colonies are likely to be found - Based on the habitat requirements of this species and the absence of records from the area, the proposed MLA is not considered to contain important habitat for the Yakka Skink. Therefore, a significant impact on an important population of the Yakka Skink is unlikely and the action does not need to be referred
<i>Furina dunmali</i>	Dunmall's Snake	Vulnerable	Possible	No	- This species inhabits a wide variety of vegetation types, including Ironbark forests on sandstone-derived soils, which are present within the proposed MLA - The species has not been recorded in the SPSNR and the nearest record is approximately 25 km east of the proposed MLA, at Mt Archer - The species was not observed during the most recent survey - Under the EPBC draft Brigalow Reptiles referral guidelines, an action only needs to be referred under the EPBC Act if the action is likely to have a <i>significant impact</i> on an <i>important habitat</i> of this species. An important habitat of Dunmall's Snake is defined as suitable habitat within the known or likely distribution of the species. The proposed MLA falls outside of this region, and so the suitable habitat that is present is not considered <i>important habitat</i> for this species. Therefore, the action does not need to be referred
<i>Rheodytes leukops</i>	Fitzroy River Turtle	Vulnerable	Unlikely	No	- There is no permanent water within the proposed MLA and therefore no suitable habitat for this species is present - Disturbance will be confined to the elevated rocky areas and will not impact on the lower alluvial region, therefore off-site impacts are unlikely, and the action will have no impact on important populations of the species elsewhere

4.2.4 EPBC listed migratory and marine species

In addition to listed threatened species, the EPBC Act also protects migratory and marine species and their habitats. Migratory species are not necessarily threatened species, but are subject to international agreements concerning their protection, such as China-Australia Migratory Bird Agreement (CAMBA), Japan-Australia Migratory Bird Agreement (JAMBA), Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA) and the Bonn Convention. It is a requirement of participating countries to 'protect and conserve important habitats' of migratory species. A total of fourteen migratory and fifteen marine species³ were identified in the EPBC search as potentially occurring in the project area (refer Appendix D). These species are listed in Table 14.

Table 14: Migratory and marine species identified in PMST report as potentially occurring within the proposed MLA

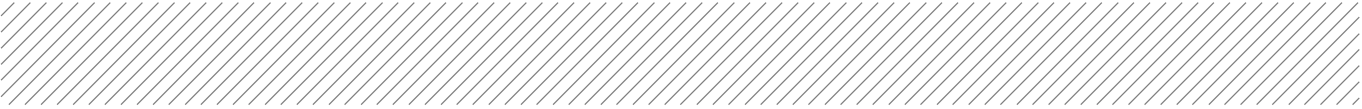
Species	Common name	Migratory	Marine
<i>Anseranas semipalmata</i>	Magpie Goose	+	+
<i>Apus pacificus</i>	Fork-tailed Swift	+	+
<i>Ardea alba</i>	Great Egret	+	+
<i>Ardea ibis</i>	Cattle Egret	+	+
<i>Crocodylus porosus</i>	Saltwater Crocodile	+	+
<i>Gallinago hardwickii</i>	Latham's Snipe	+	+
<i>Haliaeetus leucogaster</i>	White-bellied Sea Eagle	+	+
<i>Hirundapus caudacutus</i>	White-throated Needletail	+	+
<i>Hirundo rustica</i>	Barn Swallow	+	+
<i>Merops ornatus</i>	Rainbow Bee-eater	+	+
<i>Monarcha melanopsis</i>	Black-faced Monarch	+	+
<i>Monarcha trivirgatus</i>	Spectacled Monarch	+	+
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	+	+
<i>Rhipidura rufifrons</i>	Rufous Fantail	+	+
<i>Rostratula benghalensis</i>	Painted Snipe	+	+
<i>Pandion heliaetus</i>	Osprey		+

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species
- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species

The rainbow bee-eater (*Merops ornatus*) was seen and heard regularly throughout the proposed MLA. No other migratory or marine species were observed or heard. The rainbow bee-eater is widespread and common. No nests were observed within the proposed MLA, and it is not considered to contain any important habitat for this species. Therefore, no significant impact to any migratory species is considered likely as a result of the proposed MLA.

³ All of the migratory species are also listed marine species, with one additional marine



No significant impacts to any marine species are considered likely as a result of the proposed MLA, as there are no important marine habitats present.

4.3 Habitat Assessment

Fauna habitat attributes were assessed at each site, and the results are presented in Table 15. The fauna habitat assessment presented in Table 15 provides a summary of the habitat resources available to fauna at each vegetation inspection site. As the alluvial vegetation inspection sites were similar in structure and species composition, one habitat assessment was recorded for both sites (V1 and V4). A habitat assessment was also undertaken for the SEVT (V3), elevated rocky slopes (V2 Upper), and lower sandstone slopes (V2 Lower).

The first section of the table describes the floristic structure in terms of height range and canopy cover of each vegetation strata, and provides an indication of whether recruitment of canopy species is occurring.

The following section of the table provides a quantitative indication of the diversity and abundance of resources that are important for fauna in terms of shelter, nesting opportunities and food availability. The abundance of each attribute is scored on a relative scale from 0 to 7, with 0 indicating the feature is absent and 7 indicating it is in very high abundance.

The final section of the habitat assessment table records the level of habitat disturbance evident at the site.

As shown in the habitat assessment table, the relative abundance of resources varies from site to site. The table must be assessed as a whole to determine the overall condition of the site in terms of the nesting, shelter and foraging opportunities it may provide for fauna, in the context of the microhabitat requirements that each fauna group utilises.

Table 15: Fauna habitat assessment

Attribute	Site			
	V1 + V4 (Alluvial)	V2 (Upper)	V2 (Lower)	V3 (SEVT)
Floristic Structure				
Remnant/non-remnant	R	R/NR	R/NR	R/NR
Recruitment of woody perennial species	Yes	Yes	Yes	Yes
Tree canopy cover (%)	30-60	60	60	20
Tree canopy height (m)	23-26	9	9	8
Shrub cover (%)	5	25	25	90
Habitat Features - Abundance	Abundance (0-7)			
Hollows in trees and stags	5	3	3	1
Fallen logs (>10 cm diameter)	2	5	2	2
Coarse woody debris (<10cm diam)	2	5	2	5
Decorticated bark	4	3	2	2
Leaf litter	3	6	3	6
Bare ground	2	1	2	2
Grass	6	5	6	1
Soil cracks	0	0	0	0
Gilgai depressions	0	0	0	0
Rocks and/or stones	1	6	4	5
Boulders	0	5	0	0
Rock crevices	0	5	0	0
Flower abundance	1	1	2	1
Fruit abundance	2	1	2	3
Water present	0	0	0	0
Habitat Disturbance	Severity (0 = nil, 3 = severe)			
Fire	0	0	1	0
Grazing	1	0	1	0
Clearing	0	0	0	0
Weeds	1	2	2	1
Erosion	1	0	0	0



5 Ecological Assessment - Water

5.1 Watercourses

The proposed MLA includes a small section of Centre Creek in the southern corner. Centre Creek around Stanwell Power Station is a Stream Order 3 watercourse, however the tributary that adjoins Centre Creek and enters the MLA is a Stream Order 1. This mapped watercourse is located within the proposed MLA approximately 285 metres to the west of the boundary of the disturbance footprint. Provided appropriate erosion and sediment control measures are implemented throughout the quarry operations, it is not anticipated that there will be any significant impact to the mapped watercourse.

5.2 Wetlands

5.2.1 RAMSAR Wetlands

There are no RAMSAR wetlands within or in close proximity to the proposed MLA.

5.2.2 Directory of Important Wetlands

The proposed MLA does not contain any areas mapped within the Directory of Important Wetlands as administered by the Department of Environment (DoE).

5.2.3 Referable Wetlands

Wetlands which are separate to the nationally and internationally important wetlands are termed 'Wetland Protection Areas' (WPA) and are mapped on the Referable Wetland mapping administered by DEHP.

A review of the Referable Wetland mapping found that the proposed MLA does not contain any Wetland Protection Areas or Trigger Areas. The closest Wetland Protection Area is approximately 9km to the north east of the proposed MLA.



6 Ecological Assessment – Land

6.1 Soil erosion

Soils within the study area have been described in Appendix B. Soils during the field inspection were observed to be brown sandy clay loam on steep to moderate grade slopes.

There is risk during construction and operation of the quarry of erodability however this can be managed to limit impacts by ensuring all operations are carried out using the guidelines below and developing appropriate environmental management plans for both the construction and operational phases of the development including a specific sediment erosion control plan.

- *Best Practice Erosion and Sediment Control*, 2008, International Erosion Control Association
- *Soil Erosion and Sediment Control Engineering Guidelines for Queensland Construction Sites*, 1996, Institution of Engineers Australia.

6.2 Contaminated Land

Contaminated land is that which has been exposed to hazardous substances which may pose a risk to human health or the environment and can result from land uses such as landfills, service stations, cattle dips, fuel storage etc.

Registered activities which are likely to cause contaminated land are recorded on the Environmental Management Register and areas of land proven to be contaminated and which are causing or may cause serious environmental harm are recorded on the Contaminated Land Register.

A contaminated land search was outside the scope of this report, and consequently no register searches were undertaken. It is recommended that these searches are completed. However, given that the land contains continuous remnant vegetation, and no history likely to cause land contamination is known, no issues are expected.

6.3 Air

Background air quality monitoring has not been undertaken for the study area as part of this ecological assessment. The air quality within and surrounding the proposed MLA may be impacted intermittently by exhaust from the nearby Stanwell Power Station. Air quality monitoring would be undertaken regularly by Stanwell Power, to monitor these levels. The generation of dust is considered to be the most relevant air quality issue associated with the proposed MLA. Environmental Management Plans (both for construction and operation) for the project should provide mitigation measures to ensure that air quality is maintained within acceptable levels. Current mitigation measures in place at the existing quarry operations would be expected to be suitable for use at the new development.



No specific approval processes are required for air quality issues. The *Environmental Protection (Air) Policy 2008* is the subordinate legislation to the *Environmental Protection Act 1994* EP Act which addresses air quality values.

It is expected that the proponent would be subject to routine air quality monitoring as part of the conditions attached to the Environmental Authority issued under the MLA.

6.4 Noise and vibration

Noise and vibration monitoring was not conducted as part of this ecological assessment. During the field inspection, noise levels were noted to be dominated by the existing Capricorn Stone quarry to the east, and from the operational Stanwell Power Station to the west, as well as occasional distant traffic heard on Power Station Road to the north.

No specific approval processes are required for noise and vibration issues. The *Environmental Protection (Noise) Policy 2008*, is the subordinate legislation to the EP Act which addresses noise values. It is expected that the proponent would be subject to noise restrictions as part of the conditions attached to the Environmental Authority issued under the MLA.

Current mitigation measures in place at the existing quarry operations would be expected to be suitable for use at the new development.

7 Nature Refuge Values

7.1 Stanwell Power Station Nature Refuge

There is an existing Nature Refuge Agreement over the entirety of Lot 177 on CP LN2465 – the ‘Stanwell Power Station Nature Refuge’ (SPSNR), which was gazetted in October 1996. The owner of the site, the Queensland Electricity Commission (now Stanwell Power) agreed to a proposal by the then Queensland Department of Environment and Heritage that the land be set aside with a view to protecting the nature conservation and scientific values of the site. This proposal was developed as a precondition to the approval of a koala research project involving the release of koalas into the proposed nature refuge areas. This research was to be undertaken by Central Queensland University (Melzer, 1999).

A Nature Refuge is a class of protected area under the *Nature Conservation Act 1992*. The gazettal of a Nature Refuge must include a declaration of the area’s ‘Significant cultural and natural resources and values’ and the ‘Proposed management intent and use’.

The declared significant cultural and natural resources and values of the SPSNR include:

- a) open eucalypt forest on skeletal granitic or sedimentary soils; and
- b) tall open forests along creeks; and
- c) softwood scrub communities on sandstone ridge crests and
- d) igneous boulder scree; and
- e) significant flora, including –
 - i. the black ironbox (*Eucalyptus raveretiana*); and
 - ii. the asparagus fern (*Asparagus racemosus*); and
 - iii. a habitat suitable for the koala (*Phascolarctos cinereus*).

The proposed management intent and use of the SPSNR is to:

- a) provide a suitable site for the relocation of koalas from the catchment area for the Fitzroy and Dawson Rivers; and
- b) maintain the area's softwood scrubs in a natural condition, particularly by controlling the impact of fire on the area; and
- c) provide for –
 - i. the continued maintenance and use of transmission lines and associated access roads; and
 - ii. the continued maintenance and use of infrastructure associated with a water supply dam and pipelines; and

- iii. access through the area for an adjoining land-holder; and
- iv. limited pedestrian access for environmental education; and
- v. limited cattle grazing by an adjoining land-holder to reduce fuel loads; and
- vi. environmental research and monitoring; and
- vii. the collection of seeds from plants.

The extent to which each of the values and management intent of the SPSNR are likely to be impacted by the proposed MLA is discussed in the following sections.

7.1.1 Impact on declared Nature Refuge values within the proposed MLA

7.1.1.1 Open eucalypt forest on skeletal granitic or sedimentary soils

The entire disturbance footprint of the proposed MLA could be described as open eucalypt forest on skeletal granitic or sedimentary soils. Open eucalypt forest on skeletal granitic or sedimentary soils is well represented throughout the SPSNR, occupying approximately 80% of the Nature Refuge (Melzer, 1998), or around 508 hectares. Thus, the disturbance footprint of the proposed MLA represents an impact area of 3.5% of the total Nature Refuge, and around 4% of the open eucalypt forest on skeletal granitic or sedimentary soils that is present.

7.1.1.2 Tall open forests along creeks

There are tall open forests along the drainage line near the western boundary of the proposed MLA, however these are outside of the disturbance footprint and as such impacts on this value are minimal

7.1.1.3 Softwood scrub communities on sandstone ridge crests

There are no softwood scrub communities on sandstone ridge crests within the proposed MLA. A small patch of semi-evergreen vine thicket (approximately 0.5 hectares) is present in a gully on the eastern boundary of the MLA, which is generally synonymous with this value. Softwood scrubs within the SPSNR represent approximately 5% of the total Nature Refuge area, or 31.8 hectares. The area of this value to be impacted by the proposed MLA is around 0.5 hectares, or 1.5% of that present within the SPSNR.

7.1.1.4 Igneous boulder scree

There is no igneous boulder scree present within the proposed MLA and therefore this value will not be significantly impacted.

7.1.1.5 Significant flora

■ Black ironbox (*Eucalyptus raveretiana*)

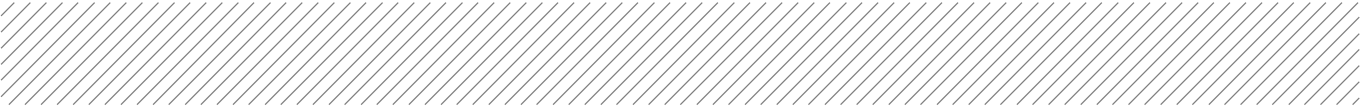
Eucalyptus raveretiana is not present within the proposed MLA and therefore will not be impacted.

■ Asparagus fern (*Asparagus racemosus*)

Asparagus racemosus is not present within the proposed MLA and therefore will not be impacted.

■ A habitat suitable for the koala

All of the proposed MLA could be considered habitat suitable for the koala, as it contains continuous, remnant vegetation dominated by *Eucalyptus* and *Corymbia* species which are known food and habitat trees for the koala. No koalas are present within the proposed MLA, and have not been recorded as naturally occurring in the vicinity since the 1930s. Populations occur north, east, south and west of Stanwell. Historical information indicates koalas inhabited the general area but numbers were probably depleted by hunting, disease and habitat destruction. The proposed MLA is part of a



larger tract of contiguous vegetation, and despite the site being linked by continuous forest to known koala populations, they continue to remain absent from the area.

A koala habitat assessment for the proposed MLA was completed, and is presented as Appendix F. On a scale of 0 to 10, the area within the proposed MLA scored a 5 for koala habitat value. This is based on a range of attributes including population size, vegetation composition, habitat connectivity, current threats and the contribution of the patch to the recovery of the species as a whole. While suitable habitat for the koala exists within the proposed MLA, it has limited value to the species, as they are currently not present, and there appears to be some unknown factor limiting their ability to disperse and re-colonise the area from other localities.

7.1.2 Potential impact of the proposed MLA on the proposed management intent of the SPSNR

7.1.2.1 Provide a suitable site for the relocation of koalas from the catchment area for the Fitzroy and Dawson Rivers

A key factor in the establishment of the Stanwell Power Station Nature Refuge was the desire of the then Queensland Electricity Commission (QEC) (now Stanwell Power), to use the land surrounding the power station as a site for the translocation of displaced koalas. The translocations were to be operated as a research project undertaken by Central Queensland University (CQU). A precondition of the research project, set by the Department of Environment and Heritage, was that the land be set aside and a formal covenant established, to protect the nature conservation and scientific values of the site into the future. The Stanwell Power Station Nature Refuge was gazetted in October 1996. A major source of the translocations to Stanwell was expected to be injured and displaced animals as a result of land clearing. This was expected in the context of much higher rates of vegetation clearing in Central Queensland than occurs today, owing to changes in land clearing legislation with the introduction of the *Vegetation Management Act* (Qld) in 1999.

Aurecon has been unable to obtain any published literature regarding the details of the koala translocation project, but discussions with Dr Alistair Melzer of CQU elicited the following information:

- A number of koalas were translocated to areas within the SPSNR under the supervision of CQU. Some or all of these animals were fitted with radio collars, to track the fate of translocated animals
- There was no evidence that a successful breeding population had established within the SPSNR (e.g. females with pouch/back young)
- The translocation project was largely unsuccessful, as translocated animals suffered a high rate of mortality due to predation by wedge-tailed eagles
- Any remaining animals that had been translocated would all have died through natural senescence by now
- Koalas are no longer translocated to SPSNR

The actions within the proposed MLA would result in the removal of approximately 22.14 hectares of potential koala habitat. However, for the reasons described above, it is believed that since the gazettal of the SPSNR in 1996, the proposed intent of the nature refuge of as a relocation site for koalas is no longer relevant and this value has diminished. As such, it would be considered that the proposed action would have minimal impact on this management intent.

7.1.2.2 Maintain the area's softwood scrubs in a natural condition, particularly by controlling the impact of fire on the area

The proposed MLA contains one small patch of softwood scrub (semi-evergreen vine thicket) on the eastern boundary measuring approximately 0.5 hectares. This patch is in degraded condition, with invasion by Guinea Grass (*Megathyrsus maximus*) and Lantana (*Lantana camara*), particularly on the margins of the community. This patch occurs in isolation; it is bordered to the north by the existing quarry, and to the south and west by eucalypt woodland. It is within the disturbance footprint of the proposed MLA, and will be cleared as a result of the expansion of the quarry. Thus the proposed MLA is inconsistent with this management intent of the SPSNR, to the extent that one patch representing approximately 1.5% of the softwood scrubs present within the Nature Refuge will be cleared.

7.1.2.3 Provide for the continued maintenance and use of transmission lines and associated access roads

No transmission lines and access roads will be impacted by the proposed MLA.

7.1.2.4 Provide for the continued maintenance and use of infrastructure associated with a water supply dam and pipelines

There is an easement on the western boundary of the proposed MLA, which provides access to a water storage dam owned by SunWater, as well as a number of well heads. The proposed MLA will not impact this infrastructure, as it is outside the disturbance footprint, and all plant and equipment utilised within the quarry will continue to operate from the eastern side where the existing quarry is located.

7.1.2.5 Provide for access through the area for an adjoining land-holder

A number of minor tracks exist within the proposed MLA. All of those accessible via 4WD were traversed during the initial site scout, and are shown in Figure 4. None of these tracks are through-roads, with the exception of the easement that leads to the SunWater dam. The easement will not be impacted by the proposed MLA, as discussed in section 7.1.2.4.

7.1.2.6 Provide for limited pedestrian access for environmental education

There are no current environmental education activities being undertaken in the section of the SPSNR that is covered by the proposed MLA. The majority of these activities are believed to be concentrated further west, in the portion of land opposite the Stanwell Power Station. Therefore, no impact to this proposed management intent is expected.

7.1.2.7 Provide for limited cattle grazing by an adjoining land-holder to reduce fuel loads

Cattle grazing was not observed within the proposed MLA at the time of survey, but there was some evidence of grazing in other areas of the SPSNR. The elevated rocky areas of the proposed MLA are considered unsuitable for grazing, due to the steep slope. The lower slopes and alluvial plains would be available for grazing, subject to stock safety constraints associated with the proximity of the operational quarry. Thus, the proposed MLA would have minimal impact on this proposed management intent of the SPSNR.

7.1.2.8 Provide for environmental research and monitoring

The proposed MLA would render the disturbance footprint area unavailable for environmental research and monitoring. This constitutes an area of approximately 22.14 hectares of the extent of the SPSNR, which measures 636 hectares in its entirety, or 3.5% of the nature refuge. The area to be lost is well represented in other areas of the nature refuge, and all vegetation communities in the MLA are mapped either as remnant 'Least Concern' or non-remnant. It is believed that environmental research and monitoring activities within the SPSNR are concentrated further west, within an agroforestry project located adjacent to the Stanwell Power Station and therefore the development would have minimal impact on this management intent.



7.1.2.9 Provide for the collection of seeds from plants

The proposed MLA would render the disturbance footprint unavailable for the collection of seeds from plants. As described in section 7.1.2.8, this vegetation represents 3.5% of that available within the SPSNR and these vegetation communities are represented elsewhere in the Nature Refuge which would still allow for seed collection from the species which would be removed as a result of the development. It is believed that any seed collection activities would be concentrated within the agroforestry development, which is further west, or species of interest would be listed threatened species, of which none were recorded within the proposed MLA. Therefore, it is expected that the proposed MLA would have a minimal impact on this identified management intent of the SPSNR.



8 Legislative Considerations

8.1 Relevant Legislation

Flora and fauna in Queensland are protected by the *Queensland Vegetation Management Act 1999* and *Nature Conservation Act 1992* and by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. These acts protect remnant and non-remnant vegetation and individual floristic species, as well as native fauna and its habitat.

Development within aquatic zones (i.e. creeks and wetlands) is subject to the *Queensland Fisheries Act 1994* and the *Water Act 2000*.

Other legislation is addressed below as relevant to the project.

Specific planning considerations (such as local planning schemes) have not been outlined in this section as only ecological issues and legislation have been addressed as per the client scope.

8.2 Queensland Legislation

8.2.1 Vegetation Management Act 1999

The purpose of the *Vegetation Management Act 1999* (VMA) is to regulate the clearing of vegetation in Queensland. The VMA is administered through the Integrated Development Assessment System (IDAS) under the *Sustainable Planning Act 2009* (SPA).

Schedule 24 of the *Sustainable Planning Regulation 2009* (SP Reg) outlines clearing of native vegetation which is not considered assessable development i.e. clearing which is exempt from requiring a permit under the VMA.

Schedule 24, Part 1, Item 6 of the SP Reg states that clearing for a 'resource activity' is not assessable development. A resource activity is defined under the *Environmental Protection Act 1994* (EP Act) and includes a mining activity as defined below (section 107):

A mining activity is—

- (a) an activity that is an authorised activity for a mining tenement under the Mineral Resources Act; or*
- (b) another activity that is authorised under an approval under the Mineral Resources Act that grants rights over land.*

The expansion of the sandstone quarry and hence the proposed MLA will result in a mining activity under the *Mineral Resources Act*.

Therefore, it is considered that vegetation clearing to occur for the proposed MLA is not assessable development under SPA and therefore does not require a vegetation clearing permit under the VMA provided the mining tenement is in place/issued before any clearing commences.

8.2.2 Nature Conservation Act 1992

8.2.2.1 Flora

The objective of the *Nature Conservation Act 1992* (NC Act) is to conserve nature by protecting all native flora and fauna. The NC Act has recently been amended to include the new Protected Plants Legislative Framework which has created a new risk-based approach to regulate the clearing of protected plants in Queensland. This means only high risk clearing requires an assessment.

All native flora species are listed in the *Nature Conservation (Wildlife) Regulation 2006* (NC Regulation) as Endangered, Vulnerable, Near Threatened or Least Concern. All of these categories (including Least Concern plants) are considered to be protected plants under the NC Act.

As mentioned in section 2.2.1, the Protected Plants Flora Survey Trigger Map found that the nearest mapped High Risk area occurs approximately 200 metres to the south of the proposed MLA. EVNT flora species have been recorded within a 5km radius of the proposed MLA, however none were recorded within the area during the field survey undertaken by Aurecon.

Under Part 3, Subdivision 2, Section 261Z of the NC Regulation, a person may take a protected plant by clearing if the flora survey trigger map shows the area is not 'high risk', and the person is not aware of the presence of any EVNT plants in the area to be cleared or within 100m of the area, and if the clearing occurs within 5 years of the map being produced.

As there were only Least Concern plants found within the clearing area, it is considered that the proposed MLA will qualify for this exemption, and therefore a Clearing Permit for Protected Plants is not required.

8.2.2.2 Fauna

All native fauna species and their breeding places are protected under the *Nature Conservation Act 1992* (NC Act). Field surveys within the project area recorded a total of 58 native species, including ground-dwelling and terrestrial mammals, bats, passerine (perching) and non-passerine birds, arboreal and terrestrial reptiles, and arboreal mammals. None of the recorded species are listed threatened species under the NC Act. However, two species that were observed are listed as Special Least Concern – the rainbow bee-eater (a migratory/marine species) and the echidna (an iconic species). Other than that described in other sections of this report, there are no special restrictions and/or legislative triggers associated with these species, however, the penalties for 'taking' them (that is to 'hunt, shoot, wound, kill, skin, poison, net, snare, spear, trap, catch, dredge for, bring ashore or aboard a boat, pursue, lure, injure or harm' the animal) without the proper authority are higher.

Desktop searches identified a total of ten NC Act-listed fauna species that may potentially occur within the MLA. These comprised five birds, one mammal and four reptiles. Following field investigations, it was determined that of these species, one bird (powerful owl) and one reptile (brigalow scaly-foot) are likely to occur within the proposed MLA, at least intermittently, as suitable habitat is present and they are known from the area from previous surveys. However, the loss of breeding places of these species is considered unlikely because there are no trees with large enough hollows to support nesting of powerful owl, and the brigalow scaly-foot does not utilise a recurrent/specific breeding place, *per se*.

As hollow bearing trees and occasional nests of other (Least Concern) birds were present, there is a risk that the action will tamper with animal breeding places, and as such, it is recommended that approval is obtained under the *Nature Conservation (Wildlife Management) Regulation 2006* to do so. Under section 332 of this regulation an approved Species Management Program (SMP) must be developed to address the management of a population and habitat of the protected species that will be



affected. One SMP may be developed that addresses all relevant protected species, including the Least Concern and Special Least Concern species known to occur within the proposed MLA, as well as the listed threatened species considered likely to occur.

8.2.3 Water Act 2000

The Department of Natural Resources and Mines (DNRM) administers the *Water Act 2000* (Water Act). Approvals, termed Riverine Protection Permits, are required to destroy or disturb vegetation, excavate or place fill within a watercourse, lake or spring, which includes the bed and banks of a watercourse.

The *Water Act* defines a watercourse as river, creek or other stream, including a stream in the form of an anabranch or a tributary, in which water flows permanently or intermittently, regardless of the frequency of flow events—

- a) in a natural channel, whether artificially modified or not; or
- b) in an artificial channel that has changed the course of the stream

It is considered that the one mapped watercourses within a small area of the proposed MLA is a watercourse under the Water Act. However, the proposed disturbance footprint does not include any interference or taking with the watercourse and therefore a Riverine Protection Permit will not be required under the Act.

8.2.4 Fisheries Act 1994

The *Fisheries Act 1994* (Fisheries Act) provides for the management, use, development and protection of fisheries resources and fish habitats. Approvals are required for marine plant disturbance, works in a declared fish habitat or constructing or raising a waterway barrier.

The project is not located within a fish habitat area and no marine plants are present. There is a mapped watercourse within a small portion of the proposed MLA, however there will be no waterway barriers as a result of the quarry activities.

Therefore this Act does not apply to the proposed MLA.

8.2.5 Land Protection (Pest and Stock Route Management) Act 2002

Certain species of animals and plants have been listed as declared pests under the *Land Protection (Pest and Stock Route Management) Act 2002*. There are three categories of declared pests: Class 1, 2 and 3. Depending which Class a species is assigned to, a range of statutory restrictions are activated. These may include restrictions on sale, introduction, possession or transport of the species. In the case of Class 1 and 2 declared pests, declaration also imposes a legal requirement on all landowners to take reasonable steps to keep their land free of these pests. Landholders are not required to control Class 3 plants unless their land is adjacent to an environmentally significant area and they are issued with a pest control notice. Weeds of National Significance (WONS) are species that have been identified as posing significant threats to Australia's biodiversity, agricultural, recreational, social and cultural values on a national scale.

The field inspection identified a number of declared pests, including:

- Lantana (*Lantana camara*), which is a Class 3 Pest and a WONS
- Rubber vine (*Cryptostegia grandiflora*), which is a Class 2 Pest and a WONS
- Prickly Pears (*Opuntia* spp), which are Class 2 Pests and WONS



Declared pest plants in the area must be managed to ensure the spread of the weed or weed seeds does not occur. Measures to mitigate the spread of weeds should be outlined in any environmental management plans for the project.

No permits are required with regard to managing weeds for this development.

Appropriate weed hygiene methods should be employed during construction to prevent the spread of weeds or importing additional weeds into the project area.

8.2.6 Environmental Protection Act 1994

The purpose of the EP Act is to protect Queensland's environment while allowing for ecological sustainable development.

No specific approval processes are required regarding soil, air, noise and vibration and therefore these are not discussed in detail in this section. However these factors are all subject to the General Environmental Duty obligations under the *Environmental Protection Act 1994* as well as specific subordinate policies relating to air and noise.

Conditions relating to these factors will likely be applied to any approvals issued for the project. The *Environmental Protection Policies* for air and noise should also be considered when preparing any environmental management plans for the project.

8.3 Commonwealth Legislation

8.3.1 Environment Protection and Biodiversity Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is Commonwealth legislation which provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, termed Matters of National Environmental Significance (MNES).

Under the EPBC Act, an action which is likely to have a significant impact on an MNES must be referred to the federal environment minister for consideration and/or subsequent approval.

A search of the EPBC Protected Matters Search database identified multiple MNES potentially occurring within the proposed MLA. Desktop and field data were assessed for each MNES, and a significant impact test was applied to each matter (refer section 3.2.2, 4.2.3 and 4.2.4) to determine whether a significant impact to any was likely as a result of the action (the proposed MLA). It was determined that no significant impacts are likely, and therefore there is no need to refer the matter.

8.4 Offsets

8.4.1 State

The Queensland Environmental Offsets Policy (EO Policy) has recently been reformed, with five separate offset policies streamlined into one policy. Under the new policy, an offset is required when there is a *significant residual impact* on any *prescribed environmental matter*. Prescribed environmental matters include, among other things, threatened species listed under state legislation, and protected areas (including nature refuges). The Department of Environment and Heritage Protection are responsible for administering the *Environmental Offsets Act 2014* (EO Act), and will assess whether the EO Act and EO Policy are applicable to the proposed MLA.



8.4.2 Federal

The EPBC Environmental Offsets Policy governs the application of offsets to address significant impacts on MNES. It was determined in this assessment that no significant impacts on any MNES are likely, so it is considered unlikely that any offsets under this policy will be required.

9 Impact mitigation

The preferred option in impact mitigation will always be to avoid the action that is causing, or likely to cause the impact. In the case of the proposed MLA, the proponent seeks to continue mining the sandstone hill that is currently quarried, which will necessarily remove the cover vegetation and the underlying geological material. Measures to reduce the adverse impacts to native flora and fauna can be effected in a number of ways, including but not limited to:

- Developing Construction and Operational Environmental Management Plans, which address issues such as:
 - Erosion and sediment control
 - Dust, noise, vibration and other air quality issues
 - Pest management
 - Waste management
 - Contaminated soils
 - Handling and storage of chemicals and fuels
 - Cultural heritage
 - Rehabilitation
- Developing a Species Management Program which addresses specific impacts to flora and fauna that are known or likely to occur in the project area. This may include actions such as:
 - Engaging an authorised person (i.e. a licensed Spotter Catcher) to undertake pre-clearing searches of the disturbance footprint for listed threatened species, and relocating individuals if necessary and appropriate
 - Creating habitat features 'off-site' such as rock piles and retaining hollow logs that can be used by hollow-dependent fauna, to augment the habitat that is lost
 - Installing nest boxes in other areas that will not be impacted, to replace tree hollow habitat that is lost

The development of such plans are outside of the scope of this report, but it is envisaged that the information in this ecological assessment will inform the range of mitigation actions that may be developed for the proposed MLA.



10 Conclusion

The Capricorn Stone Ecological Assessment involved detailed desktop and field investigations to determine what, if any, environmental constraints to the proposed MLA exist. While no state or federally listed threatened species were recorded during field investigations, the following matters are relevant:

- Suitable habitat exists within the proposed MLA for two state-listed threatened species (powerful owl and brigalow scaly-foot). Both species have been recorded within close proximity to the proposed MLA, in similar habitat. The proposed MLA will impact approximately 22.14 hectares of powerful owl and brigalow scaly-foot foraging habitat only.
- The proposed MLA occurs within the Stanwell Power Station Nature Refuge, which is a class of protected area under the NC Act. The values of the nature refuge that are likely to be impacted by the proposed MLA include:
 - Approximately 22.14 hectares of open eucalypt forest on skeletal granitic or sedimentary soils
 - Approximately 22.14 hectares of habitat suitable to the koala – although the value of this habitat is diminished by the absence of this species, and its apparent inability to naturally recolonise the area
- The proposed MLA is inconsistent with a number of management intents of the Stanwell Power Station Nature Refuge, to the extent only that the proposed MLA will reduce the area available for these activities within the SPSNR by 22.14 hectares, which is the disturbance footprint. It is expected that none of the management intents will be impacted significantly, and minimal impacts are likely for the following:
 - limited pedestrian access for environmental education
 - limited cattle grazing by an adjoining land-holder to reduce fuel loads
 - environmental research and monitoring
 - the collection of seeds from plants
- The proposed MLA is also inconsistent with the management intent of maintaining the area's softwood scrubs in a natural condition, particularly by controlling the impact of fire on the area, to the extent that a patch of approximately 0.5 hectares will be cleared. This represents roughly 1.5% of the softwood scrubs that are present within the Nature Refuge. Therefore the impact on this management intent in the context of the entire Nature Refuge is not considered to be significant
- No significant impact on any matters of national environmental significance are likely, and therefore no referral under the EPBC Act is required



It is expected that the proponent would qualify for vegetation clearing permit exemptions under the VMA and NC Act.

It is recommended that the proponent prepares a Species Management Program for approval under the NC Act, to address the likely tampering with animal breeding places and impacts on native fauna species that will occur as a result of the proposed MLA.

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Appendices



Appendix A

Fauna Records





Appendix A

Fauna Records

Capricorn Stone Ecological Assessment fauna species list

Scientific Name	Common Name	Site	Method*
Birds			
<i>Aquila audax</i>	Wedge-tailed Eagle	F4	BS
<i>Artamus cinereus</i>	Black-faced Woodswallow	F4	BS
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	F4	BS
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	F2, F4	BS
<i>Calyptorhynchus banksii</i>	Red-tailed Black-cockatoo	F4	BS
<i>Centropus phasianinus</i>	Pheasant Coucal	F4	BS
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	F2, F4	BS
<i>Corvus orru</i>	Torresian Crow	F2, F4	BS
<i>Cracticus nigrogularis</i>	Pied Butcherbird	F2, F4	BS
<i>Cracticus tibicen</i>	Australian Magpie	F2, F4	BS
<i>Cuculus pallidus</i>	Pallid Cuckoo	F4	BS
<i>Dacelo leachii</i>	Blue-winged Kookaburra	F4	BS
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	F2, F4	BS
<i>Dicaeum hirundinaceum</i>	Mistletoebird	F2, F4	BS
<i>Dicrurus bracteatus</i>	Spangled Drongo	F2, F4	BS
<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater	F2	BS
<i>Falco berigora</i>	Brown Falcon	F4	BS
<i>Falco peregrinus</i>	Peregrine Falcon	F4	BS
<i>Geopelia placida</i>	Peaceful Dove	F2	BS
<i>Gerygone albogularis</i>	White-throated Gerygone	F2, F4	BS
<i>Malarus melanocephalus</i>	Red-backed Fairy Wren	F4	BS
<i>Manorina melanocephala</i>	Noisy Miner	F2, F4	BS
<i>Meliphaga lewinii</i>	Lewin's Honeyeater	F2	BS
<i>Melithreptus albogularis</i>	White-throated Honeyeater	F2	BS
<i>Merops ornatus</i> *^	Rainbow Bee-eater	F4	BS
<i>Myiagra rubecula</i>	Leaden Flycatcher	F4	BS
<i>Pachycephala rufiventris</i>	Rufous Whistler	F2, F4	BS
<i>Pardalotus striatus</i>	Striated Pardalote	F2, F4	BS
<i>Philemon citreogularis</i>	Little friarbird	F4	BS
<i>Philemon corniculatus</i>	Noisy Friarbird	F2, F4	BS
<i>Platycercus adscitus</i>	Pale-headed Rosella	F2	BS
<i>Podargus strigoides</i>	Tawny Frogmouth	T2	SL
<i>Rhipidura albiscapa</i>	Grey Fantail	F2	BS
<i>Rhipidura leucophrys</i>	Willie Wagtail	F2, F4	BS
<i>Stepers graculina</i>	Pied Currawong	F2, F4	BS
<i>Trichoglossus chlorolepidotus</i>	Scaly-breasted Lorikeet	F4	BS
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet	F4	BS
Reptiles			
<i>Heteronotia binoei</i>	Bynoe's Gecko	F2, F4	HS
<i>Carlia foliorum</i>	Skink	F2, F4, F5	HS
<i>Carlia pectoralis</i>	Skink	F4, F5	HS
<i>Cryptoblepharus virgatus</i>	Fence skink	F2, F4	HS
<i>Eulamprus brachysoma</i>	Skink	F5	HS
<i>Varanus sp</i>	Goanna species	F3	TS
Mammals			
<i>Chalinolobus nigrogriseus</i>	Hoary Wattled Bat	F1	AB
<i>Macropus dorsalis</i>	Black-striped Wallaby	T4	skull
<i>Macropus giganteus</i>	Eastern Grey Kangaroo	-	I
<i>Macropus parryi</i>	Pretty-faced Wallaby	-	I
<i>Miniopterus australis</i>	Little Bentwing Bat	F4, F5	AB
<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing Bat	F4, F5	AB
<i>Mormopterus beccarii</i>	Beccari's Freetail Bat	F1, F2	AB
<i>Nyctophilus sp</i>	Long-eared Bat species	F5	AB
<i>Petaurus breviceps</i>	Sugar Glider	T3	SL
<i>Petaurus norfolcensis</i>	Squirrel Glider	T2	SL

Capricorn Stone Ecological Assessment fauna species list

<i>Petrogale herberti</i>	Herbert's Rock-wallaby	F5	IC
<i>Saccolaimus flaviventris</i>	Yellow-bellied sheath-tail bat	F5	AB
<i>Scotorepens</i> sp or <i>Scotorepens greyii</i>	Central-eastern Broad-nosed Bat or Little Broad-nosed Bat	F1, F5	AB
<i>Tachyglossus aculeatus</i> [^]	Short-beaked Echidna	T4	scats
<i>Trichosurus vulpecula</i>	Brush-tailed possum	T2	SL
<i>Vespadelus baverstocki</i>	Inland forest bat	F3	AB
*BS=bird survey/ SL=spotlighting/ HS=herpetofauna search/ AB=Anabat/ TS=tree search/ IC=infrared camera/ I=incidental			
*EPBC Act migratory ^NC Act Special Least Concern			

Appendix B

Flora Records





Appendix B

Flora Records

Site Name: **V1**

Long: 150.3406465

Site Type: General

Lat: -23.5057170009999

Landform: Alluvium

Notes: - dry creek bed
- boundary of alluvial RE mapped incorrectly

Mapped RE: 11.3.25/11.3.4/11.3.2

Proposed RE: 11.3.4

Soil Type: Medium brown sandy loam

Weed Cover %: 15

Structural Layer:	Height Range (m):	Average height (m):	Canopy Cover %	Scientific Name	Common Name
T1	18 - 25	23	60	<i>Corymbia clarksoniana</i>	Clarkson's Bloodwood
				<i>Corymbia dallachiana</i>	Dallachy's Gum
				<i>Corymbia erythrophloia</i>	Variable-barked Bloodwood
				<i>Corymbia tessellaris</i>	Moreton Bay Ash
				<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark
				<i>Eucalyptus tereticornis</i>	Queensland Blue Gum
				<i>Melaleuca fluviatilis</i>	Paper-barked Tea Tree
				<i>Melaleuca viridiflora</i>	Broad Leaf Tea Tree
T2	8 - 10	9	10	<i>Acacia bidwilli</i>	Corkwood Wattle
				<i>Alectryon diversifolius</i>	Scrub Boonaree
				<i>Casuarina cunninghamiana</i>	River She-oak
				<i>Corymbia dallachiana</i>	Dallachy's Gum
				<i>Erythrina vespertilio</i>	Batwing Coral Tree
				<i>Mallotus phillippensis</i>	Red Kamala
				<i>Melaleuca bracteata</i>	Black Tea Tree
				<i>Melaleuca viridiflora</i>	Broad Leaf Tea Tree
				<i>Opuntia tomentosa</i>	Velvety Tree Pear
				<i>Petalostigma pubescens</i>	Quinine
S1	1.5 - 4	2	5	<i>Abutilon leucopetalum</i>	Desert Lantern-bush
				<i>Acacia excelsa</i>	Ironwood
				<i>Acacia salicina</i>	Sally Wattle



<i>Alectryon diversifolius</i>	Scrub Boonaree
<i>Alphitonia excelsa</i>	Red Ash
<i>Atalaya hemiglauca</i>	Whitewood
<i>Capparis mitchellii</i>	Wild Orange
<i>Crotalaria pallida</i>	Streaked Rattlepod
<i>Cryptostegia grandiflora</i>	Rubber Vine
<i>Cupaniopsis anacardioides</i>	Tuckeroo
<i>Cymbidium canaliculatum</i>	Black Orchid
<i>Desmodium brachypodum</i>	Large Ticktrefoil
<i>Ficus opposita</i>	Sandpaper Fig
<i>Jasminum simplicifolium</i>	Native Jasmine
<i>Lantana camara</i>	Lantana
<i>Leptochloa digitata</i>	Cane Grass
<i>Malvastrum americanum</i> var. <i>americanum</i>	Spiny Malvastrum
<i>Maytenus cunninghamii</i>	Yellow Berry Bush
<i>Megathyrsus maximus</i> var. <i>maximus</i>	Guinea Grass
<i>Melaleuca linariifolia</i>	Narrow-leaved Paperbark
<i>Petalostigma pubescens</i>	Quinine
<i>Pittosporum spinescens</i>	Wallaby Apple
<i>Planchonia careya</i>	Cocky Apple
<i>Themeda avenacea</i>	Wild Oats Grass
<i>Trichodesma zeylanicum</i>	Camel Bush
<i>Trophis scandens</i>	Burny Vine

G	0.1 - 1.2	0.7	90
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<i>Aristida ramosa</i>	Purple Wiregrass
<i>Bidens pilosa</i>	Cobbler's Pegs
<i>Bothriochloa bladhii</i>	Forest Blue Grass
<i>Capparis mitchellii</i>	Wild Orange
<i>Cirsium vulgare</i>	Spear Thistle
<i>Cyperus gracilis</i>	Bunchy Sedge
<i>Desmodium varians</i>	Slender Tick Trefoil
<i>Dichanthium sericeum</i>	Queensland Blue Grass



<i>Enneapogon lindleyanus</i>	Conetop Nineawn
<i>Eragrostis elongata</i>	Clustered Lovegrass
<i>Glycine tomentella</i>	Woolly Glycine
<i>Grewia latifolia</i>	Dysentery Plant, Dog's Balls
<i>Heliotropium amplexicaule</i>	Blue Heliotrope
<i>Heteropogon contortus</i>	Black Spear Grass
<i>Lantana camara</i>	Lantana
<i>Lantana montevidensis</i>	Creeping Lantana
<i>Lepidium sagittulatum</i>	Pepper Cress
<i>Lomandra longifolia</i>	Lomandra
<i>Macroptilium atropurpureum</i>	Siratro
<i>Megathyrsus maximus</i> var. <i>maximus</i>	Guinea Grass
<i>Melinis repens</i>	Red Natal Grass
<i>Passiflora suberosa</i>	Corky Passionflower
<i>Sida hackettiana</i>	Queensland Hemp
<i>Sida rohlenae</i>	Shrub Sida
<i>Sporobolus creber</i>	Western Rat's Tail Grass
<i>Stylosanthes scabra</i>	Seca Stylo
<i>Themeda triandra</i>	Kangaroo Grass
<i>Wahlenbergia communis</i>	Tufted Bluebell

V1



Photo Date:

16/05/2014 4:34:06 PM

Photo Name:

DSC06018.JPG

Bearing: 353

Quadrant: N

Latitude: -23.50623

Longitude: 150.34017

Remark:

Facing north



Photo Date:

16/05/2014 4:34:21 PM

Photo Name:

DSC06019.JPG

Bearing: 77

Quadrant: ENE

Latitude: -23.50613

Longitude: 150.34016

Remark:

Facing east



Photo Date:
16/05/2014 4:34:31 PM
Photo Name:
DSC06020.JPG
Bearing: 168
Quadrant: SSE
Latitude: -23.50615
Longitude: 150.34016
Remark:
Facing south



Photo Date:
16/05/2014 4:34:38 PM
Photo Name:
DSC06021.JPG
Bearing: 247.25
Quadrant: WSW
Latitude: -23.50616
Longitude: 150.34017
Remark:
Facing west

Site Name: **V2**

Long: 150.343810333

Site Type: General

Lat: -23.5043898339999

Landform: Ridge

Notes: Sandstone slopes

Mapped RE: non-rem

Proposed RE: 11.11.1

Soil Type: Rocky, skeletal soils

Weed Cover %: 40

Structural Layer:	Height Range (m):	Average height (m):	Canopy Cover %	Scientific Name	Common Name
T1	8 - 10	9	60	<i>Corymbia citriodora</i>	Spotted Gum
				<i>Corymbia erythrophloia</i>	Variable-barked Bloodwood
				<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark
T2	6 - 8	7	25	<i>Acacia fasciculifera</i>	Scrub Ironbark
				<i>Acacia salicina</i>	Sally Wattle
				<i>Alphitonia excelsa</i>	Red Ash
				<i>Corymbia tessellaris</i>	Moreton Bay Ash
				<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark
				<i>Eucalyptus melanophloia</i>	Silver-leafed Ironbark
				<i>Santalum lanceolatum</i>	Sandalwood
S1	1 - 4	2	25	<i>Acacia fasciculifera</i>	Scrub Ironbark
				<i>Alphitonia excelsa</i>	Red Ash
				<i>Atalaya hemiglauca</i>	Whitewood
				<i>Breynia oblongifolia</i>	Breynia
				<i>Capparis canescens</i>	Wild Orange
				<i>Corymbia erythrophloia</i>	Variable-barked Bloodwood
				<i>Cryptostegia grandiflora</i>	Rubber Vine
				<i>Cupaniopsis anacardioides</i>	Tuckeroo
				<i>Eucalyptus exserta</i>	Queensland Peppermint
				<i>Ficus opposita</i>	Sandpaper Fig
				<i>Hakea lorea subsp. lorea</i>	Bootlace Oak



G	0.5 - 1.2	0.7	80	<i>Lantana camara</i>	Lantana
				<i>Myrsine variabilis</i>	Muttonwood
				<i>Petalostigma pubescens</i>	Quinine
				<i>Pittosporum spinescens</i>	Wallaby Apple
				<i>Senna artemisioides subsp. artemisioides</i>	Silver Cassia
				<i>Sida hackettiana</i>	Queensland Hemp
				<i>Trophis scandens</i>	Burny Vine
G	0.5 - 1.2	0.7	80	<i>Ancistrachne uncinulata</i>	Black Spear Grass
				<i>Araujia sericifera</i>	Moth Vine
				<i>Aristida calycina</i>	Dark Wiregrass
				<i>Bothriochloa bladhii</i>	Forest Blue Grass
				<i>Bothriochloa decipiens</i>	Pitted Bluegrass
				<i>Calotis cuneifolia</i>	Burr Daisy
				<i>Cheilanthes sieberi</i>	Mulga Fern
				<i>Cymbopogon refractus</i>	Barbed-wire Grass
				<i>Cyperus gracilis</i>	Bunchy Sedge
				<i>Desmodium varians</i>	Slender Tick Trefoil
				<i>Dichanthium sericeum</i>	Queensland Blue Grass
				<i>Enneapogon lindleyanus</i>	Conetop Nineawn
				<i>Eustrephus latifolius</i>	Wombat Berry
				<i>Evolvulus alsinoides</i>	Tropical Speedwell
				<i>Grewia latifolia</i>	Dysentery Plant, Dog's Balls
				<i>Harrisia martinii</i>	Harissia Cactus
				<i>Heliotropium amplexicaule</i>	Blue Heliotrope
				<i>Hyparrhenia hirta</i>	Thatch Grass
				<i>Indigofera linifolia</i>	Little Red Pea
				<i>Jasminum didymum</i>	Native Jasmine
				<i>Jasminum simplicifolium</i>	Native Jasmine
				<i>Lantana montevidensis</i>	Creeping Lantana
				<i>Lepidium sagittulatum</i>	Pepper Cress
				<i>Marsdenia viridiflora</i>	Bush Banana
				<i>Melinis repens</i>	Red Natal Grass



<i>Opuntia stricta</i>	Prickly Pear
<i>Opuntia tomentosa</i>	Velvety Tree Pear
<i>Oxalis stricta</i>	Yellow Wood Sorrel
<i>Panicum effusum</i>	Inquisitive Grass
<i>Passiflora suberosa</i>	Corky Passionflower
<i>Pennisetum ciliare</i>	Buffel Grass
<i>Pterocaulon redolens</i>	Apple Bush
<i>Senecio laetus subsp. laetus</i>	Fire Weed
<i>Sida cordifolia</i>	Flannel Weed
<i>Sida hackettiana</i>	Queensland Hemp
<i>Sida rohlenae</i>	Shrub Sida
<i>Solanum seaforthianum</i>	Brazilian Nightshade
<i>Themeda quadrivalvis</i>	Grader Grass

V2



Photo Date:

15/05/2014 8:10:57 AM

Photo Name:

DSC05997.JPG

Bearing: 355.5

Quadrant: N

Latitude: -23.50466

Longitude: 150.34375

Remark:

Facing north



Photo Date:

15/05/2014 8:11:03 AM

Photo Name:

DSC05998.JPG

Bearing: 82.75

Quadrant: E

Latitude: -23.50468

Longitude: 150.34375

Remark:

Facing east



Photo Date:

15/05/2014 8:11:11 AM

Photo Name:

DSC05999.JPG

Bearing: 166.75

Quadrant: SSE

Latitude: -23.50468

Longitude: 150.34375

Remark:

Facing south



Photo Date:

15/05/2014 8:11:28 AM

Photo Name:

DSC06000.JPG

Bearing: 257.75

Quadrant: WSW

Latitude: -23.50469

Longitude: 150.34375

Remark:

Facing west

Site Name: **V3**

Long: 150.345057167

Site Type: General

Lat: -23.5054671669999

Landform: Low Slope

Notes: Semi-evergreen Vine Thicket (SEVT) at edge of lower slope and in gully

Mapped RE: non-rem

Proposed RE: 11.11.5

Soil Type: Medium brown, silty sand

Weed Cover %: 20

Structural Height Average Canopy
Layer: Range (m): height (m): Cover %

Scientific Name

Common Name

E 7 - 9 8 20

Alphitonia excelsa

Red Ash

Brachychiton australis

Broad-leaved Bottle Tree

Breynia oblongifolia

Breynia

Diospyros humilis

Small-leaved Ebony

Eucalyptus crebra

Narrow-leaved Ironbark

Pittosporum spinescens

Wallaby Apple

S1 2 - 6 2 90

Abutilon leucopetalum

Desert Lantern-bush

Acacia fasciculifera

Scrub Ironbark

Acacia salicina

Sally Wattle

Alectryon diversifolius

Scrub Boonaree

Alyxia ruscifolia

Chain Fruit

Cissus opaca

Native Grape

Cissus sterculiifolia

Yaroong

Cryptostegia grandiflora

Rubber Vine

Diospyros geminata

Scaly Ebony

Diospyros humilis

Small-leaved Ebony

Erythrina vespertilio

Batwing Coral Tree

Eustrephus latifolius

Wombat Berry

Exocarpos latifolius

Broad-leaved Native Cherry

Jasminum didymum

Native Jasmine

Lantana camara

Lantana

Mallotus repandus

Native Witch Hazel



G	0.2 - 0.8	0.2	10	<i>Marsdenia viridiflora</i>	Bush Banana
				<i>Maytenus cunninghamii</i>	Yellow Berry Bush
				<i>Murraya ovatifoliolata</i>	Native Murraya
				<i>Petalostigma pubescens</i>	Quinine
				<i>Pittosporum spinescens</i>	Wallaby Apple
				<i>Tabernaemontana orientalis</i>	Eastern Gondala Bush
				<i>Trophis scandens</i>	Burny Vine
				<i>Zanthoxylum brachyacanthum</i>	Thorny Yellow Wood
G	0.2 - 0.8	0.2	10	<i>Ancistrachne uncinulata</i>	Black Spear Grass
				<i>Aristida ramosa</i>	Purple Wiregrass
				<i>Bothriochloa bladhii</i>	Forest Blue Grass
				<i>Desmodium brachypodum</i>	Large Ticktrefoil
				<i>Eucalyptus exserta</i>	Queensland Peppermint
				<i>Evolvulus alsinoides</i>	Tropical Speedwell
				<i>Heliotropium amplexicaule</i>	Blue Heliotrope
				<i>Megathyrsus maximus</i> var. <i>maximus</i>	Guinea Grass
				<i>Olearia canescens</i>	
				<i>Passiflora foetida</i>	Stinking Passion Fruit
				<i>Passiflora suberosa</i>	Corky Passionflower
				<i>Sida hackettiana</i>	Queensland Hemp
				<i>Solanum seaforthianum</i>	Brazilian Nightshade
				<i>Themeda triandra</i>	Kangaroo Grass

V3



Photo Date:

16/05/2014 10:37:32 PM

Photo Name:

DSC06001.JPG

Bearing: 356.75

Quadrant: N

Latitude: -23.50534

Longitude: 150.34503

Remark:

From western edge of SEVT,
facing north



Photo Date:

16/05/2014 10:37:42 PM

Photo Name:

DSC06003.JPG

Bearing: 159.25

Quadrant: SSE

Latitude: -23.50536

Longitude: 150.34504

Remark:

From western edge of SEVT,
facing south



Photo Date:

16/05/2014 10:37:42 PM

Photo Name:

DSC06002.JPG

Bearing: 76.5

Quadrant: ENE

Latitude: -23.50536

Longitude: 150.34504

Remark:

From western edge of SEVT,
facing east



Photo Date:

16/05/2014 10:37:58 PM

Photo Name:

DSC06004.JPG

Bearing: 265.25

Quadrant: W

Latitude: -23.50535

Longitude: 150.34507

Remark:

From western edge of SEVT,
facing west



Photo Date:

16/05/2014 10:54:10 PM

Photo Name:

DSC06005.JPG

Bearing: 347.5

Quadrant: NNW

Latitude: -23.5052

Longitude: 150.34564

Remark:

From boundary, facing north



Photo Date:

16/05/2014 10:54:17 PM

Photo Name:

DSC06006.JPG

Bearing: 79.75

Quadrant: E

Latitude: -23.50517

Longitude: 150.34564

Remark:

From boundary, facing east



Photo Date:

16/05/2014 10:54:29 PM

Photo Name:

DSC06007.JPG

Bearing: 163.25

Quadrant: SSE

Latitude: -23.50522

Longitude: 150.34572

Remark:

From boundary, facing south



Photo Date:

16/05/2014 10:54:44 PM

Photo Name:

DSC06008.JPG

Bearing: 211.75

Quadrant: SSW

Latitude: -23.5052

Longitude: 150.34564

Remark:

From boundary, facing west

Site Name: **V4**

Long: 150.339579667

Site Type: General

Lat: -23.5053300009999

Landform: Alluvium

Notes:

Mapped RE: 11.3.25/11.3.4/11.3.2

Proposed RE: 11.3.4

Soil Type: Medium brown sandy loam

Weed Cover %: 5

Structural Layer:	Height Range (m):	Average height (m):	Canopy Cover %	Scientific Name	Common Name
T1	25 - 30	26	25	<i>Corymbia clarksoniana</i>	Clarkson's Bloodwood
				<i>Corymbia tessellaris</i>	Moreton Bay Ash
				<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark
				<i>Eucalyptus tereticornis</i>	Queensland Blue Gum
T2	7 - 12	8	10	<i>Corymbia clarksoniana</i>	Clarkson's Bloodwood
				<i>Corymbia tessellaris</i>	Moreton Bay Ash
S1	1 - 6	2	5	<i>Alphitonia excelsa</i>	Red Ash
				<i>Corymbia tessellaris</i>	Moreton Bay Ash
				<i>Ficus opposita</i>	Sandpaper Fig
				<i>Lantana camara</i>	Lantana
G	0.1 - 1	0.8	85	<i>Ancistrachne uncinulata</i>	Black Spear Grass
				<i>Aristida ramosa</i>	Purple Wiregrass
				<i>Bidens pilosa</i>	Cobbler's Pegs
				<i>Bothriochloa decipiens</i>	Pitted Bluegrass
				<i>Dichanthium sericeum</i>	Queensland Blue Grass
				<i>Grewia latifolia</i>	Dysentery Plant, Dog's Balls
				<i>Megathyrsus maximus var. maximus</i>	Guinea Grass
				<i>Melinis repens</i>	Red Natal Grass
				<i>Neptunia gracilis</i>	Native Sensitive Weed
				<i>Planchonia careya</i>	Cocky Apple



<i>Sida hackettiana</i>	Queensland Hemp
<i>Sorghum almum</i>	Columbus Grass
<i>Themeda triandra</i>	Kangaroo Grass
<i>Trichodesma zeylanicum</i>	Camel Bush

V4



Photo Date:

17/05/2014 7:48:07 AM

Photo Name:

DSC06027.JPG

Bearing: 355.75

Quadrant: N

Latitude: -23.50512

Longitude: 150.3396

Remark:

Facing north



Photo Date:

17/05/2014 7:48:14 AM

Photo Name:

DSC06028.JPG

Bearing: 64.75

Quadrant: ENE

Latitude: -23.50529

Longitude: 150.33958

Remark:

Facing east



Photo Date:

17/05/2014 7:48:31 AM

Photo Name:

DSC06029.JPG

Bearing: 150.75

Quadrant: SSE

Latitude: -23.50507

Longitude: 150.33975

Remark:

Facing south



Photo Date:

17/05/2014 7:48:44 AM

Photo Name:

DSC06030.JPG

Bearing: 257

Quadrant: WSW

Latitude: -23.50507

Longitude: 150.33972

Remark:

Facing west

Appendix C

Wildlife Online Report





Appendix C

Wildlife Online Report



Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Defined Area
Species: All
Type: All
Status: All
Records: All
Date: All
Latitude: 23.464 to 23.5447
Longitude: 150.2886 to 150.3838
Email: sandra.walters@aurecongroup.com
Date submitted: Tuesday 25 Mar 2014 16:22:51
Date extracted: Tuesday 25 Mar 2014 16:30:06

The number of records retrieved = 405

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.

Feedback about Wildlife Online should be emailed to wildlife.online@science.dsitia.qld.gov.au

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufonidae	<i>Rhinella marina</i>	cane toad	Y			12
animals	amphibians	Hylidae	<i>Litoria rothii</i>	northern laughing treefrog		C		1
animals	amphibians	Hylidae	<i>Litoria inermis</i>	bumpy rocketfrog		C		1
animals	amphibians	Hylidae	<i>Litoria rubella</i>	ruddy treefrog		C		2
animals	amphibians	Hylidae	<i>Litoria caerulea</i>	common green treefrog		C		3
animals	amphibians	Hylidae	<i>Cyclorana brevipes</i>	superb collared frog		C		1
animals	amphibians	Hylidae	<i>Cyclorana novaehollandiae</i>	eastern snapping frog		C		1
animals	amphibians	Hylidae	<i>Litoria fallax</i>	eastern sedgefrog		C		2
animals	amphibians	Hylidae	<i>Litoria latopalmata</i>	broad palmed rocketfrog		C		2
animals	amphibians	Limnodynastidae	<i>Limnodynastes peronii</i>	striped marshfrog		C		2
animals	amphibians	Limnodynastidae	<i>Limnodynastes salmini</i>	salmon striped frog		C		3/2
animals	amphibians	Limnodynastidae	<i>Platyplectrum ornatum</i>	ornate burrowing frog		C		2
animals	amphibians	Limnodynastidae	<i>Limnodynastes tasmaniensis</i>	spotted grassfrog		C		1
animals	amphibians	Limnodynastidae	<i>Limnodynastes terraereginae</i>	scarlet sided pobblebonk		C		2
animals	birds	Acanthizidae	<i>Sericornis frontalis</i>	white-browed scrubwren		C		3
animals	birds	Acanthizidae	<i>Gerygone albogularis</i>	white-throated gerygone		C		1
animals	birds	Acanthizidae	<i>Smicronis brevirostris</i>	weebill		C		6
animals	birds	Accipitridae	<i>Accipiter cirrocephalus</i>	collared sparrowhawk		C		1
animals	birds	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle		C		6
animals	birds	Accipitridae	<i>Milvus migrans</i>	black kite		C		1
animals	birds	Accipitridae	<i>Haliastur indus</i>	brahmny kite		C		1
animals	birds	Accipitridae	<i>Elanus axillaris</i>	black-shouldered kite		C		2
animals	birds	Accipitridae	<i>Accipiter fasciatus</i>	brown goshawk		C		5
animals	birds	Accipitridae	<i>Aviceda subcristata</i>	Pacific baza		C		1
animals	birds	Accipitridae	<i>Haliastur sphenurus</i>	whistling kite		C		6
animals	birds	Accipitridae	<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle		C		5
animals	birds	Accipitridae	<i>Hieraaetus morphnoides</i>	little eagle		C		1
animals	birds	Acrocephalidae	<i>Acrocephalus australis</i>	Australian reed-warbler		C		2
animals	birds	Aegothelidae	<i>Aegotheles cristatus</i>	Australian owl-nightjar		C		4
animals	birds	Alaudidae	<i>Mirafra javanica</i>	Horsfield's bushlark		C		5
animals	birds	Alcedinidae	<i>Ceyx azureus</i>	azure kingfisher		C		6
animals	birds	Anatidae	<i>Anas gracilis</i>	grey teal		C		3
animals	birds	Anatidae	<i>Cygnus atratus</i>	black swan		C		4
animals	birds	Anatidae	<i>Aythya australis</i>	hardhead		C		3
animals	birds	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck		C		4
animals	birds	Anatidae	<i>Nettapus coromandelianus</i>	cotton pygmy-goose		NT		1
animals	birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck		C		5
animals	birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter		C		4
animals	birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron		C		3
animals	birds	Ardeidae	<i>Ardea ibis</i>	cattle egret		C		2
animals	birds	Ardeidae	<i>Ardea modesta</i>	eastern great egret		C		2
animals	birds	Ardeidae	<i>Nycticorax caledonicus</i>	Nankeen night-heron		C		2
animals	birds	Artamidae	<i>Cracticus tibicen</i>	Australian magpie		C		18
animals	birds	Artamidae	<i>Artamus superciliosus</i>	white-browed woodswallow		C		2
animals	birds	Artamidae	<i>Cracticus nigrogularis</i>	piebald butcherbird		C		18
animals	birds	Artamidae	<i>Artamus personatus</i>	masked woodswallow		C		3

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Artamidae	<i>Strepera graculina</i>	pied currawong		C		7
animals	birds	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird		C		3
animals	birds	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow		C		2
animals	birds	Artamidae	<i>Artamus cinereus</i>	black-faced woodswallow		C		5
animals	birds	Burhinidae	<i>Burhinus grallarius</i>	bush stone-curlew		C		6
animals	birds	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo		C		11
animals	birds	Cacatuidae	<i>Calyptorhynchus lathami</i>	glossy black-cockatoo		V		1
animals	birds	Cacatuidae	<i>Calyptorhynchus banksii</i>	red-tailed black-cockatoo		C		12
animals	birds	Cacatuidae	<i>Nymphicus hollandicus</i>	cockatiel		C		1
animals	birds	Campephagidae	<i>Coracina tenuirostris</i>	cicadabird		C		2
animals	birds	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike		C		4
animals	birds	Campephagidae	<i>Lalage leucomela</i>	varied triller		C		1
animals	birds	Campephagidae	<i>Lalage sueurii</i>	white-winged triller		C		1
animals	birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike		C		14
animals	birds	Charadriidae	<i>Vanellus miles novaehollandiae</i>	masked lapwing (southern subspecies)		C		5
animals	birds	Charadriidae	<i>Elseya melanops</i>	black-fronted dotterel		C		2
animals	birds	Cisticolidae	<i>Cisticola exilis</i>	golden-headed cisticola		C		3
animals	birds	Columbidae	<i>Streptopelia chinensis</i>	spotted dove	Y			2
animals	birds	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove		C		4
animals	birds	Columbidae	<i>Phaps chalcoptera</i>	common bronzewing		C		1
animals	birds	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon		C		10
animals	birds	Columbidae	<i>Geopelia striata</i>	peaceful dove		C		16
animals	birds	Columbidae	<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)		V	V	16
animals	birds	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird		C		5
animals	birds	Corcoracidae	<i>Struthidea cinerea</i>	apostlebird		C		6
animals	birds	Corcoracidae	<i>Corcorax melanorhamphos</i>	white-winged chough		C		10
animals	birds	Corvidae	<i>Corvus orru</i>	Torresian crow		C		17
animals	birds	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal		C		12
animals	birds	Cuculidae	<i>Cacomantis flabelliformis</i>	fan-tailed cuckoo		C		8
animals	birds	Cuculidae	<i>Eudynamis orientalis</i>	eastern koel		C		1
animals	birds	Cuculidae	<i>Cacomantis pallidus</i>	pallid cuckoo		C		8
animals	birds	Cuculidae	<i>Chalcites basalus</i>	Horsfield's bronze-cuckoo		C		6
animals	birds	Cuculidae	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo		C		2
animals	birds	Cuculidae	<i>Chalcites lucidus</i>	shining bronze-cuckoo		C		4
animals	birds	Dicruridae	<i>Dicrurus bracteatus</i>	spangled drongo		C		4
animals	birds	Estrildidae	<i>Taeniopygia guttata</i>	zebra finch		C		4
animals	birds	Estrildidae	<i>Neochmia modesta</i>	plum-headed finch		C		2
animals	birds	Estrildidae	<i>Lonchura castaneothorax</i>	chestnut-breasted mannikin		C		4
animals	birds	Estrildidae	<i>Taeniopygia bichenovii</i>	double-barred finch		C		15
animals	birds	Eurostopodidae	<i>Eurostopodus mystacalis</i>	white-throated nightjar		C		3
animals	birds	Falconidae	<i>Falco berigora</i>	brown falcon		C		6
animals	birds	Falconidae	<i>Falco subniger</i>	black falcon		C		1
animals	birds	Falconidae	<i>Falco longipennis</i>	Australian hobby		C		1
animals	birds	Falconidae	<i>Falco cenchroides</i>	Nankeen kestrel		C		6
animals	birds	Falconidae	<i>Falco peregrinus</i>	peregrine falcon		C		5
animals	birds	Halcyonidae	<i>Dacelo leachii</i>	blue-winged kookaburra		C		2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Halcyonidae	<i>Dacelo novaeguineae</i>	laughing kookaburra		C		17
animals	birds	Halcyonidae	<i>Todiramphus sanctus</i>	sacred kingfisher		C		6
animals	birds	Halcyonidae	<i>Todiramphus macleayii</i>	forest kingfisher		C		7
animals	birds	Halcyonidae	<i>Todiramphus pyrrhopygius</i>	red-backed kingfisher		C		2
animals	birds	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow		C		9
animals	birds	Hirundinidae	<i>Petrochelidon ariel</i>	fairy martin		C		4
animals	birds	Hirundinidae	<i>Petrochelidon nigricans</i>	tree martin		C		3
animals	birds	Maluridae	<i>Malurus lamberti</i>	variegated fairy-wren		C		4
animals	birds	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren		C		13
animals	birds	Megaluridae	<i>Megalurus timoriensis</i>	tawny grassbird		C		1
animals	birds	Megaluridae	<i>Cincloramphus cruralis</i>	brown songlark		C		2
animals	birds	Megaluridae	<i>Cincloramphus mathewsi</i>	rufous songlark		C		2
animals	birds	Megapodiidae	<i>Alectura lathamii</i>	Australian brush-turkey		C		1
animals	birds	Meliphagidae	<i>Myzomela sanguinolenta</i>	scarlet honeyeater		C		4
animals	birds	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater		C		5
animals	birds	Meliphagidae	<i>Philemon buceroides</i>	helmeted friarbird		C		1
animals	birds	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater		C		10
animals	birds	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's honeyeater		C		6
animals	birds	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner		C		14
animals	birds	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird		C		17
animals	birds	Meliphagidae	<i>Melithreptus brevirostris</i>	brown-headed honeyeater		C		1
animals	birds	Meliphagidae	<i>Melithreptus albogularis</i>	white-throated honeyeater		C		11
animals	birds	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird		C		13
animals	birds	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater		C		6
animals	birds	Monarchidae	<i>Myiagra inquieta</i>	restless flycatcher		C		4
animals	birds	Monarchidae	<i>Myiagra rubecula</i>	leaden flycatcher		C		7
animals	birds	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark		C		13
animals	birds	Monarchidae	<i>Symposiarchus trivirgatus</i>	spectacled monarch		C		1
animals	birds	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit		C		3
animals	birds	Nectariniidae	<i>Dicaeum hirundinaceum</i>	mistletoebird		C		8
animals	birds	Neosittidae	<i>Daphoenositta chrysoptera</i>	varied sittella		C		1
animals	birds	Oriolidae	<i>Sphecotheres vieilloti</i>	Australasian figbird		C		10
animals	birds	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole		C		4
animals	birds	Otididae	<i>Ardeotis australis</i>	Australian bustard		C		3
animals	birds	Pachycephalidae	<i>Colluricincla megarhyncha</i>	little shrike-thrush		C		3
animals	birds	Pachycephalidae	<i>Colluricincla harmonica</i>	grey shrike-thrush		C		10
animals	birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler		C		8
animals	birds	Pardalotidae	<i>Pardalotus punctatus</i>	spotted pardalote		C		6
animals	birds	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote		C		10
animals	birds	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican		C		1
animals	birds	Petroicidae	<i>Eopsaltria australis</i>	eastern yellow robin		C		1
animals	birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant		C		3
animals	birds	Phalacrocoracidae	<i>Phalacrocorax carbo</i>	great cormorant		C		1
animals	birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant		C		1
animals	birds	Phasianidae	<i>Coturnix pectoralis</i>	stubble quail		C		1
animals	birds	Phasianidae	<i>Coturnix ypsilophora</i>	brown quail		C		6

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Podargidae	<i>Podargus strigoides</i>	tawny frogmouth		C		7
animals	birds	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe		C		4
animals	birds	Pomatostomidae	<i>Pomatostomus temporalis</i>	grey-crowned babbler		C		14
animals	birds	Psittacidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet		C		8
animals	birds	Psittacidae	<i>Trichoglossus haematodus moluccanus</i>	rainbow lorikeet		C		15
animals	birds	Psittacidae	<i>Aprosmictus erythropterus</i>	red-winged parrot		C		6
animals	birds	Psittacidae	<i>Platycercus adscitus</i>	pale-headed rosella		C		17
animals	birds	Psittacidae	<i>Glossopsitta pusilla</i>	little lorikeet		C		1
animals	birds	Psittacidae	<i>Alisterus scapularis</i>	Australian king-parrot		C		3
animals	birds	Ptilonorhynchidae	<i>Ptilonorhynchus maculatus</i>	spotted bowerbird		C		1
animals	birds	Rallidae	<i>Porphyrio porphyrio</i>	purple swamphen		C		2
animals	birds	Rallidae	<i>Amaurornis moluccana</i>	pale-vented bush-hen		C		1
animals	birds	Rallidae	<i>Fulica atra</i>	Eurasian coot		C		3
animals	birds	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen		C		4
animals	birds	Recurvirostridae	<i>Himantopus himantopus</i>	black-winged stilt		C		2
animals	birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail		C		13
animals	birds	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail		C		6
animals	birds	Strigidae	<i>Ninox strenua</i>	powerful owl		V		1
animals	birds	Strigidae	<i>Ninox boobook</i>	southern boobook		C		4
animals	birds	Sturnidae	<i>Sturnus vulgaris</i>	common starling	Y			1
animals	birds	Threskiornithidae	<i>Platalea regia</i>	royal spoonbill		C		1
animals	birds	Threskiornithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis		C		4
animals	birds	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis		C		2
animals	birds	Timaliidae	<i>Zosterops lateralis</i>	silveryeye		C		4
animals	birds	Turnicidae	<i>Turnix varius</i>	painted button-quail		C		2
animals	birds	Turnicidae	<i>Turnix velox</i>	little button-quail		C		3
animals	birds	Turnicidae	<i>Turnix pyrrhothorax</i>	red-chested button-quail		C		3
animals	birds	Tytonidae	<i>Tyto javanica</i>	eastern barn owl		C		1
animals	mammals	Bovidae	<i>Bos taurus</i>	European cattle	Y			5
animals	mammals	Canidae	<i>Vulpes vulpes</i>	red fox	Y			1
animals	mammals	Canidae	<i>Canis lupus dingo</i>	dingo				3
animals	mammals	Canidae	<i>Canis lupus familiaris</i>	dog	Y			1
animals	mammals	Dasyuridae	<i>Planigale maculata</i>	common planigale		C		2
animals	mammals	Emballonuridae	<i>Saccolaimus flaviventris</i>	yellow-bellied sheath-tail bat		C		1
animals	mammals	Emballonuridae	<i>Taphozous troughoni</i>	Troughton's sheath-tail bat		C		1
animals	mammals	Felidae	<i>Felis catus</i>	cat	Y			4
animals	mammals	Leporidae	<i>Oryctolagus cuniculus</i>	rabbit	Y			6
animals	mammals	Leporidae	<i>Lepus europaeus</i>	European brown hare	Y			1
animals	mammals	Macropodidae	<i>Macropus agilis</i>	agile wallaby		C		5
animals	mammals	Macropodidae	<i>Petrogale herberti</i>	Herbert's rock-wallaby		C		3
animals	mammals	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo		C		5
animals	mammals	Macropodidae	<i>Wallabia bicolor</i>	swamp wallaby		C		2
animals	mammals	Macropodidae	<i>Macropus parryi</i>	whiptail wallaby		C		5
animals	mammals	Molossidae	<i>Chaerephon jobensis</i>	northern freetail bat		C		1
animals	mammals	Molossidae	<i>Mormopterus beccarii</i>	Beccari's freetail bat		C		1
animals	mammals	Molossidae	<i>Mormopterus loriae ridei</i>	little north-eastern freetail bat		C		1

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animals	mammals	Molossidae	<i>Tadarida australis</i>	white-striped freetail bat		C		1
animals	mammals	Muridae	<i>Hydromys chrysogaster</i>	water rat		C		2
animals	mammals	Muridae	<i>Pseudomys delicatulus</i>	delicate mouse		C		1
animals	mammals	Muridae	<i>Melomys cervinipes</i>	fawn-footed melomys		C		1
animals	mammals	Muridae	<i>Zyzomys argurus</i>	common rock-rat		C		1
animals	mammals	Muridae	<i>Mus musculus</i>	house mouse	Y			6
animals	mammals	Muridae	<i>Melomys burtoni</i>	grassland melomys		C		1
animals	mammals	Peramelidae	<i>Isodon macrourus</i>	northern brown bandicoot		C		5
animals	mammals	Petauridae	<i>Petaurus norfolcensis</i>	squirrel glider		C		1
animals	mammals	Phalangeridae	<i>Trichosurus vulpecula</i>	common brushtail possum		C		2
animals	mammals	Potoroidae	<i>Aepyprymnus rufescens</i>	rufous bettong		C		2
animals	mammals	Pseudocheiridae	<i>Petauroides volans</i>	greater glider		C		3
animals	mammals	Pteropodidae	<i>Pteropus alecto</i>	black flying-fox		C		2
animals	mammals	Rhinolophidae	<i>Rhinolophus megaphyllus</i>	eastern horseshoe-bat		C		1
animals	mammals	Tachyglossidae	<i>Tachyglossus aculeatus</i>	short-beaked echidna		C		5
animals	mammals	Vespertilionidae	<i>Vespadelus troughtoni</i>	eastern cave bat		C		1
animals	mammals	Vespertilionidae	<i>Miniopterus schreibersii oceanensis</i>	eastern bent-wing bat		C		3
animals	mammals	Vespertilionidae	<i>Scotorepens sp.</i>					4
animals	mammals	Vespertilionidae	<i>Nyctophilus sp.</i>					1
animals	mammals	Vespertilionidae	<i>Myotis macropus</i>	large-footed myotis		C		3
animals	mammals	Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's wattled bat		C		4
animals	mammals	Vespertilionidae	<i>Chalinolobus morio</i>	chocolate wattled bat		C		2
animals	mammals	Vespertilionidae	<i>Miniopterus australis</i>	little bent-wing bat		C		4
animals	mammals	Vespertilionidae	<i>Scotorepens balstoni</i>	inland broad-nosed bat		C		1
animals	mammals	Vespertilionidae	<i>Chalinolobus nigrogriseus</i>	hoary wattled bat		C		3
animals	ray-finned fishes	Ambassidae	<i>Ambassis agassizii</i>	Agassiz's glassfish				9
animals	ray-finned fishes	Anguillidae	<i>Anguilla reinhardtii</i>	longfin eel				1
animals	ray-finned fishes	Apogonidae	<i>Glossamia aprion</i>	mouth almighty				8/1
animals	ray-finned fishes	Ariidae	<i>Neoarius graeffei</i>	blue catfish				1
animals	ray-finned fishes	Atherinidae	<i>Craterocephalus stercusmuscarum</i>	flyspecked hardyhead				12
animals	ray-finned fishes	Belonidae	<i>Strongylura krefftii</i>	freshwater longtom				1
animals	ray-finned fishes	Clupeidae	<i>Nematalosa erebi</i>	bony bream				7
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris klunzingeri</i>	western carp gudgeon				3
animals	ray-finned fishes	Eleotridae	<i>Philypnodon grandiceps</i>	flathead gudgeon				1
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris compressa</i>	empire gudgeon				1
animals	ray-finned fishes	Eleotridae	<i>Oxyeleotris lineolata</i>	sleepy cod				1
animals	ray-finned fishes	Eleotridae	<i>Mogurnda adspersa</i>	southern purplespotted gudgeon				1
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris galii</i>	firetail gudgeon				3
animals	ray-finned fishes	Melanotaeniidae	<i>Melanotaenia splendida splendida</i>	eastern rainbowfish				11/1
animals	ray-finned fishes	Plotosidae	<i>Neosilurus hyrtlii</i>	Hyrtl's catfish				4
animals	ray-finned fishes	Terapontidae	<i>Amniataba percoides</i>	barred grunter				7
animals	ray-finned fishes	Terapontidae	<i>Leiopotherapon unicolor</i>	spangled perch				8
animals	reptiles	Agamidae	<i>Intellagama lesueurii</i>	eastern water dragon		C		2
animals	reptiles	Agamidae	<i>Pogona barbata</i>	bearded dragon		C		3
animals	reptiles	Agamidae	<i>Diporiphora australis</i>			C		2
animals	reptiles	Carphodactylidae	<i>Nephrurus asper</i>	spiny knob-tailed gecko		C		1

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animals	reptiles	Chelidae	<i>Emydura macquarii krefftii</i>	Krefft's river turtle		C		5
animals	reptiles	Colubridae	<i>Dendrelaphis punctulata</i>	common tree snake		C		2
animals	reptiles	Colubridae	<i>Boiga irregularis</i>	brown tree snake		C		2
animals	reptiles	Diplodactylidae	<i>Lucasium steindachneri</i>	Steindachner's gecko		C		1
animals	reptiles	Diplodactylidae	<i>Diplodactylus vittatus</i>	wood gecko		C		1
animals	reptiles	Diplodactylidae	<i>Amalosia rhombifer</i>	zig-zag gecko		C		2
animals	reptiles	Elapidae	<i>Furina ornata</i>	orange-naped snake		C		2
animals	reptiles	Elapidae	<i>Pseudonaja textilis</i>	eastern brown snake		C		1
animals	reptiles	Elapidae	<i>Demansia psammophis</i>	yellow-faced whip snake		C		2
animals	reptiles	Gekkonidae	<i>Gehyra dubia</i>			C		2
animals	reptiles	Gekkonidae	<i>Gehyra catenata</i>			C		1
animals	reptiles	Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's gecko		C		7
animals	reptiles	Pygopodidae	<i>Delma tincta</i>			C		2
animals	reptiles	Pygopodidae	<i>Paradelma orientalis</i>	brigalow scaly-foot		V		2
animals	reptiles	Scincidae	<i>Glaphyromorphus punctulatus</i>			C		1
animals	reptiles	Scincidae	<i>Carlia pectoralis sensu lato</i>			C		2
animals	reptiles	Scincidae	<i>Cryptoblepharus pulcher pulcher</i>	elegant snake-eyed skink		C		1
animals	reptiles	Scincidae	<i>Cryptoblepharus virgatus sensu lato</i>			C		6
animals	reptiles	Scincidae	<i>Cryptoblepharus metallicus</i>	metallic snake-eyed skink		C		3
animals	reptiles	Scincidae	<i>Cryptoblepharus australis</i>	inland snake-eyed skink		C		1
animals	reptiles	Scincidae	<i>Morethia taeniopleura</i>	fire-tailed skink		C		5
animals	reptiles	Scincidae	<i>Eulamprus brachysoma</i>			C		1
animals	reptiles	Scincidae	<i>Ctenotus taeniolatus</i>	copper-tailed skink		C		4
animals	reptiles	Scincidae	<i>Lygisaurus foliorum</i>			C		8
animals	reptiles	Scincidae	<i>Eulamprus martini</i>			C		1
animals	reptiles	Scincidae	<i>Ctenotus robustus</i>			C		5
animals	reptiles	Scincidae	<i>Carlia schmeltzii</i>			C		8
animals	reptiles	Scincidae	<i>Lerista fragilis</i>			C		2
animals	reptiles	Scincidae	<i>Eulamprus tenuis</i>			C		1
animals	reptiles	Scincidae	<i>Eulamprus quoyii</i>	eastern water skink		C		1
animals	reptiles	Scincidae	<i>Menetia timlowi</i>			C		4
animals	reptiles	Scincidae	<i>Menetia greyii</i>			C		3
animals	reptiles	Scincidae	<i>Carlia vivax</i>			C		2
animals	reptiles	Scincidae	<i>Carlia munda</i>			C		5
animals	reptiles	Typhlopidae	<i>Ramphotyphlops sp.</i>					1
plants	cycads	Cycadaceae	<i>Cycas megacarpa</i>			E	E	4/1
plants	higher dicots	Aizoaceae	<i>Trianthema portulacastrum</i>	black pigweed	Y			1/1
plants	higher dicots	Anacardiaceae	<i>Euroschinus falcatus</i>			C		3
plants	higher dicots	Anacardiaceae	<i>Pleiogynium timorense</i>	Burdekin plum		C		3
plants	higher dicots	Apocynaceae	<i>Alstonia constricta</i>	bitterbark		C		2
plants	higher dicots	Apocynaceae	<i>Alyxia ruscifolia</i>			C		4
plants	higher dicots	Apocynaceae	<i>Marsdenia viridiflora subsp. viridiflora</i>			C		1/1
plants	higher dicots	Apocynaceae	<i>Cryptostegia grandiflora</i>	rubber vine	Y			6/1
plants	higher dicots	Apocynaceae	<i>Parsonsia straminea</i>	monkey rope		C		1
plants	higher dicots	Apocynaceae	<i>Carissa ovata</i>	currantbush		C		1
plants	higher dicots	Apocynaceae	<i>Secamone elliptica</i>			C		2

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plants	higher dicots	Asteraceae	<i>Synedrellopsis grisebachii</i>		Y			1/1
plants	higher dicots	Asteraceae	<i>Cassinia laevis</i>			C		1
plants	higher dicots	Bignoniaceae	<i>Pandorea pandorana</i>	wonga vine		C		1
plants	higher dicots	Boraginaceae	<i>Ehretia membranifolia</i>	weeping koda		C		3
plants	higher dicots	Cactaceae	<i>Opuntia stricta</i>		Y			1
plants	higher dicots	Capparaceae	<i>Capparis canescens</i>			C		3
plants	higher dicots	Capparaceae	<i>Capparis lasiantha</i>	nipan		C		1
plants	higher dicots	Capparaceae	<i>Apophyllum anomalum</i>	broom bush		C		2
plants	higher dicots	Casuarinaceae	<i>Casuarina cunninghamiana</i>			C		1
plants	higher dicots	Celastraceae	<i>Elaeodendron melanocarpum</i>			C		1
plants	higher dicots	Celastraceae	<i>Denhamia pittosporoides</i>			C		1
plants	higher dicots	Celastraceae	<i>Denhamia oleaster</i>			C		2
plants	higher dicots	Celastraceae	<i>Maytenus disperma</i>	orange boxwood		C		3
plants	higher dicots	Celastraceae	<i>Siphonodon australis</i>	ivorywood		C		3
plants	higher dicots	Celastraceae	<i>Elaeodendron australe</i>			C		1
plants	higher dicots	Celastraceae	<i>Maytenus cunninghamii</i>	yellow berry bush		C		2
plants	higher dicots	Chenopodiaceae	<i>Enchylaena</i>			C		2
plants	higher dicots	Chenopodiaceae	<i>Sclerolaena birchii</i>	galvanised burr		C		1/1
plants	higher dicots	Ebenaceae	<i>Diospyros humilis</i>	small-leaved ebony		C		1
plants	higher dicots	Ebenaceae	<i>Diospyros geminata</i>	scaly ebony		C		5
plants	higher dicots	Erythroxylaceae	<i>Erythroxylum australe</i>	cocaine tree		C		1
plants	higher dicots	Euphorbiaceae	<i>Croton insularis</i>	Queensland cascarilla		C		1
plants	higher dicots	Euphorbiaceae	<i>Ricinus communis</i>	castor oil bush	Y			1/1
plants	higher dicots	Euphorbiaceae	<i>Mallotus philippensis</i>	red kamala		C		2
plants	higher dicots	Fabaceae	<i>Clitoria ternatea</i>	butterfly pea	Y			1/1
plants	higher dicots	Fabaceae	<i>Indigofera tinctoria</i>		Y			1/1
plants	higher dicots	Fabaceae	<i>Macroptilium lathyroides</i> var. <i>semierectum</i>		Y			1/1
plants	higher dicots	Fabaceae	<i>Crotalaria pallida</i> var. <i>obovata</i>		Y			2/2
plants	higher dicots	Fabaceae	<i>Erythrina vespertilio</i>			C		4
plants	higher dicots	Fabaceae	<i>Desmodium macrocarpum</i>			NT		1/1
plants	higher dicots	Lamiaceae	<i>Ocimum americanum</i> var. <i>americanum</i>		Y			1/1
plants	higher dicots	Lecythidaceae	<i>Planchonia careya</i>	cockatoo apple		C		3
plants	higher dicots	Malvaceae	<i>Hibiscus heterophyllus</i>			C		3
plants	higher dicots	Malvaceae	<i>Abutilon oxycarpum</i>			C		1
plants	higher dicots	Malvaceae	<i>Sida cordifolia</i>		Y			1/1
plants	higher dicots	Martyniaceae	<i>Martynia annua</i>	small-fruited devil's claw	Y			2/2
plants	higher dicots	Meliaceae	<i>Turraea pubescens</i>	native honeysuckle		C		4
plants	higher dicots	Mimosaceae	<i>Acacia salicina</i>	doolan		C		3
plants	higher dicots	Mimosaceae	<i>Acacia fasciculifera</i>	scaly bark		C		4
plants	higher dicots	Mimosaceae	<i>Vachellia bidwillii</i>			C		3
plants	higher dicots	Mimosaceae	<i>Acacia decora</i>	pretty wattle		C		2
plants	higher dicots	Mimosaceae	<i>Desmanthus pernambucanus</i>		Y			1/1
plants	higher dicots	Mimosaceae	<i>Albizia lebbek</i>	Indian siris		C		1
plants	higher dicots	Mimosaceae	<i>Acacia polifolia</i>			C		1/1
plants	higher dicots	Mimosaceae	<i>Acacia rhodoxylon</i>	ringy rosewood		C		1
plants	higher dicots	Mimosaceae	<i>Acacia aulacocarpa</i>			C		3

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plants	higher dicots	Mimosaceae	<i>Acacia harpophylla</i>	brigalow		C		1
plants	higher dicots	Moraceae	<i>Ficus obliqua</i>			C		1
plants	higher dicots	Moraceae	<i>Trophis scandens subsp. scandens</i>			C		2
plants	higher dicots	Moraceae	<i>Ficus opposita</i>			C		4
plants	higher dicots	Myrtaceae	<i>Melaleuca fluviatilis</i>			C		1
plants	higher dicots	Myrtaceae	<i>Corymbia erythrophloia</i>	variable-barked bloodwood		C		3
plants	higher dicots	Myrtaceae	<i>Eucalyptus raveretiana</i>	black ironbox		V	V	2/1
plants	higher dicots	Myrtaceae	<i>Melaleuca linariifolia</i>	snow-in summer		C		1
plants	higher dicots	Myrtaceae	<i>Eucalyptus melanophloia</i>			C		5
plants	higher dicots	Myrtaceae	<i>Eucalyptus tereticornis</i>			C		1
plants	higher dicots	Myrtaceae	<i>Eucalyptus crebra</i>	narrow-leaved red ironbark		C		5
plants	higher dicots	Myrtaceae	<i>Melaleuca nervosa</i>			C		1
plants	higher dicots	Myrtaceae	<i>Syzygium australe</i>	scrub cherry		C		1
plants	higher dicots	Myrtaceae	<i>Eucalyptus exserta</i>	Queensland peppermint		C		1
plants	higher dicots	Myrtaceae	<i>Corymbia intermedia</i>	pink bloodwood		C		4
plants	higher dicots	Myrtaceae	<i>Melaleuca bracteata</i>			C		1
plants	higher dicots	Myrtaceae	<i>Corymbia dallachiana</i>			C		3
plants	higher dicots	Myrtaceae	<i>Corymbia tessellaris</i>	Moreton Bay ash		C		2
plants	higher dicots	Oleaceae	<i>Jasminum didymum</i>			C		2
plants	higher dicots	Oleaceae	<i>Jasminum simplicifolium</i>					3
plants	higher dicots	Passifloraceae	<i>Passiflora foetida</i>		Y			1/1
plants	higher dicots	Phyllanthaceae	<i>Bridelia leichhardtii</i>			C		3
plants	higher dicots	Phyllanthaceae	<i>Flueggea leucopyrus</i>			C		2
plants	higher dicots	Phyllanthaceae	<i>Glochidion lobocarpum</i>			C		1
plants	higher dicots	Phyllanthaceae	<i>Breynia oblongifolia</i>			C		3
plants	higher dicots	Picrodendraceae	<i>Petalostigma pubescens</i>	quinine tree		C		3
plants	higher dicots	Pittosporaceae	<i>Pittosporum ferrugineum</i>			C		1
plants	higher dicots	Pittosporaceae	<i>Bursaria incana</i>			C		1
plants	higher dicots	Pittosporaceae	<i>Pittosporum spinescens</i>			C		4
plants	higher dicots	Putranjivaceae	<i>Drypetes deplanchei</i>	grey boxwood		C		4
plants	higher dicots	Rhamnaceae	<i>Alphitonia excelsa</i>	soap tree		C		5
plants	higher dicots	Rubiaceae	<i>Spermacoce brachystema</i>			C		1/1
plants	higher dicots	Rubiaceae	<i>Psydrax odorata</i>			C		2
plants	higher dicots	Rubiaceae	<i>Psydrax longipes</i>			C		1/1
plants	higher dicots	Rubiaceae	<i>Pogonolobus reticulatus</i>			C		2
plants	higher dicots	Rubiaceae	<i>Cyclophyllum coprosmoides</i>			C		1
plants	higher dicots	Rubiaceae	<i>Pavetta australiensis var. australiensis</i>			C		1
plants	higher dicots	Rutaceae	<i>Geijera salicifolia</i>	brush wilga		C		4
plants	higher dicots	Rutaceae	<i>Micromelum minutum</i>	clusterberry		C		1
plants	higher dicots	Rutaceae	<i>Zanthoxylum brachyacanthum</i>			C		1
plants	higher dicots	Santalaceae	<i>Exocarpos latifolius</i>			C		1
plants	higher dicots	Santalaceae	<i>Santalum lanceolatum</i>			C		3
plants	higher dicots	Sapindaceae	<i>Cupaniopsis anacardioides</i>	tuckeroo		C		4
plants	higher dicots	Sapindaceae	<i>Elattostachys xylocarpa</i>	white tamarind		C		2
plants	higher dicots	Sapindaceae	<i>Alectryon diversifolius</i>	scrub boonaree		C		1
plants	higher dicots	Sapindaceae	<i>Atalaya hemiglauca</i>			C		2

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plants	higher dicots	Sapindaceae	<i>Harpullia pendula</i>			C		1
plants	higher dicots	Sapindaceae	<i>Alectryon connatus</i>	grey birds-eye		C		1
plants	higher dicots	Scrophulariaceae	<i>Myoporum acuminatum</i>	coastal boobialla		C		2/1
plants	higher dicots	Sparrmanniaceae	<i>Grewia latifolia</i>	dysentery plant		C		5
plants	higher dicots	Sterculiaceae	<i>Brachychiton australis</i>	broad-leaved bottle tree		C		3
plants	higher dicots	Sterculiaceae	<i>Brachychiton rupestris</i>			C		1
plants	higher dicots	Ulmaceae	<i>Trema tomentosa</i> var. <i>aspera</i>			C		1
plants	higher dicots	Verbenaceae	<i>Lantana montevidensis</i>	creeping lantana	Y			2
plants	higher dicots	Verbenaceae	<i>Glandularia aristigera</i>		Y			1/1
plants	higher dicots	Verbenaceae	<i>Stachytarpheta cayennensis</i>		Y			1/1
plants	higher dicots	Verbenaceae	<i>Lantana camara</i>	lantana	Y			4/1
plants	higher dicots	Vitaceae	<i>Cissus oblonga</i>			C		1
plants	higher dicots	Vitaceae	<i>Clematicissus opaca</i>			C		3
plants	lower dicots	Lauraceae	<i>Cryptocarya triplinervis</i>			C		1
plants	monocots	Asparagaceae	<i>Asparagus racemosus</i>	native asparagus		C		1/1
plants	monocots	Hemerocallidaceae	<i>Dianella</i>			C		2
plants	monocots	Hemerocallidaceae	<i>Geitonoplesium cymosum</i>	scrambling lily		C		2
plants	monocots	Laxmanniaceae	<i>Eustrephus latifolius</i>	wombat berry		C		1
plants	monocots	Laxmanniaceae	<i>Lomandra longifolia</i>			C		3
plants	monocots	Poaceae	<i>Digitaria bicornis</i>			C		1/1
plants	monocots	Poaceae	<i>Enneapogon gracilis</i>	slender nineawn		C		1/1
plants	monocots	Poaceae	<i>Tragus australianus</i>	small burr grass		C		1
plants	monocots	Poaceae	<i>Cymbopogon refractus</i>	barbed-wire grass		C		3
plants	monocots	Poaceae	<i>Enneapogon avenaceus</i>			C		1
plants	monocots	Poaceae	<i>Eragrostis alveiformis</i>			C		1/1
plants	monocots	Poaceae	<i>Urochloa mosambicensis</i>	sabi grass	Y			1/1
plants	monocots	Poaceae	<i>Megathyrsus maximus</i> var. <i>maximus</i>		Y			1/1
plants	monocots	Poaceae	<i>Megathyrsus maximus</i> var. <i>coloratus</i>		Y			1/1
plants	monocots	Poaceae	<i>Megathyrsus maximus</i> var. <i>pubiglumis</i>		Y			1/1
plants	monocots	Poaceae	<i>Chloris pectinata</i>	comb chloris		C		1/1
plants	monocots	Poaceae	<i>Cenchrus setaceus</i>		Y			1
plants	monocots	Poaceae	<i>Aristida contorta</i>	bunched kerosene grass		C		2
plants	monocots	Poaceae	<i>Themeda triandra</i>	kangaroo grass		C		3
plants	monocots	Poaceae	<i>Chloris gayana</i>	rhodes grass	Y			1/1
plants	monocots	Poaceae	<i>Aristida spuria</i>			C		1/1
plants	monocots	Xanthorrhoeaceae	<i>Xanthorrhoea johnsonii</i>			C		1
plants	monocots	Xanthorrhoeaceae	<i>Xanthorrhoea latifolia</i> subsp. <i>latifolia</i>			C		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 D

Protected Matters Search Tool Report





Appendix D

Protected Matters Search Tool Report



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: 25/03/14 16:25:25

[Summary](#)

[Details](#)

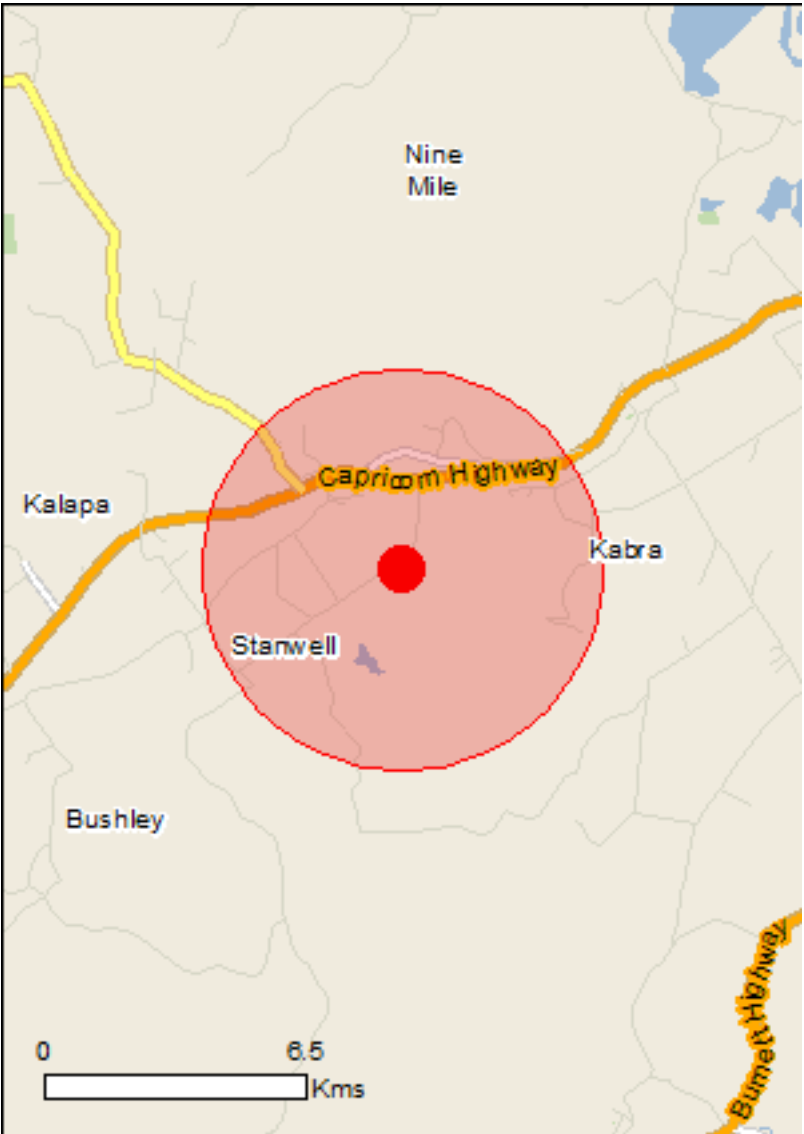
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

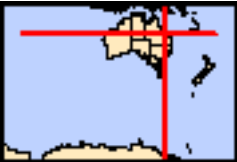
[Acknowledgements](#)



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

[Buffer: 5.0Km](#)



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 Areas:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	21
Listed Migratory Species:	14

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 and the heritage values of a place on the Register of the National Estate.

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.

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:	16
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine	None

Extra Information

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

Place on the RNE:	None
State and Territory Reserves:	2
Regional Forest Agreements:	None
Invasive Species:	31
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
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community may occur within area
Weeping Myall Woodlands	Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Erythrotriorchis radiatus		
Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Geophaps scripta scripta		
Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat known to occur within area
Neochmia ruficauda ruficauda		
Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
Poephila cincta cincta		
Black-throated Finch (southern) [64447]	Endangered	Species or species habitat likely to occur within area
Rostratula australis		
Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Turnix melanogaster		
Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat may occur within area
Dasyurus hallucatus Northern Quoll [331]	Endangered	Species or species habitat known to occur within area
Nyctophilus corbeni South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may 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 may occur within area
Other		
Cycas megacarpa [55794]	Endangered	Species or species habitat known to occur within area
Cycas ophiolitica [55797]	Endangered	Species or species habitat likely to occur within area
Plants		
Bulbophyllum globuliforme Miniature Moss-orchid, Hoop Pine Orchid [6649]	Vulnerable	Species or species habitat likely to occur within area
Cossinia australiana Cossinia [3066]	Endangered	Species or species habitat likely to occur within area
Eucalyptus raveretiana Black Ironbox [16344]	Vulnerable	Species or species habitat likely to occur within area
Streblus pendulinus Siah's Backbone, Sia's Backbone, Isaac Wood [21618]	Endangered	Species or species habitat may occur within area
Reptiles		
Delma torquata Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
Denisonia maculata Ornamental Snake [1193]	Vulnerable	Species or species habitat may occur within area
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Rheodytes leukops Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver [1761]	Vulnerable	Species or species habitat may 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 Marine Species		

Name	Threatened	Type of Presence
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		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
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	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		
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

Name	Threatened	Type of Presence
		within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		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 known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Reptiles		
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves		[Resource Information]
Name		State
Rainbow Mountain		QLD
Stanwell Power Station		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
Anas platyrhynchos Mallard [974]		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
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
Bufo marinus Cane Toad [1772]		Species or species habitat likely to occur within area
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
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
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur

Name	Status	Type of Presence
		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
Rattus rattus Black Rat, Ship Rat [84]		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		
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		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
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		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
Prosopis spp. Mesquite, Algaroba [68407]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area
Reptiles		

Name	Status	Type of Presence
Hemidactylus frenatus		
Asian House Gecko [1708]		Species or species habitat likely to occur within area

Coordinates

-23.50127 150.34398

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 Heritage and Register of National Estate properties, Wetlands of International 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.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

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.

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:

- [Department of Environment, Climate Change and Water, New South Wales](#)
- [Department of Sustainability and Environment, Victoria](#)
- [Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [Department of Environment and Natural Resources, South Australia](#)
- [Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts](#)
- [Environmental and Resource Management, Queensland](#)
- [Department of Environment and Conservation, Western Australia](#)
- [Department of the Environment, Climate Change, Energy and Water](#)
- [Birds Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [Museum Victoria](#)
- [Australian Museum](#)
- [SA 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, Atherton and Canberra](#)
- [University of New England](#)
- [Ocean Biogeographic Information System](#)
- [Australian Government, Department of Defence](#)
- [State Forests of NSW](#)
- [Geoscience Australia](#)
- [CSIRO](#)
- 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 E

Detailed CVs of survey personnel





Appendix E

Detailed CVs of survey personnel



Qualifications

Bachelor of Environmental
Science (Conservation
Ecology)

Specialisation

Flora and fauna ecology
Environmental impact
assessment
Licenced Spotter Catcher

Years in industry

13

Sandra Walters Senior Ecologist

Sandra joined Aurecon from the Queensland Department of Environment and Resource Management (DERM) and has extensive experience in fauna and flora survey, natural resource management, fire management systems, pest animal management, and Indigenous cultural heritage management. At DERM Sandra was a Conservation Officer and co-ordinated the 2010 survey of the Proserpine Rock Wallaby population on Hayman Island. As a casual field ecologist with Bush Heritage Australia, Sandra implemented a small mammal recovery assessment of Carnarvon Station Reserve, while undertaking a broad range of natural resource management activities.

Role on the Capricorn Stone Ecological Assessment

Sandra was the Project Leader in the Capricorn Stone Ecological Assessment. She authored the Ecological Assessment Report and led the field survey. Sandra has 12 years' experience in the identification of Queensland flora, including threatened (endangered, vulnerable and near-threatened species) with formal training including BioCondition, Queensland Land Zones, and Rainforest Plant Identification. Sandra has extensive experience in fauna survey methodology and implementation, having led a range of range of projects over the past 13 years. She is a licenced Spotter Catcher and has formal training in the handling of venomous snakes.

Project experience

March 2011 to Present
Aurecon Australasia Pty Ltd
Mackay QLD
Environmental Scientist

- Preparation, planning and implementation of flora and fauna surveys across Queensland in a range of landscapes, in accordance with DSEWPaC's Survey Guidelines for Australia's threatened mammals, frogs, bats, reptiles, birds and fish and DSITIA's Terrestrial Vertebrate Fauna Survey Guidelines for Queensland
- Ecological assessment and fauna survey associated with the Dysart Road realignment, Central Queensland
- EPBC Referral Self-Assessments for numerous projects, including the Dysart Road realignment, Goyder River Crossing and road realignment, and

West Funnel Creek Bridge
Replacement

- Preparation, submission and subsequent approval of Species Management Programs under the *Nature Conservation Act 1992* across a range of projects, including Mackay Regional Council's Milton Street Drain and West Funnel Creek Bridge Replacement
- Independent review of Construction Environmental Management Plans (CEMPs)
- Habitat assessment and fauna survey associated with the Wiggins Island Coal Export Terminal (WICET) project, Gladstone, including trapping and radio-tracking of the EPBC-listed 'vulnerable' water mouse *Xeromys myoides*
- Habitat assessment, flora survey, and targeted surveys of platypus and EPBC-

Sandra Walters Senior Ecologist

listed fauna species for the West Funnel Creek Bridge Replacement (Mackay Regional Council)

- Implementation and reporting of flora and fauna surveys associated with Santos' 'water to grade' pipeline project in the Fairview and Roma gas fields, including the identification and mapping of listed Threatened Ecological Communities (TECs) under the EPBC Act
- Ecological assessment, flora survey, terrestrial vertebrate fauna survey, aquatic macroinvertebrate sampling (AUSRIVAS) and freshwater fish surveys (netting and electrofishing) of Goyder River Crossing and road realignment, Arnhemland, Northern Territory
- Fauna habitat assessments and impact mitigation advice of waterway crossings within the Santos GLNG Fairview Gas Fields, including targeted survey for Platypus (*Ornithorhynchus anatinus*) in Hutton Creek and Christmas Creek
- Preparation and submission of Clearing Permit Applications to (the former) DERM where remnant vegetation exists in proposed development areas of the Santos GLNG Fairview and Roma Gas Fields
- Preparation and submission of Regional Ecosystem Amendment Reports where the certified Regional Ecosystem Mapping is erroneous
- Preparation of GLNG Transmission Pipeline Pest Animal Management Plan
- Preparation of GLNG Fairview and Roma Species Management Program
- Preparation of the GLNG Gas Transmission Pipeline Water Mouse (*Xeromys myoides*) Management Plan
- Preparation of WICET Fauna Relocation Monitoring Plan
- Provision of licenced Spotter Catcher services on construction projects for a range of clients across Queensland

July 2010 to March 2011

Department of Environment and Resource Management, Airlie Beach QLD

Conservation Officer, Queensland Parks and Wildlife Service

Projects:

Proserpine Rock Wallaby (*Petrogale persephone*) Survey of Hayman Island

- Co-ordinate, supervise and implement the Proserpine Rock-Wallaby Monitoring Program on Hayman Island (a specific objective of the National Recovery Plan for the species, listed nationally as 'endangered' under the EPBC Act)

Conway Visitor Management Strategy

- Project-manage the development of a strategic direction for the management of visitation in the mainland protected area estate of the Whitsunday District. Outputs included authoring the Conway Visitor Management Strategy 2011-2016

Other responsibilities of the role

- Identify threatening processes within the region, including those relating to fire and weeds, and provide advice to departmental natural resource managers in managing those threats
- Undertake and report on environmental impact assessment of proposed activities and development within the protected area estate
- Advise the department on potential ecological impacts relating to commercial activity permits within the protected area estate
- Assess and condition development applications that are referred under the *Environment Protection Act 1994* and *Nature Conservation Act 1992*
- Liaise with and provide advice to stakeholders regarding threatened species management, including local community members, federal, state and local government departments and non-government conservation organisations (e.g. WWF)

Sandra Walters Senior Ecologist

July 2009 to July 2010

**The Reserve Group, Airlie Beach,
Queensland**

**Client Liaison and Administration
Officer**

- Advise, liaise, consult and negotiate with Reserve Group clients on accounts payable, human resources and workplace health and safety issues

2005 to 2009

**Bush Heritage Australia, Carnarvon
Station Reserve, Queensland**

**Casual field ecologist and natural
resource officer**

Duties:

- Work collaboratively with pastoral neighbours across a broad range of natural resource management activities, including prescribed burning (infrastructure protection and ecological burns), wildfire response, stock control, pest species control, soil conservation and infrastructure maintenance (e.g. repair and upgrade of boundary fences)
- Co-ordination of bi-annual fauna surveys including pitfall, Elliott, cage and funnel trapping of small mammals, reptiles and invertebrates; bird transects; spotlighting and call playback for arboreal mammals, birds and frogs
- Use of infrared camera equipment for detecting cryptic species, including two species previously unrecorded on the reserve (EPBC-listed 'endangered' Northern Quoll (*Dasyurus hallucatus*) and the cryptic Eastern Pebble-mound Mouse (*Pseudomys patrius*)
- Analysis of fauna survey data using Microsoft Excel
- Monitoring of habitat condition of natural freshwater springs across the reserve, using rapid assessment techniques
- Vegetation surveys of grassland habitats using line transects and basal area measurements of trees to investigate woodland thickening
- Feral animal control using a range of methods, including firearms and traps
- Fire management, including prescribed burning, fire planning and fire mapping using ArcView

- Interpretation of the reserve's conservation values for visitation, including preparation of and contribution to printed material
- Engagement in fundraising activities during visitation to the reserve by potential and existing financial supporters
- Various practical natural resource management actions, including fencing, soil conservation works and weed control
- Maintenance of Royal Flying Doctor Service (RFDS) emergency equipment
- Participation in Cultural Heritage Workshops with local Indigenous Bidjara people, involving the identification and recording of Indigenous cultural sites of significance on Carnarvon Station Reserve and engaging the Bidjara people regarding the protection and management of those sites

2003 to 2005

**Watarrka National Park, Northern
Territory, Australia**

**Parks and Wildlife Service Northern
Territory
(Volunteer/casual)**

Duties:

- Assist with censuses of captive populations of the EPBC-listed 'endangered' Rufous Hare Wallaby (Mala), *Lagorchestes hirsutus unnamed subspecies*
- Participate in research into the EPBC-listed 'endangered' Southern Marsupial Mole and Northern Marsupial Mole (*Notoryctes typhlops* and *Notoryctes caurinus*, respectively) including estimates of distribution and abundance
- Undertake rotary wing aerial surveys of Buffel grass (*Cenchrus ciliaris*) abundance and distribution
- Provide field support in archaeological recording of the rock engravings at Wanga, Watarrka National Park
- Provide field support in an archaeological study of the Glen Thirsty cultural site in Central Australia

Sandra Walters Senior Ecologist

- Assist with response to medical emergencies on Kings Canyon walking trails and road accidents on the Luritja Highway
- Participate in prescribed burning activities within Watarrka National Park and Kings Canyon Resort
- Weather Observer, Bureau of Meteorology (BOM), Watarrka Weather Station, Northern Territory, Australia
- Tour Guide, Australian Pacific Tours, Kings Canyon, Northern Territory, Australia
- Slide show presenter, Kings Canyon Resort, Watarrka National Park, Northern Territory, Australia

2001 to 2003

Gregory National Park, Northern Territory, Australia
Parks and Wildlife Service Northern Territory
Volunteer

Duties:

- Participate in quarterly fauna surveys, including pitfall and Elliott trapping for small mammals and reptiles
- Assist with bird research through mist netting for the EPBC-listed 'vulnerable' Purple-crowned fairy wren, *Malurus coronatus coronatus*, in the Victoria River District
- Four wheel drive track maintenance
- Participate in the annual Devil's Claw (*Martynia annual*) control program with volunteers and local Ngaliwurru Indigenous community members
- Conduct prescribed burning and participate in wildfire response

Training and qualifications

- Bachelor of Environmental Science (Conservation Ecology) (Charles Sturt University) awarded with Distinction 2009
- BioCondition Methodology training (Queensland Herbarium) completed 18 October 2011
- Queensland Land Zones training (Queensland Herbarium) completed 24 May 2013
- Rainforest Plant Identification Course (Australian Tropical Herbarium/Wet Tropics Management Authority) completed 1 December 2013
- Licenced Spotter Catcher – Rehabilitation Permit WIRP10507611 current to 12 May 2015
- Venomous snake handling course (Blackadder Reptiles) completed 10 May 2011



Rachel Hackett Environmental Scientist

Rachel is an Environmental Scientist and Ecologist with Aurecon's Environment and Advisory Team in Mackay. She has 3 years' experience and in that time has been involved in ecological assessments including both flora and fauna surveys; and has helped produce environmental management plans and various environmental approvals for transport, coal seam gas, mining and civil infrastructure projects across Queensland. Rachel has experience in targeted flora and fauna surveys, environmental auditing, environmental sampling and monitoring for a wide range of projects.

Qualifications

Bachelor of Environmental Management (Natural Systems & Wildlife) (Honours)

Specialisation

Environmental Management Ecology
Environmental auditing and monitoring
Environmental impact assessment and approvals

Professional Memberships

Environment Institute of Australia and New Zealand (EIANZ)

Years in industry

3

Role on the Capricorn Stone Ecological Assessment

Rachel was a contributing ecologist in the Capricorn Stone Ecological Assessment. She co-authored the Ecological Assessment Report and participated in the field survey. Rachel has 3 years' experience in ecological assessments (both flora and fauna), training internally with expert ecologists in BioCondition, Queensland Land Zones and Regional Ecosystem Identification. Rachel has developed legislative knowledge by attending relevant reform information sessions and working on many other projects to determine their legislative requirements. In addition, Rachel has prepared numerous environmental applications for approval from local and state departments, including relevant liaison with the regulating authorities.

Project experience

Australian Defence Force – HMAS Coonawarra

- Contributed to the HMAS Coonawarra Environmental Assessment prepared in December 2013, including assessment of impacts on listed fauna and flora species.

BHP Billiton Braeside Borefields – Ecological Assessment and Approvals

- Conducted targeted flora and fauna survey and produced Ecological Assessment Report which also provided legislative advice. Developed Species Management Program to comply with *Nature Conservation Act 1992* for vegetation clearing and construction.

Mackay Regional Council (MRC) – Milton St Drain Environmental Assessment and Approvals

- Conducted Environmental Assessment (desktop and field surveys) of proposed stormwater drain location and provided legislative advice. Prepared Development Application for Prescribed Tidal Works, and various construction documents for environmental management.

MRC - West Funnel Creek Bridge Replacement

- Assisted with platypus monitoring at West Funnel Creek, and conducted baseline water quality monitoring before construction works. Also reviewed Contractor's Environmental

Rachel Hackett Environmental Scientist

Management Plan for compliance against DEHP requirements.

MRC - Sarina Landfill Environmental Approvals

- Conducted site visit and vegetation/marine plant assessment and developed Marine Plan Project Plan which was approved by DAFF for the Sarina Landfill Remediation works.

Plantation Palms Properties Pty Ltd – Weed Clearing Application

- Conducted vegetation and weed assessment of remnant vegetation and developed weed clearing application for client in endangered regional ecosystem. Approval granted by DNRM with minimal conditions.

Mackay Sugar Ltd – Mackay Harbour Molasses Bladder Facility REF and Environmental Approvals

- Assisted with Review of Environmental Factors desktop and field assessments and produced report to notify client of possible impacts and legislative requirements. Developed Construction Environmental Management Plans for the works, and Site Based Management Plan for an Environmentally Relevant Activity (ERA).

MRC – Glenpark St Bridge Duplication

- Conducted vegetation, marine plant and fauna habitat assessments for the Glenpark St Bridge Duplication which contributed to the Review of Environmental Factors report.

Palmbild – Bushfire Hazard Assessment and Management Plan

- Conducted field assessment of vegetation and bushfire risk for proposed development. Developed Bushfire Hazard Assessment and Management Plan to be submitted with Development Application, which was approved by DNRM and Queensland Rural Fire Services.

MRC – Construction Environmental Management Plan Reviews

- Assist council by reviewing Contractor's Construction Environmental Management Plans for various local projects.

Santos GLNG - Upstream Ecological Assessments

- Involved in ecological assessments within the Fairview and Roma CSG Fields, including desktop and field surveys.

Peabody – Codrill Mine Project

- Environmental Advisor on site to assist with project start up, approvals requirements and on site compliance. Role included environmental audits and air, noise and water monitoring.

BMA - Dysart Road Realignment

- Involved in extensive fauna and flora assessments for application of Property Map of Assessable Vegetation (PMAV) to the Department of Natural Resources and Mines, and also involved in detailed flora and fauna surveys to develop an Ecological Assessment Report for the road realignment.

Transport Network Reconstruction Project (DTMR) – North Coast

- Involved in environmental and cultural heritage desktop risk assessments for flood recovery road works in the North Coast region. Also reviewed contractor's Environmental Management Plans and gained experience in construction environmental auditing and erosion and sediment control on site.

Wiggins Island Coal Export Terminal

- Assisted in various environmental applications and management plans within the Gladstone region, for both terrestrial and marine environments. Involved in preparing IAS and EPBC Referral for client.

Goonyella System Expansion - Acid Sulfate Soils

- Assisted in writing report from Acid Sulfate Soils investigation for rail system expansion.

BMA - Abbot Point Expansion X80 and X110 Ecological Assessment

- Involved in desktop study, initial flora and fauna assessments, compiling of results and writing of initial ecological assessment report. Further studies to be undertaken.



Rachel Hackett Environmental Scientist

Pring GAP 50 Project - Vegetation assessment and clearing application

- Involved in a vegetation assessment and writing of a Vegetation Clearing Application for Coal Stream Alliance under the VM Act, which entailed applying for the clearing of laydown areas to support construction of the QR GAP50 project.

NQBP - Harbour Rail Line Contaminated Site Assessment

- Involved in soil sampling for contaminated land at an old rail line site on Harbour Road, Mackay Port and assisted with reporting.

Norfolk Island Marine Ecological Assessment

- Involved in desktop study for marine assessment, compiling of results and writing of existing environment report.

Career History

August 2012 to Present

Aurecon Mackay office

Environmental Scientist

December 2010 to July 2012

Aurecon Brisbane office

Student/Graduate Environmental Scientist

August 2010 to December 2010

Aurecon Mackay office

Student work placement

November 2009 to January 2010

BHP Mitsubishi Alliance (BMA), South Walker Creek

Vacation Student

Training and qualifications

- Bachelor of Environmental Management (Natural Systems and Wildlife) (University of Queensland) awarded with Honours 2011
- Queensland Land Zones training (internal)
- Apply First Aid Certificate + Perform CPR
- Standard 11 Coal Induction 2012
- Construction White Card
- Fundamentals of Erosion and Sediment Control (Centre for Environmental Training)

Appendix F

Koala Habitat Assessment





Appendix F

Koala Habitat Assessment

Capricorn Sandstone Koala Habitat Assessment

1 Background

The combined populations of the koala (*Phascolarctos cinereus*) in Queensland, New South Wales and the Australian Capital Territory are listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and are therefore a Matter of National Environmental Significance (MNES). Draft EPBC Act referral guidelines for this species have been prepared, which provide guidance on whether an action that may impact on koalas or koala habitat should be referred to the federal environment minister for consideration. This document has been prepared as an EPBC referral self-assessment in relation to the Capricorn Stone proposed MLA.

2 Description of proposed MLA as koala habitat

The vegetation communities within the proposed MLA include *Eucalyptus crebra*/*Acacia rhodoxylon* co-dominant woodland on sandstone ridges and slopes, with lower slopes and undulating hills dominated by *E. crebra* woodland interspersed with *Corymbia citriodora*, *C. erythrophloia* and *C. clarksoniana*. There are also limited areas of alluvial plains containing tall *Eucalyptus tereticornis*. All of these species, with the exception of *A. rhodoxylon* are known koala food trees.



Figure 1 Koala habitat is present throughout the proposed MLA in the form of a) *E. crebra* dominated woodland on rocky slopes and b) *E. tereticornis* open woodland on alluvial plains

3 Current and historical occurrence

Historically, koalas were hunted to extinction in the area around Stanwell, and have not been known to naturally occur in the region since the 1930s (A. Melzer, pers. comm). The proposed MLA is part of a larger tract of contiguous vegetation, and despite the site being linked by continuous forest to known koala populations, they continue to remain absent from the area. Koalas were not recorded in previous surveys undertaken within the SPSNR, and there was no evidence in this survey that koalas are present. Targeted searches of suitable habitat failed to locate any animals, despite more than 6.5 km of linear transects being searched on foot and via light vehicle. Trees that may reveal evidence of use by koala in the form of scratches on the trunk or faecal pellets on the ground were also investigated. Many of the *E. tereticornis* in the alluvial areas showed signs of use by arboreal fauna, but none appeared to be koala scratches, and were most likely left by goannas and possums or gliders (See Figure 2 and Figure 3. The current survey also included 18 trap-nights of infrared camera trapping, with no koalas recorded.



Figure 2 Claw scratches on *E. tereticornis* in the proposed MLA, with two longer fingers. These are most likely from a large varanid (goanna)



Figure 3 Claw scratches with four fingers and an opposing thumb, most likely left by a possum or glider

4 Koala Habitat Assessment

The Koala Habitat Assessment Tool provides a scoring system of a number of habitat attributes, as shown in Figure 4. The proposed MLA occurs within the 'Inland' zone for the purpose of this assessment. The Koala Habitat Assessment for the proposed MLA is provided in Table 1.

Table 3: Koala habitat assessment tool.

Attribute	Score	Inland	Coastal
Koala occurrence	+2 (high)	Evidence of one or more koalas within the last 5 years.	Evidence of one or more koalas within the last 2 years.
	+1 (medium)	Evidence of one or more koalas within 5 km of the edge of the impact area within the last 10 years.	Evidence of one or more koalas within 5 km of the edge of the impact area within the last 5 years.
	0 (low)	None of the above.	None of the above.
Vegetation composition	+2 (high)	Has forest, woodland or shrubland with emerging trees with 2 or more known koala food tree species in the canopy.	Has forest or woodland with 2 or more known koala food tree species in the canopy.
	+1 (medium)	Has forest, woodland or shrubland with emerging trees with only 1 species of known koala food tree present in the canopy.	Has forest or woodland with only 1 species of known koala food tree present in the canopy.
	0 (low)	None of the above.	None of the above.
Habitat connectivity	+2 (high)	Area is part of a contiguous landscape ≥ 1000 ha.	Area is part of a contiguous landscape ≥ 500 ha.
	+1 (medium)	Area is part of a contiguous landscape < 1000 ha, but ≥ 500 ha.	Area is part of a contiguous landscape < 500 ha, but ≥ 300 ha.
	0 (low)	None of the above	None of the above.
Key existing threats	+2 (low)	Little or no evidence of koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence.	
	+1 (medium)	Evidence of infrequent or irregular koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence.	
	0 (high)	Evidence of frequent or regular koala mortality from vehicle strike or dog attack in the study area at present, or Areas which score 0 for koala occurrence and have a significant dog or vehicle threat present.	
Recovery value	+2 (high)	Habitat is likely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	
	+1 (medium)	Uncertainty exists as to whether the habitat is important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	
	0 (low)	Habitat is unlikely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	

Figure 4 Koala Habitat Assessment Tool

Table 1 Koala habitat assessment of the Capricorn Stone proposed MLA

Attribute	Score	Comment
Koala occurrence	0	Koalas do not occur in the proposed MLA, which has been confirmed in numerous surveys over the past 20 years
Vegetation composition	2	The proposed MLA contains woodland and open woodland with <i>E. crebra</i>, <i>E. tereticornis</i>, <i>Corymbia erythrophloia</i>, <i>C. clarksoniana</i>, and <i>C. tessellaris</i> in the canopy – all are known koala food trees
Habitat connectivity	2	- The patch of koala habitat that will be impacted is bounded on the northern side by Power Station Road. - To the east and south, the SPSNR contains continuous intact vegetation. The SPSNR totals 636 hectares, and this is part of a larger polygon of remnant vegetation exceeding 1000 hectares.
Key existing threats	1	- There are no koalas present in the proposed MLA, so this question is difficult to answer accurately as per the tool instructions. - If koalas were present, it is expected that koala mortality from vehicle strike and dog attack would be low to moderate, as the nearest road (Power Station Road) receives relatively light traffic and there are no residential areas in the vicinity to augment natural dog/dingo populations.
Recovery Value	0	- Due to the size of the contiguous landscape, vegetation composition and level of threats present, the habitat is considered unlikely to be important for the recovery of the koala - Consultation with Alistair Melzer of Central Queensland University identified that the SPSNR had previously been trialed as a translocation area for koalas that had been displaced with the Fitzroy and Dawson catchments due to land clearing. These translocations were unsuccessful due to predation on koalas by Wedge-tailed Eagles
Total	5	

Under the EPBC koala referral guidelines, impact areas that score five or more using the habitat assessment tool for the koala contain habitat critical to the survival of the koala. Therefore, the proposed MLA would be considered to contain habitat critical to the survival of the koala.

5 Impact of proposed action

The EPBC koala referral guidelines provide a decision tool as to whether a proposed action is likely to adversely impact habitat critical to the survival of the koala, and consequently whether the action should be referred to the federal environment minister. This decision tool is provided in Figure 5.

Figure 2: Assessing adverse effects on habitat critical to the survival of the koala.

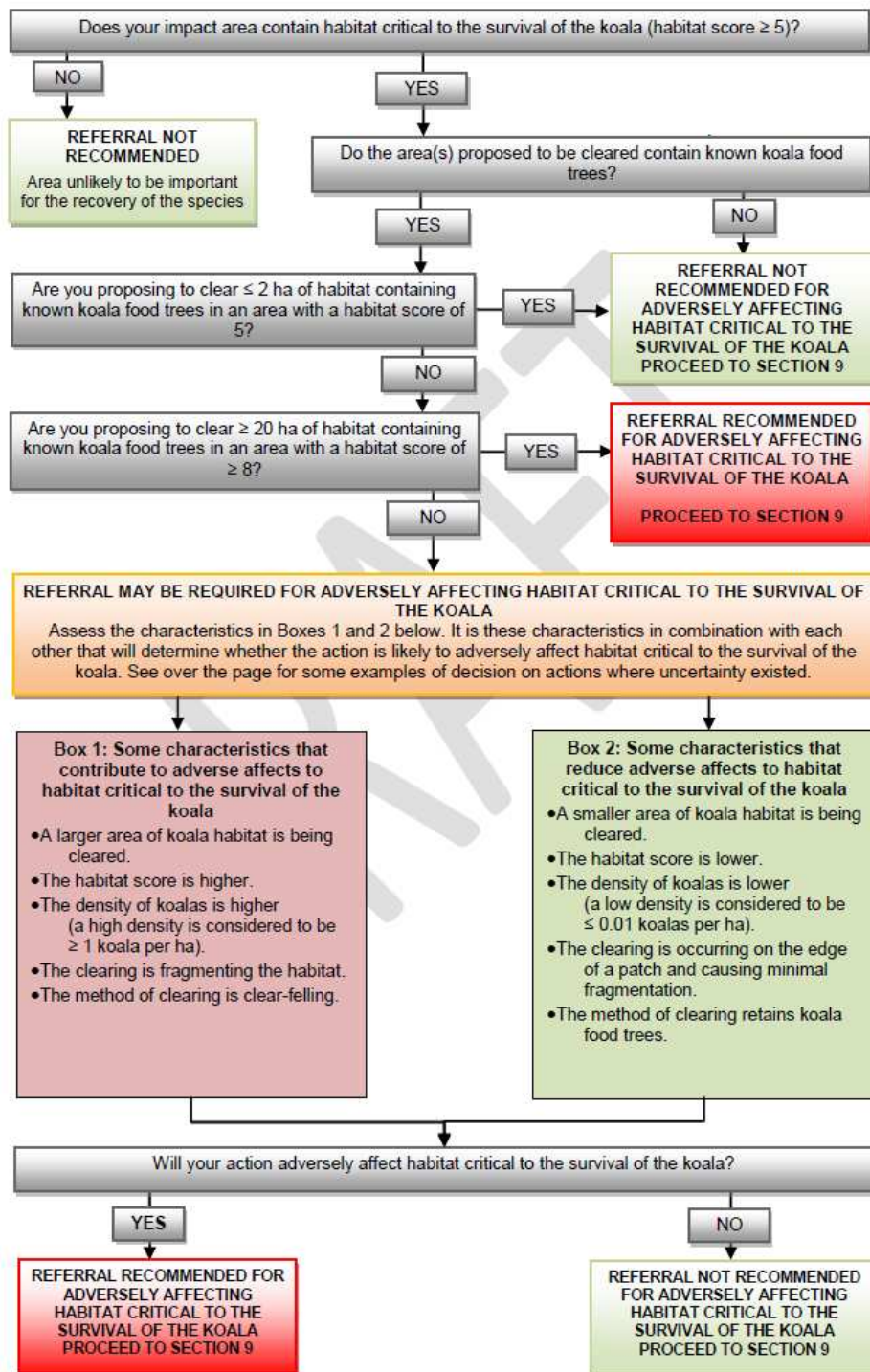


Figure 5 Decision tool for assessing whether to refer an action

The decision tool process has been followed for the Capricorn Stone proposed MLA, and is presented in

Table 2 Decision tool process for Capricorn Stone proposed MLA

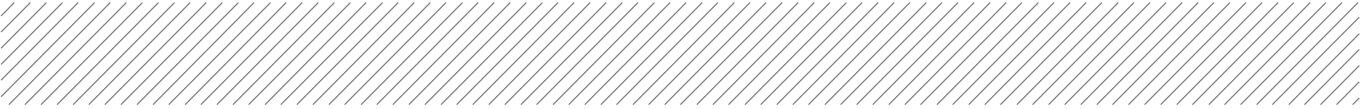
Query	Response
Does your impact area contain habitat critical to the survival of the koala (habitat score ≥ 5)?	Yes. The habitat score is 5.
Do the area(s) proposed to be cleared contain known koala food trees?	Yes.
Are you proposing to clear ≤ 2 ha of habitat containing known koala food trees in an area with a habitat score of 5?	No. The area proposed to be cleared contains approximately 22.15 hectares of habitat containing known food trees and the habitat score is 5
Are you proposing to clear ≥ 20 ha of habitat containing known koala food trees in an area with a habitat score of ≥ 8 ?	No. The area proposed to be cleared contains approximately 22.15 hectares of habitat containing known food trees and the habitat score is 5

Further considerations in this decision making process include:

- The size of the area to be cleared
- The position of the clearing in the landscape and whether it is likely to fragment a koala population
- Whether the habitat score is high or low in the range of possible scores (5-10)
- Whether the density of koalas is high (≥ 1 koala per hectare) or low (≤ 0.01 koalas per hectare)
- Whether the method of clearing is selective or clear felling

In the case of the Capricorn Stone proposed MLA, it is advised that an EPBC Referral is **not required** under the EPBC koala referral guidelines, based on the decision tool results shown in Table 2, along with the following considerations:

- The size of the area to be cleared is approximately 22 hectares, which in the context of the contiguous remnant vegetation it adjoins that extends for tens of thousands of hectares to the south, is relatively small
- The patch to be cleared is at the northernmost extremity of the contiguous vegetation, and is bordered by Power Station Road to the north, beyond which there are large areas of cleared vegetation and narrow movement corridors along riparian zones. There are no koalas present within the patch and therefore the clearing will not fragment any koala populations
- The habitat score is 5, which is the lowest possible to still be considered habitat critical to the survival of the koala

- 
- While the method of clearing will be clear-felling, it will be staged and gradual, as is necessary to allow the establishment of stable quarry pits. This would allow any resident fauna that is present to move into adjacent areas of intact vegetation

Appendix G

Insectivorous microbat survey (Anabat) analysis





Appendix G

Insectivorous microbat survey (Anabat) analysis

Capricorn Sandstone bat echolocation call analysis

1 Background and methodology

1.1 Survey methodology

All Australian insectivorous bats use echolocation to assist with navigation and foraging. Each species produces a distinctive call signature when viewed through call analysis software, which can be used to identify the animal with reasonable accuracy. An Anabat SDII bat call recorder (Titley Scientific) was used to record echolocation bat calls during fauna surveys conducted at Stanwell Power Station Nature Refuge. Five nights of active Anabat survey was undertaken by suitably experienced ecologists (Sandra Walters and Rachel Hackett), during which spotlights were also used to observe any animal in flight that may have been detected by the Anabat. (Menkhorst & Knight, 2011) was used in the field to assist with identification. This method allowed the observation of distinctive physical characteristics such as colour and size as well as flight behaviour, which improved the reliability of identification attributed to call signature analysis.

Bat call analysis was undertaken by Aurecon using AnalookW version 3.8s software (Titley Scientific), by an experienced fauna ecologist (Sandra Walters). Animals were identified to species where possible using *Key to the bat calls of south-east Queensland and north-east New South Wales* (Reinhold, Law, Ford, & Pennay, 2001) along with reference calls of bats previously collected from the region by Aurecon.

Animals were identified to species using call signature analysis, only when the following conditions were satisfied:

- The call sequence was characteristic of search phase pulses
- There was minimal 'environmental noise' to distort the sequence
- The call sequence was of adequate duration to demonstrate a regular pattern
- There was no evidence of interference from another bat call (e.g. alternation out of step)
- The call could not be confused with that of another species due to overlapping characteristic frequencies

1.2 Survey Effort

Anabat surveys were performed over five nights from 12 to 17 May 2014. Active monitoring and spotlighting was undertaken at each site, and the Anabat was left overnight to passively record echolocation calls, as per the detail in Table 1.

Table 1 Anabat survey schedule and effort

Date/Time	Site	Site description	Survey type	Survey effort (hours)
13/05/14 05:45 – 06:40	F2	<i>E. tereticornis</i> open woodland on alluvial plain	Active	1.0
13/05/14 18:30 – 14/05/14 06:00	F4	<i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises	Passive	11.5
14/05/14 17:45 – 19:05	F3	<i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises	Active	1.25
14/05/14 19:50 – 20:05	F4	<i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises	Active	0.25
14/05/14 20:15 – 15/05/14 06:05	F1	<i>E. crebra</i> , <i>Corymbia citriodora</i> , <i>C. erythrophloia</i> woodland on undulating hills and low rises	Passive	10.0
15/05/14 17:45 – 16/05/14 08:00	F5	<i>E. crebra</i> / <i>Acacia rhodoxylon</i> woodland on sandstone scarp and slope	Passive	14.25
Total effort				38.25

1.3 Glossary of terms

Terms specific to bat echolocation call analysis and reporting are explained in Table 2.

Table 2 Glossary of terms used in bat echolocation call analysis and reporting

Term	Definition
Call sequence	Series of units of sound repeated at regular intervals
Characteristic frequency (Fc)	Frequency of the last point of the flattest section of a pulse
Echolocation	The method used by Australian microchiropteran bats to navigate and forage, whereby high-frequency, usually inaudible pulses of sound are emitted and the time taken for the 'echoed' sound to return from an object is used to pinpoint that object's location
Microchiropteran bats	The order of insectivorous bats that use echolocation for navigation and foraging (excludes fruit bats)

1.4 Nomenclature

Species names used in this analysis follow Churchill (2008) and nomenclature used in the Species Profile and Threats Database (SPRAT), maintained by the federal Department of Environment.

1.5 Call identification and reporting standard

Call identification was based on published call descriptions for Queensland (Reinhold, et.al, 2001), and on reference calls collected in Central Queensland. Species distribution maps published in Menkhorst & Knight (2011) and the SPRAT database also assisted in determining the probability of occurrence. The format and content of this report complies with nationally accepted standards in bat detector based surveys (Reardon, 2003).

2 Results

2.1 Notes on species not able to be identified to species with absolute certainty

A total of 49 calls were attributed to unknown bat species, either because the call sequence was too short to demonstrate an even pattern of pulses, or there was too much variation in the pulses to be certain that the call was of a bat in 'search' phase (the diagnostic phase), or there was too much background noise to obtain a clear signature. Uncertainties in this analysis are discussed in section 3.

2.2 Summary of bat species recorded

A summary of the bat species recorded during echolocation surveys is provided in Table 3.

Table 3 Anabat call signature analysis summary

Species	Common name	Total calls for species
<i>Chalinolobus nigrogriseus</i>	Hoary Wattled Bat	10
<i>Miniopterus australis</i>	Little Bentwing Bat	19
<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing Bat	9
<i>Mormopterus beccarii</i>	Beccari's Freetail Bat	4
<i>Nyctophilus sp</i>	Long-eared Bat species	3
<i>Saccolaimus flaviventris</i>	Yellow-bellied sheath-tail bat	74
<i>Scotorepens sp</i> or <i>Scotorepens greyii</i>	Central-eastern Broad-nosed Bat or Little Broad-nosed Bat	7
<i>Vespadelus baverstocki</i>	Inland forest bat	10
Unknown	See section 2.1	49
Noise		8
Total recordings		195

2.3 Representative call signatures

Representative call signatures of bat species identified in this survey are provided in Figures 1 to 8.

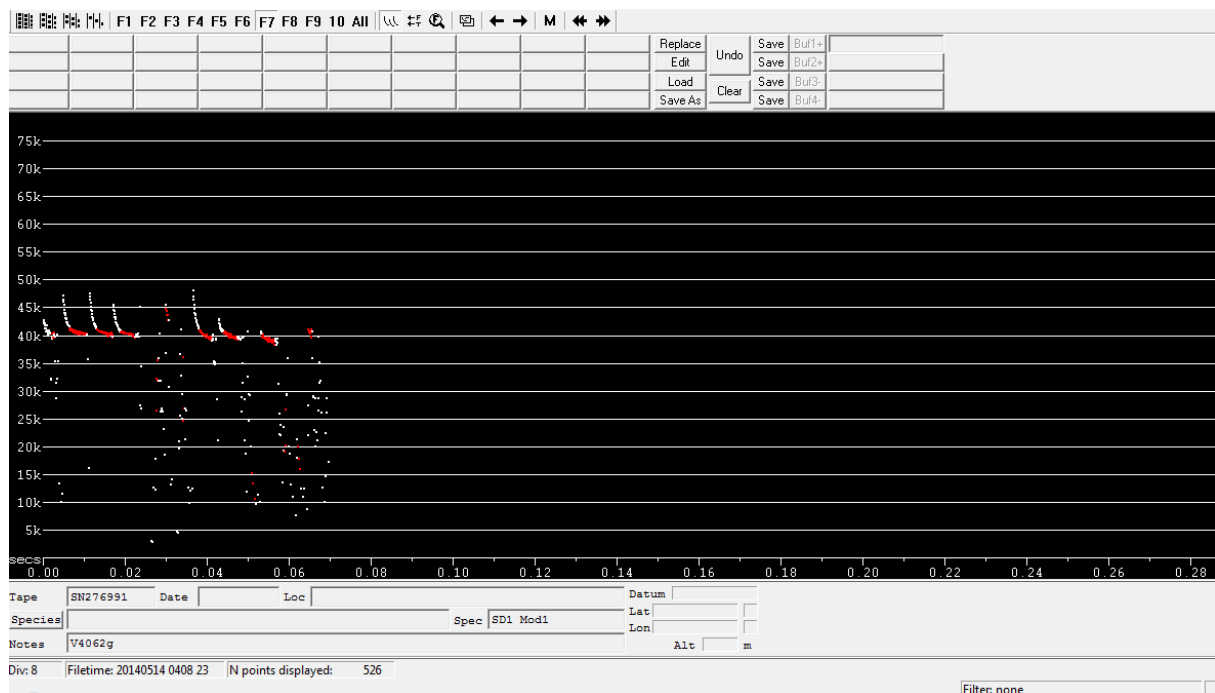


Figure 1 Anabat call signature of *Chalinolobus nigrogriseus* (Hoary Wattled Bat) recording curvilinear pulses with a long characteristic section at a frequency of 39-40 k Hz

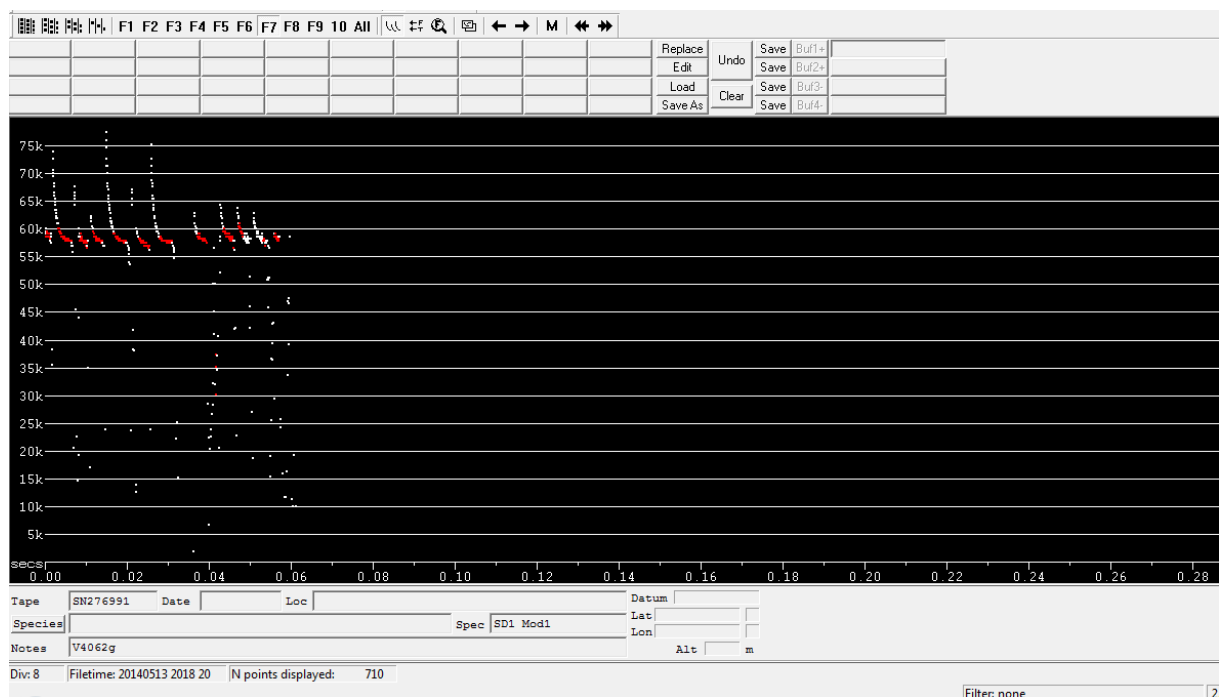


Figure 2 Anabat call signature of *Miniopterus australis* (Little Bentwing Bat) with characteristic frequency of 58 k Hz and curvilinear pulses with down-sweeping tail

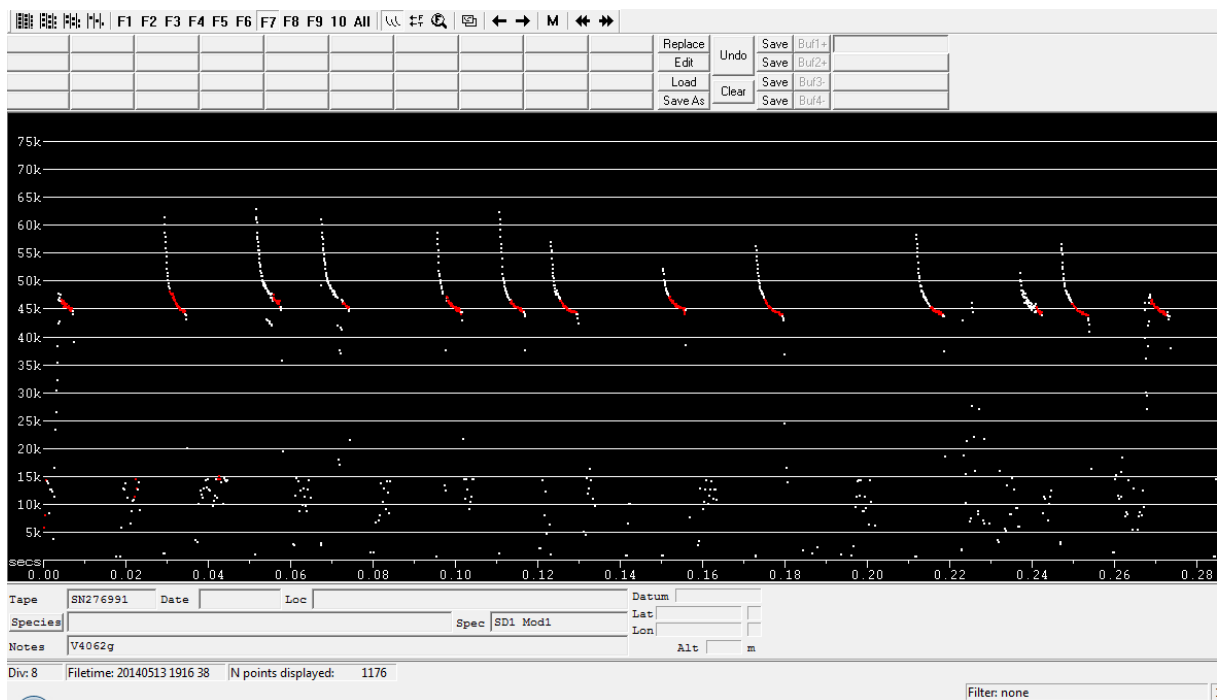


Figure 3 *Miniopterus schreibersii oceanensis* (Eastern Bentwing Bat), with a curved pulse at a characteristic frequency of 44 k Hz with distinctive down-sweeping tail

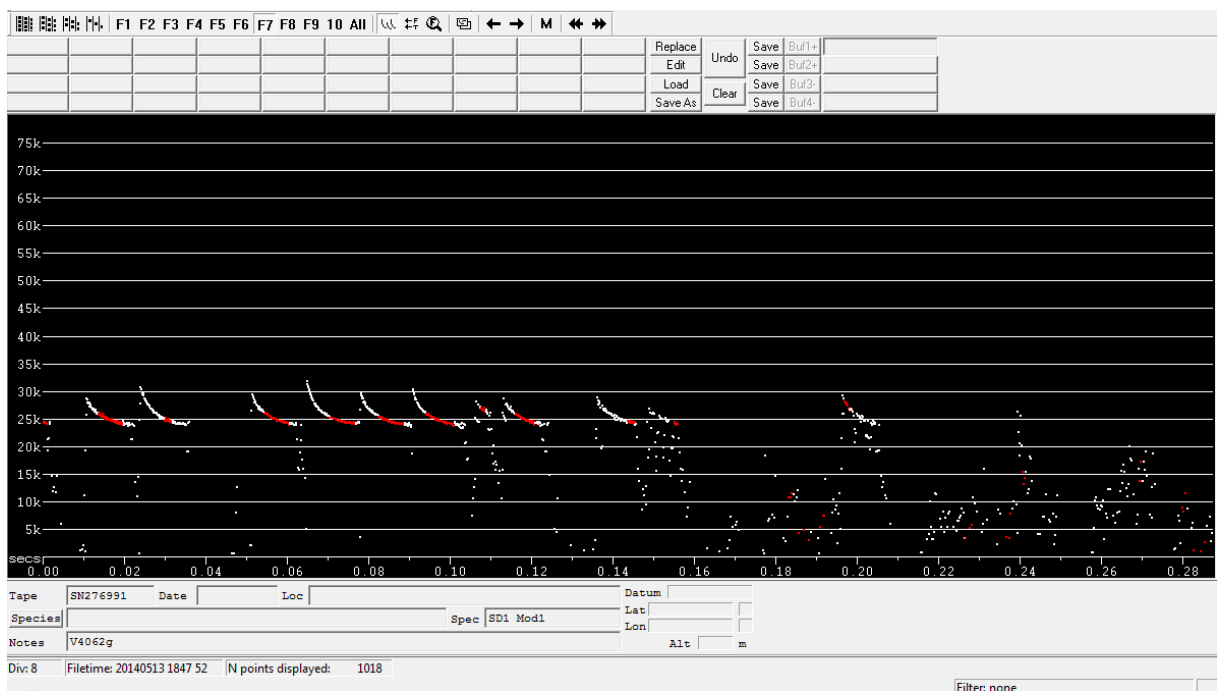


Figure 4 *Mormopterus beccarii* (Beccari's Freetail Bat) with curved pulses at a characteristic frequency of 24 kHz

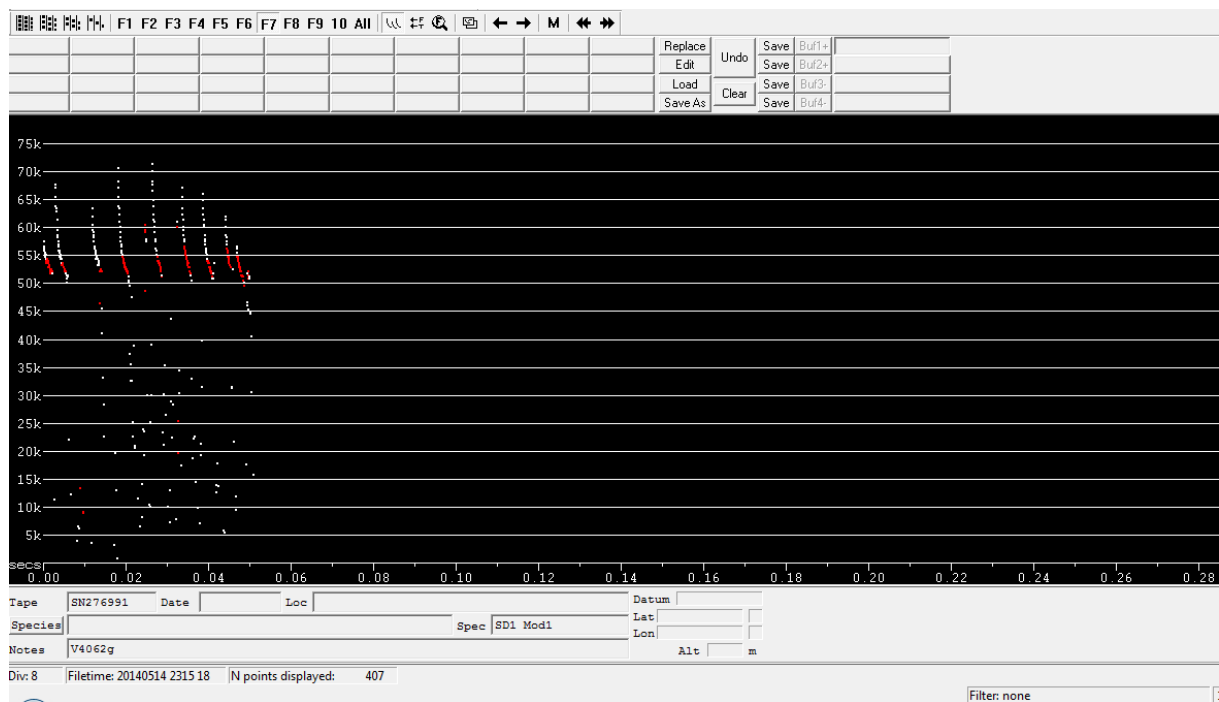


Figure 5 *Nyctophilus* sp (Long-eared Bat species) with near-vertical pulse between 50 and 70 k Hz

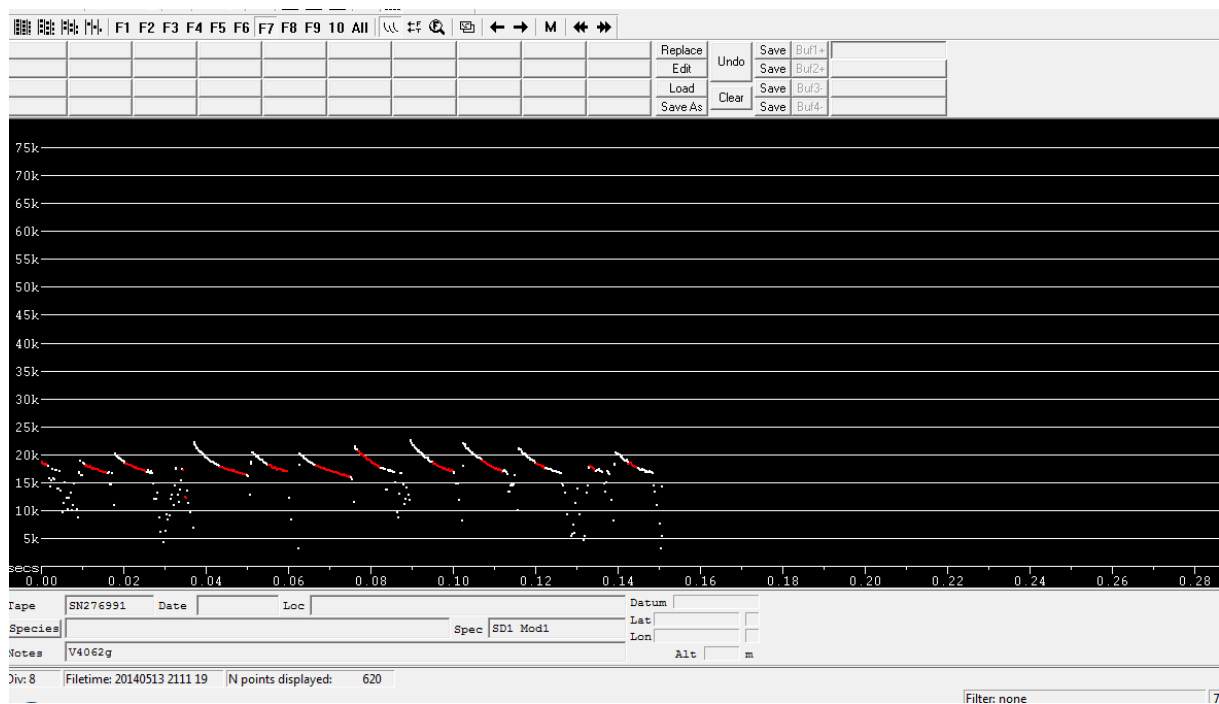


Figure 6 *Saccolaimus flaviventris* (Yellow-bellied sheath-tail bat) has distinctive curved pulses with a characteristic frequency around 18 kHz

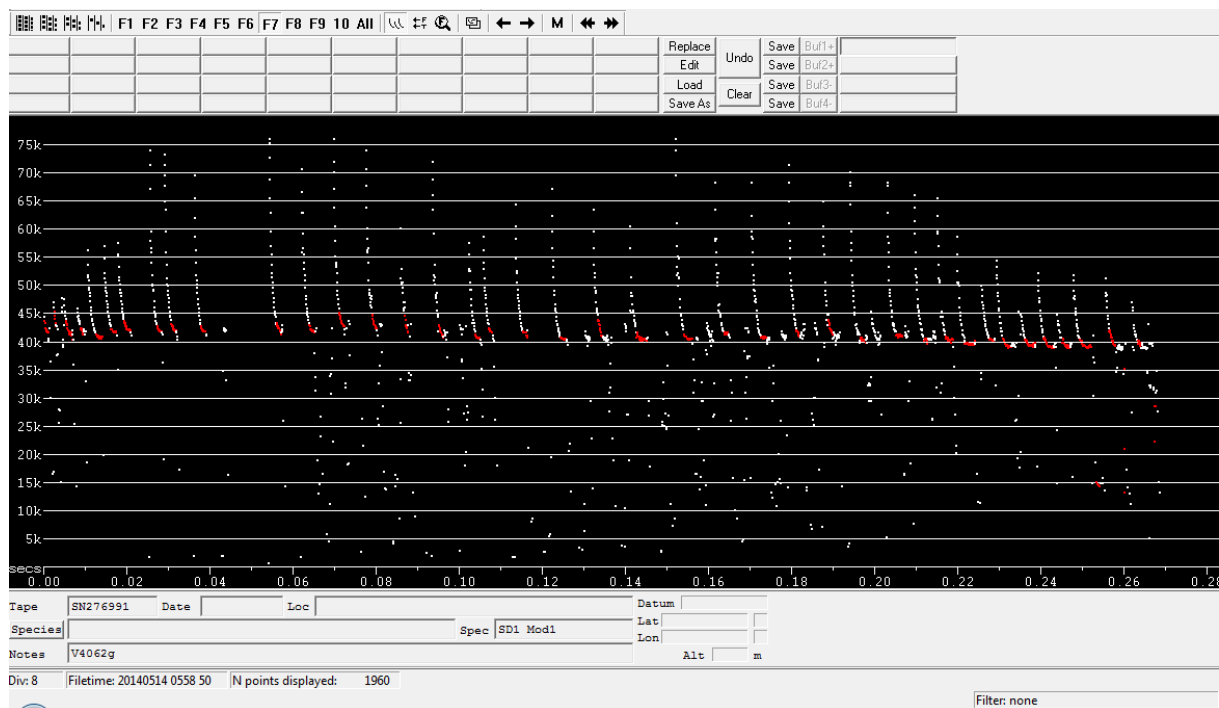


Figure 7 *Scotorepens* sp. (Central-eastern Broad-nosed Bat) or *Scotorepens greyii* (Little Broad-nosed Bat) with curvilinear pulses at a characteristic frequency of 40 k Hz

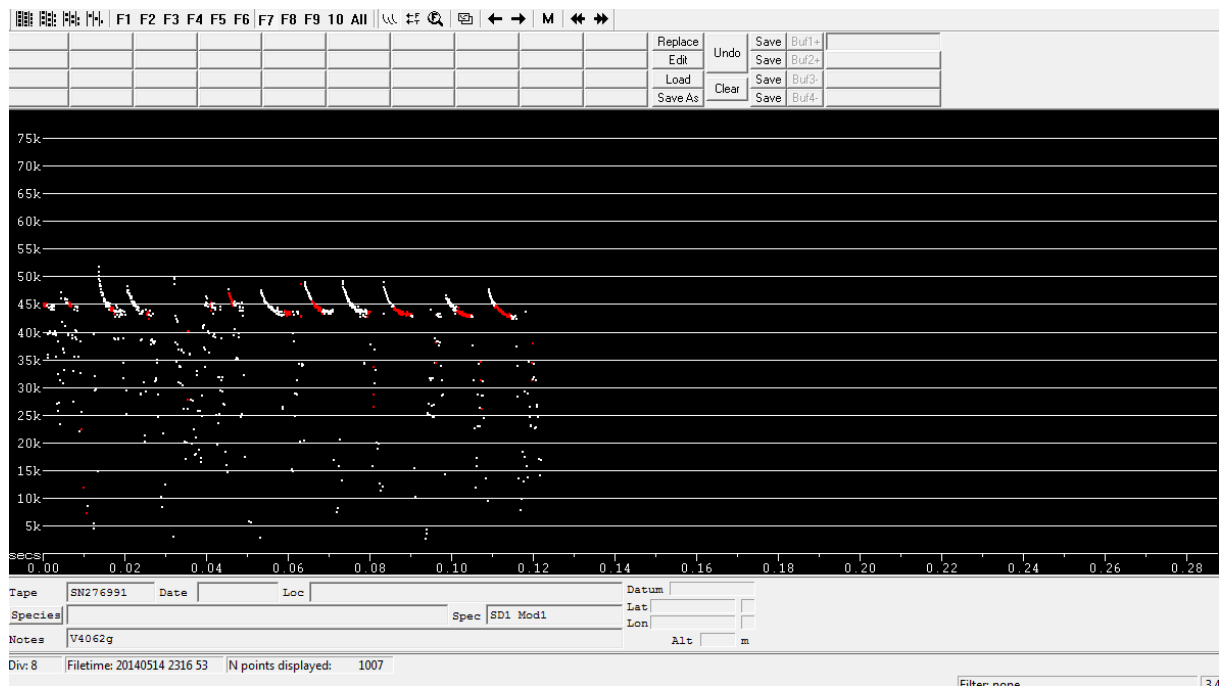


Figure 8 *Vespadelus baverstocki* (Inland Forest Bat) with curved pulses and an upsweeping tail at a characteristic frequency of 44 k Hz

3 Discussion

3.1 *Scotorepens* sp. (Central-eastern Broad-nosed Bat) or *Scotorepens greyii* (Little Broad-nosed Bat)

There were 7 calls that may have been either *Scotorepens* sp. or *S. greyii*, which both echolocate at a characteristic frequency between 36 k Hz and 41.5 k Hz. The distribution of *S. sp* is poorly known, and probably overlaps with *S. greyii*, so it should be assumed that both are present. Neither species are listed as threatened under the provisions of the *Nature Conservation Act 1992* (QLD) (NC Act) or *Environment Protection and Biodiversity Conservation Act 1999* (Cwth) (EPBC Act).

3.2 *Nyctophilus* sp (Long-eared Bat species)

All *Nyctophilus* species produce distinctive near-vertical linear pulses, which are indistinguishable from each other. Five *Nyctophilus* species occur within the range of the study area; *N. bifax*, *N. corbeni*/*N. timoriensis*, *N. geoffroyi*, *N. gouldi* and *N. major*. The species *N. corbeni*/*N. timoriensis* has undergone recent taxonomic changes; it is referred to as *N. corbeni* under the EPBC Act, and listed as vulnerable. It is referred to as *N. timoriensis* under the NC Act, and also listed as vulnerable. None of the other *Nyctophilus* species that occur within the study area are listed as threatened species under federal or state legislation. Three calls attributable to *Nyctophilus* species were recorded within the project area. Suitable habitat for *N. corbeni*/*N. timoriensis* exists within these areas, so the calls recorded could potentially be those of this species, although this is extremely unlikely, as the species is rare and has not been recorded in the vicinity. The nearest record is from approximately 200 km to the southwest of the project area, in Expedition National Park.

4 Conclusion

A total of 138 identifiable calls were recorded during this survey, which were attributable to eight species of microbat. There is a possibility that one EPBC listed species is present (*Nyctophilus corbeni*) although this is considered highly unlikely due to its rarity and the absence of records in the vicinity.

5 References

- Churchill, S. (2008). *Australian Bats*. Sydney: Jacana Books, Allen & Unwin.
- Menkhorst, P. & Knight, F. (2011). *A field guide to the mammals of Australia*, 3rd edition. South Melbourne: Oxford University Press
- Reardon, T. (2003). *Standards in bat detector based surveys*. Australasian Bat Society Newsletter 20, 41-43.
- Reinhold, L., Law, B., Ford, G., & Pennay, M. (2001). *Key to the bat calls of south-east Queensland and north-east New South Wales*. Brisbane: Queensland Department of Natural Resources and Mines.

Appendix H

Land tenure searches





Appendix H

Land tenure searches

CURRENT STATE TENURE SEARCH

DEPT OF NATURAL RESOURCES AND MINES, QUEENSLAND

Request No: 14738717

Search Date: 28/09/2012 13:30

Title Reference: 17587032

Date Created: 22/10/1995

DESCRIPTION OF LAND

Tenure Reference: SL 35/51245

LOT 177 CROWN PLAN LN2465

County of LIVINGSTONE

Parish of STANWELL

Local Government: ROCKHAMPTON

Area: 65.680000 Ha. (SURVEYED)

No Land Description

No Forestry Entitlement Area

No Future Conservation Area

Purpose for which granted:

BUSINESS (ELECTRICAL WORKS)

TERM OF LEASE

Term and day of beginning of lease

Term: 50 years commencing on 01/03/1990

Expiring on 29/02/2040

REGISTERED LESSEE

Dealing No: 703091390 31/12/1998

STANWELL CORPORATION LIMITED A.C.N. 078 848 674

CONDITIONS

- C5 The lessee shall allow any person authorised under the Forestry Act 1959 access to the leased land for the purpose of cutting and removing timber or removing other forest products, or quarry material, or other material from the leased land.
- C173 The lessee shall not interfere with any forest products or remove any quarry material (including any stone, gravel, sand, earth, soil, rock, guano or clay which is not a mineral within the meaning of the Mining Act 1968) or other material upon the leased land without the permission of the Minister except under the authority of and in compliance in every respect with the requirements of a permit, license, agreement or contract granted or made under the Forestry Act 1959.

CURRENT STATE TENURE SEARCH

DEPT OF NATURAL RESOURCES AND MINES, QUEENSLAND

Request No: 14738717

Search Date: 28/09/2012 13:30

Title Reference: 17587032

Date Created: 22/10/1995

CONDITIONS

- C183 The lessee shall not at any time destroy any tree upon the leased land without the prior permit in writing of the Land Commissioner or contrary to any terms and conditions of such permit.
- E9 The lessee shall pay the cost of any required re-survey of the leased land.
- K1 The lessee shall maintain the leased land free from noxious plants.
- M76 No compensation for improvements or developmental works shall be payable by the Crown at the expiration of the term of the lease, but the Lessee shall have the right to remove movable improvements within a period of three months, provided all moneys due by the Lessee to the Crown on any account whatsoever have been paid. However, should the leased land revert to the Crown and be again made available for lease or purchase the former Lessee will be entitled to receive payment for the value of his improvements or developmental work, in accordance with the principles set out in the said Act.
- M76 The Lessee shall use the leased land for Business (Electrical Works) purposes and associated purposes only.
- M76 The Lessee shall maintain fencing existing on the leased land at the commencement of the term of the lease in a good and substantial state of repair.
- M76 No further access will be provided to the leased land by the Crown or Local Authority.
- M76 The Lessee may utilise Section 207 of the Land Act upon completion of the Stanwell Power Station.

ENCUMBRANCES AND INTERESTS

1. Rights and interests reserved to the Crown by
Lease No. 17587032
2. RESUMPTION EASEMENT No 602810376 (K658251R) 03/06/1991
EASEMENT BEING EASEMENT D IN LOT 177 ON PLAN LN2465 ON PLAN
LN807459 IS TAKEN BY PROCLAMATION AND IS HEREBY RESUMED AND
SHALL VEST IN
WATER RESOURCES COMMISSION
AS FROM 13 MARCH 1991
3. VESTING No 706095708 06/11/2002 at 13:30
RESUMPTION EASEMENT: 602810376 (K658251R)
SUNWATER A.B.N. 17 020 276 523

CURRENT STATE TENURE SEARCH

DEPT OF NATURAL RESOURCES AND MINES, QUEENSLAND

Request No: 14738717

Search Date: 28/09/2012 13:30

Title Reference: 17587032

Date Created: 22/10/1995

ENCUMBRANCES AND INTERESTS

4. NATURE REFUGE NOTING No 701542354 11/09/1996 at 09:02
all or part of the within land has been declared a Nature
Refuge under the Nature Conservation Act 1992

ADMINISTRATIVE ADVICES

Dealing	Type	Lodgement Date	Status
AS6300J	NOTC INT RES	01/11/1990 00:00	CURRENT

ACQUISITION OF LAND ACT 1967

UNREGISTERED DEALINGS - NIL

Caution - Charges do not necessarily appear in order of priority

** End of Current State Tenure Search **

Information provided under section 34 Land Title Act(1994) or
section 281 Land Act(1994)

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Requested By: D APPLICATIONS GLOBAL X



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