



Terrequip Environmental Pty Ltd

Environmental Management Plan - Warwick Limestone Mine



Terrequip Environmental Pty Ltd

Environmental Management Plan - Warwick Limestone Mine

17 November 2020

Epic Environmental Pty Ltd

Level 6, 193 North Quay,
Brisbane, QLD 4000

Email: enquiries@epicenvironmental.com.au

www.epicenvironmental.com.au

ABN: 54 169 579 275

ACN: 169 579 275



Contents

1	Introduction	1
1.1	The Project	1
1.2	Purpose and Context	1
2	Existing Operations	4
2.1	Overview of Warwick Limestone Mine	4
2.2	Mining Tenure Details	5
2.3	Operational Activities	5
2.3.1	Current Operations	5
2.3.2	Project Extraction Rates and Reserves	6
2.3.3	Operational Hours	6
2.3.4	Environmentally Relevant Activities	6
2.3.5	Notifiable Activities	7
2.4	Environmental Management	7
2.5	Rehabilitation	7
3	General Environmental Management Conditions	8
3.1	Legislative Requirements	8
3.2	Estimated Rehabilitation Costs	8
3.3	Maintenance of Measures, Plant and Equipment	8
3.4	Monitoring	9
3.5	Storage and Handling of Flammable and Combustible Liquids	9
3.6	Environmental Auditing	9
3.7	Aesthetic Values	9
4	Existing Environment	10
4.1	Regional Description	10
4.2	Project Site	10
4.3	Site Topography	10
4.4	Climate	11
4.4.1	Air Quality	11
4.4.2	Noise	12
4.5	Local Watercourses	13
4.6	Onsite Water Storage	13
4.7	Stormwater	13
4.8	Groundwater	13
4.9	Geology	15
4.9.1	Regional Geology Description	15
4.9.2	Site Geology Description	15
4.10	Soils	15
4.10.1	Strategic Cropping Land	15
4.10.2	Good Quality Agricultural Land	17
4.11	Nature Conservation	20

4.11.1	Flora (Phoenix Pit)	20
4.11.2	Flora (Aspinal Pit)	21
4.11.3	Fauna (Phoenix Pit)	21
4.11.4	Fauna (Aspinal Pit)	21
4.11.5	Ecology Surveys (2017 and 2018) - Vegetation Communities and Regional Ecosystem Classification	24
4.12	Cultural Heritage	25
4.12.1	Aboriginal Heritage	25
4.12.2	European Heritage	25
4.13	Local Community and Industry	25
4.13.1	Community Consultation	25
4.14	Waste	26
4.15	Visual Amenity	26
5	Environmental Commitments	27
5.1	Air	27
5.1.1	Air Quality Protection Commitments	27
5.2	Noise	28
5.2.1	Noise Protection Commitments	29
5.3	Water	29
5.3.1	Water Supply	29
5.3.2	Water Usage	30
5.3.3	Water Protection Commitments	30
5.4	Waste	31
5.4.1	Waste Protection Commitments	31
5.5	Land	32
5.5.1	Land Protection Commitments	32
5.6	Nature Conservation	33
5.6.1	Nature Conservation Protection Commitments	33
5.7	Cultural Heritage	34
5.7.1	Aboriginal Heritage	34
5.7.2	European Heritage	35
5.7.3	Cultural Heritage Protection Commitments	35
5.8	Community	35
5.8.1	Community Protection Commitments	36
5.9	Light	36
5.10	Staff and Contractor Training	36
5.11	Energy Efficiency and Cleaner Production	36
6	Rehabilitation and Remediation	38
6.1	East/West Pit – ML50236, ML50239 and ML50083	38
6.2	Aspinal Pit – ML50146	39
6.3	Phoenix Pit – ML50237 and ML50238	40

List of Figures

Figure 1: Project Location	3
Figure 2: Strategic Cropping Land	18
Figure 3: Good Quality Agricultural Land	19
Figure 4: Ecological Features	23

List of Tables

Table 1: Mining Tenure Details	5
Table 2: Existing and Forecast Production Rates	6
Table 3: ERAs for the Site	7
Table 4: Climate Data for Warwick and Applethorpe	11
Table 5: Annual Average Insoluble Dust Deposition Data (g/m ² /month)	11
Table 6: Maximum Monthly Average Insoluble Dust Deposition Data (g/m ² /month)	11
Table 7: Geological Formations Within the Mining Leases	15
Table 8: Pest Animals	24
Table 9: Ground-truthed Regional Ecosystems	24
Table 10: Environmental Protection Commitments – Air	27
Table 11: Environmental Protection Commitments – Noise	29
Table 12: Environmental Protection Commitments – Water Supply and Usage	30
Table 13: Environmental Protection Commitments – Waste	31
Table 14: Environmental Protection Commitments – Land	32
Table 15: Environmental Protection Commitments – Nature Conservation	34
Table 16: Environmental Protection Commitments – Cultural Heritage	35
Table 17: Community Protection Commitments	36
Table 18: Final Land Use and Rehabilitation Approval Schedule for ML50236	38
Table 19: Final Land Use and Rehabilitation Approval Schedule for ML50239	38
Table 20: Final Land Use and Rehabilitation Approval Schedule for ML50083	39
Table 21: Final Land Use and Rehabilitation Approval Schedule for ML50146	39
Table 22: Final Land Use and Rehabilitation Approval Schedule for ML50237	40
Table 23: Final Land Use and Rehabilitation Approval Schedule for ML50238	40

List of Appendices

Appendix A – Environment and Sustainability Policy Statement
Appendix B – Visual Amenity Assessment Report
Appendix C – Site Water Management Plan
Appendix D – Dust Management Plan
Appendix E – Vegetation Management Plan
Appendix F – Fauna Management Plan
Appendix G – Feral Animal (Fox and Cat) Management Guidelines

Document History and Status

Revision	Date Issued	Approved By	Date Approved	Revision Type	Issued To
A	05/11/18	M. Breitfuss	07/11/18	Draft	Internal
0	07/11/18	M. Breitfuss	14/11/18	Final	Sibelco
1	01/04/19	A. Siddaway	01/04/19	Final (Revised)	Sibelco
2	12/11/2020	K. Douglas	13/11/2020	Final (Revised)	Terrequip Environmental Pty Ltd
2	17/11/2020	K. Douglas	17/11/2020	Final (Revised)	Terrequip Environmental Pty Ltd

Printed:	17 November 2020
Last saved:	17 November 2020 12:23 PM
File name:	BE170038.02-RPT-EMP_Rev1
Author:	Maria Mahon
Project Manager:	Allison Siddaway
Client:	Terrequip Environmental Pty Ltd
Document Title:	Environmental Management Plan - Warwick Limestone Mine
Document version:	Final
Project number:	BE170038.02

1 Introduction

1.1 The Project

Terrequip Environmental Pty Ltd (Terrequip Environmental) currently operate the Warwick Limestone Mine (the Project) located at 401 O'Deas Road, Elbow Valley, Queensland (the Site). The Project is located approximately 21 kilometres (km) south south-east of Warwick (**Figure 1**). The Mining Lease (ML) areas occupy a total of 172.1 hectares (ha).

The operational phase of the existing Warwick Limestone Mine began around 1930 and involved the production of agricultural lime, crushed rock, marble chips and (previously) small amounts of burnt lime. Prior to this, the land was used for agricultural purposes.

Limestone is removed from the operational open cut limestone pit using conventional open cut benching methods. The limestone is trucked to either the crusher plant situated in Aspinall Pit (ML50146) or a mobile crusher and screened and/or crushed in an on-site plant to a specified size (determined by market requirements). The final product is then trucked off-site to the respective customers.

1.2 Purpose and Context

Environmental management and regulation of the mining industry in Queensland is administered by the Department of Environment and Science (DES) (previously Department of Environment and Heritage Protection [DEHP]) through the provisions of the *Environmental Protection Act 1994* (EP Act). Within this regulatory system, the Project operates under Environmental Authority (EA) EPML00136213.

This Environmental Management Plan (EMP) has been prepared to amalgamate and update the two pre-existing EMPs for the Site. This EMP supersedes previous EMPs which were known as:

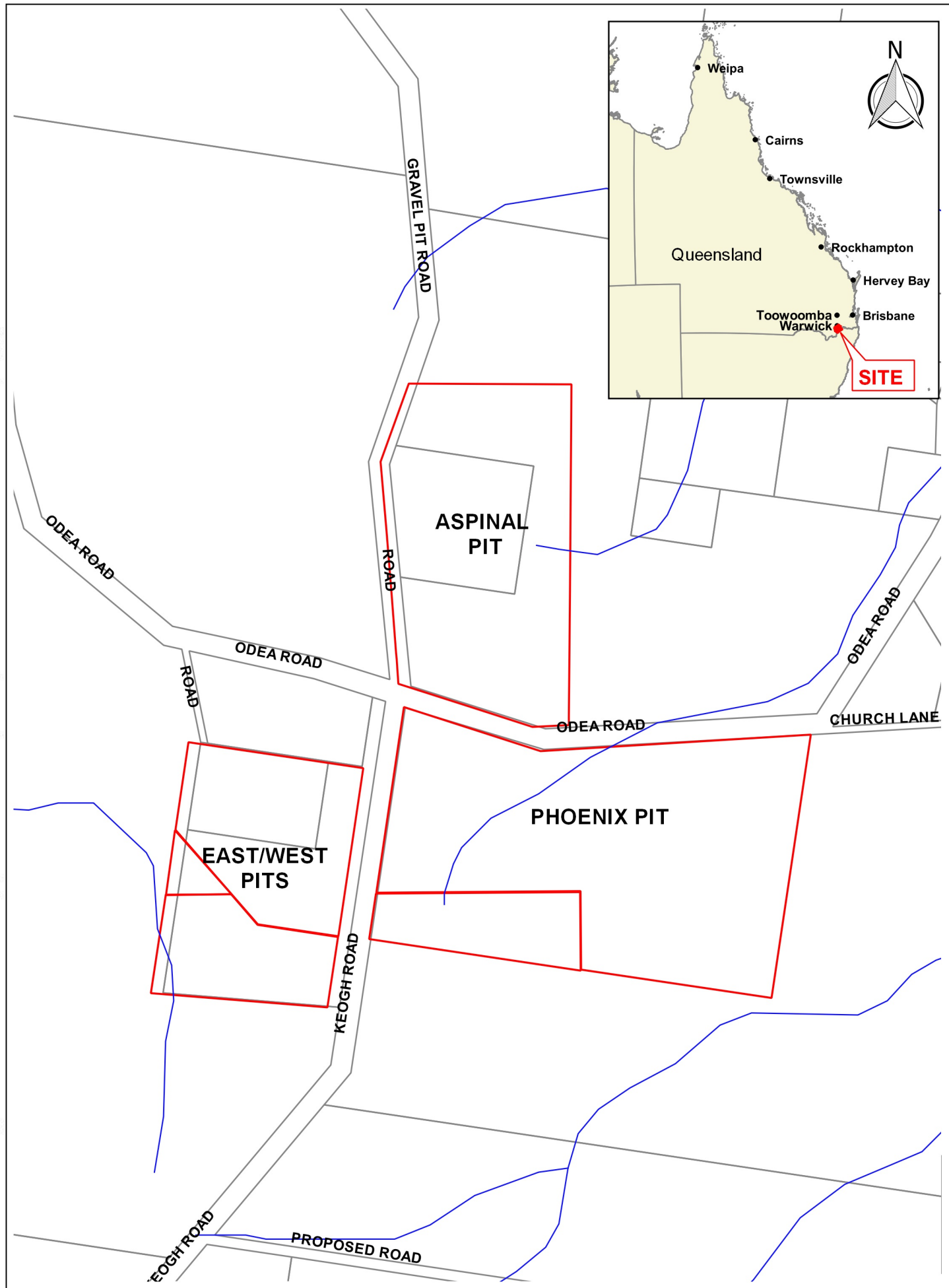
- Warwick Limestone Deposit Environment Management Plan (URS Australia Pty Ltd, 2006) – ML50083 and ML50146; and
- Unimin Warwick Mine Site Environmental Management Plan (URS Australia Pty Ltd, 2010) – ML50236, ML50237, ML50238 and ML50239.

This updated version of the EMP encompasses the entire Site and includes the latest ecological survey results and recommendations. Specifically, this EMP applies to ML50146, ML50083, ML50236, ML50237, ML50238 and ML50239. The purpose of this EMP is to:

- Identify the potential for harm to environmental values;
- Provide mitigation measures to minimise the potential for harm to environmental values;
- Document operating criteria for the site to minimise harm to environmental values;

- Provide corrective actions to be implemented in the event of harm to environmental values; and
- Comply with the conditions of EA EPML00136213.

Figure 1: Project Location



2 Existing Operations

This section provides an overview of the existing operations at the Site.

2.1 Overview of Warwick Limestone Mine

The operational phase of the existing Project began around 1930 and involved the production of agricultural lime, crushed rock, marble chips and (previously) small amounts of burnt lime. Prior to this the land was used for agricultural purposes. Based on calculations of remaining limestone deposits, it is planned that the mining operations will continue for the medium term.

Limestone is removed from the operational open cut limestone pit using conventional open cut benching methods. The limestone is trucked to either the crusher plant situated in Aspinall Pit (ML50146) or a mobile crusher and screened and/or crushed in an on-site plant to a specified size (determined by market requirements). The final product is then trucked off-site to the respective customer.

Activities carried out at the Project include:

- Mining;
- Separation of limestone from its natural state;
- Stockpiling of product;
- Overburden stockpiling;
- Activities supporting mining (i.e. supply of power or water, equipment maintenance, administration support);
- Rehabilitation; and
- Environmental monitoring, implementation and review of environmental controls to prevent environmental harm.

The Terrequip Environmental Warwick Limestone Mine employs 10 full-time personnel. These employees are supported by 5-8 contract personnel.

The nearest habitation is a cluster of buildings including a homestead and other buildings, approximately 300 metres (m) north-west of ML50236 and a homestead approximately 300 m north-east of ML50237.

Although there is little through traffic on the public roads passing the operation, it is noted that Keoghs Road (along the western side of ML50237) provides the only access to the Cherrabah Tourist Resort.

2.2 Mining Tenure Details

Tenure and title details are shown in **Table 1**.

Table 1: Mining Tenure Details

Lease	Proposed Activity	Land Tenure	Landowner	Status	Area (ha)
ML50083	Open pit mining	Lot 5 SP236094, Lot 178 M34534	Terrequip Environmental Pty Ltd State of Queensland	Current	22.9
ML50146	Open pit mining	Lot 106 ML623, Lot 2 RP36822	Benjamin Usher	Current	51.03
ML50236	Open pit mining	Lot 5 SP236094	Terrequip Environmental Pty Ltd	Current	1.85
ML50237	Open pit mining	Lot 1219 M34519	Liam O'Dea	Current	71.38
ML50238	Open pit mining	Lot 1219 M34519	Liam O'Dea	Current	11.33
ML50239	Open pit mining	Lot 5 SP236094	Terrequip Environmental Pty Ltd	Current	13.51

2.3 Operational Activities

The operational phase of the existing mine began around 1930. Based on the current LOM Plan, mining operations will continue for the medium term, focussing on Phoenix Pit (ML50237 and ML50238) and Aspal Pit (ML50146).

Within Phoenix Pit, mining of the southern and northern orebodies will occur at the same time to maintain longer term product quality. The mining sequence assumes that all pit development (footprint extension) will be done by 2024, whereafter the pit will increase in depth only. Mining benches will be at 10 m depth intervals. With regards to mining lease boundaries, a 10 m buffer zone has been allowed for around the lease boundary where no mining activity or disturbances will occur. Trees planted along the lease boundary will be maintained for vegetative screening purposes.

Aspal Pit will continue to undergo mining activities to further target the limestone orebody. If market conditions allow, the Aspal Pit will be extended to the north and west of the current pit location. To allow this to occur, additional waste dump, topsoil storage and sediment dam areas are required.

2.3.1 Current Operations

The following activities have been or are currently being conducted at the Site:

- Mining on ML50237 and ML50238 will continue in line with the Life of Mine (LOM) Plan.
- Mining on ML50146 will continue in line with the LOM Plan.
- Waste dumps are located adjacent to the Phoenix pit on ML50237, as well as the East/West pits on ML50083 and the extension on ML50236 / ML50239.

- Access to the Phoenix Pit is via the haul road within ML50237 which joins O'Deas Road approximately 320 m to the east of its junction with Keoghs Road. This junction is approximately 30 m west of the entrance to the Aspal Pit (ML50146).
- There will be no "permanent infrastructure" located on any MLs other than the sedimentation dams and some roads, which will benefit the landowner and will be retained on relinquishment of the mining tenements. It is initially planned that all crushing, screening and processing of the limestone ore will be undertaken at the existing plant on ML50146. However, some mobile crushing may be undertaken in the pit on ML50237 in the future. This may also include portable office buildings.
- No permanent fuel storage is planned for the mining leases at this time. Fuel is delivered on an as-needs basis by the local distributor. Deliveries are usually once or twice per week. Diesel is stored on site in one above-ground bunded tank, of 10,500 litre (L) capacity.
- Fuel and any other flammable or combustible liquids are stored adjacent to the road between the weighbridge and workshop within Aspal Pit (ML50146).

2.3.2 Project Extraction Rates and Reserves

The approximate planned extraction rate will be up to 140,000 tonnes (t) of product saleable limestone. The mine production rates for 2020 and forecast rates for 2021 are presented in **Table 2**.

Table 2: Existing and Forecast Production Rates

Mine Production	2020 Production Actual (t)	2021 Production Forecast (t)
Run-of-Mine (ROM)	167,000	175,000
Product ²	131,000	150,000
Waste/Overburden	221,000	200,000
Total Tonnes Moved¹	388,000	385,000

Notes:

¹ Total tonnes moved is the total material mined (i.e. ROM and waste/overburden) at the Project.

² Product limestone is saleable material processed from ROM limestone.

Any planned increase in the extraction rates listed in **Table 2** will undergo formal risk assessment prior to implementation.

2.3.3 Operational Hours

The mine currently operates between 6:00am to 5:00pm on weekdays. Road truck haulage to/from site is normally between 6:30am to 5:00pm. Blasting is undertaken on average one-two times per month, generally between 10:00am and 3:00pm.

2.3.4 Environmentally Relevant Activities

The Environmentally Relevant Activities (ERAs) for the operation as per the EA EPML00136213 are outlined in **Table 3**.

Table 3: ERAs for the Site

Type	ERA	Location(s)
Extractive	ERA 16(2)(b) – Extractive and screening activities – extracting, other than by dredging more than >100,000 t but <1,000,000 t yr.	Lot 106 Plan ML623, Lot 1291 Plan M34534, Lot 178 Plan M34534, Lot 2 Plan RP36822
Extractive	ERA 16(2)(b) – Extractive and screening activities – extracting, other than by dredging more than >100,000 t but <1,000,000 t yr. ERA 16(3)(b) – Extractive and screening activities >100,000 t but <1,000,000 t yr.	Lot 1219 Plan M34519 and Lot 5 Plan SP236094
Mining	Schedule 2A 21: A mining activity that is an ineligible ERA, other than a mining activity mentioned in items 9 to 20.	ML50236, ML50237, ML50238, ML50239, ML50083, ML50146

2.3.5 Notifiable Activities

Notifiable activities are outlined in the Plan of Operations as: (29) Petroleum product or oil storage – storing petroleum products or oil (b) in above ground tanks with (ii) for petroleum products or oil in class 3 in packaging groups 3 of the dangerous goods code – more than 5,000 L capacity.

2.4 Environmental Management

The Project operates under the following statutory documents under the EP Act:

1. Environmental Authority EPML00136213; and
2. Plan of Operations 1 February 2020 to 31 January 2021, renewed annually.

This EMP has been produced for the Project, encompassing the entire site and includes the latest ecological survey results and recommendations. This EMP will be reviewed and amended as required for the Project moving forward. The Plan of Operations, which is renewed annually, provides for a detailed action program for implementing environmental protection and control commitments.

In addition, the Site operates under an Environment and Sustainability Policy which forms the basis for rigorous and consistent environmental management. The Environment and Sustainability Policy is a management tool implemented by Terrequip Environmental rather than a statutory requirement.

2.5 Rehabilitation

The rehabilitation progress and plans for the Project are outlined in **Section 6**.

3 General Environmental Management Conditions

Terrequip Environmental is committed to the following general environmental management conditions for the Project. The commitments below meet DES' requirements for:

- Estimated Rehabilitation Costs;
- Maintenance of measures for plant and equipment;
- Monitoring; and
- Storage and handling of flammable and combustible liquids.

3.1 Legislative Requirements

Terrequip Environmental is required to ensure that mining operations are conducted in accordance with all legislative requirements, including the *Mineral Resources Act 1989*, *Planning Act 2016* and the EP Act. Whilst this EMP is not a statutory requirement, it will be utilised to manage and mitigate potential environmental impacts at the Site.

3.2 Estimated Rehabilitation Costs

In accordance with Section 297 of the EP Act, Terrequip Environmental cannot carry out an activity or allow the carrying out of an activity under the EA unless an ERC decision is in effect, paid the scheme assurance and complied with the requirements under the MERFP Act. Terrequip Environmental is required to provide an Estimated Rehabilitation Cost (ERC) to DES in accordance with Section 298 of the EP Act. The ERC application is to state the amount the holder considers to be an estimate of the total estimated rehabilitation cost in accordance with the approved method in the DES guideline '*Estimated rehabilitation cost under the Environmental Protection Act 1994 (ESR/2018/4425)*'.

The total proposed ERC for the Project is **\$2,349,377**.

3.3 Maintenance of Measures, Plant and Equipment

With regards to maintenance measures of plant and equipment, Terrequip Environmental is required to ensure:

- That all measures, plant and equipment necessary to ensure compliance with the conditions of the EA are installed;
- That such measures, plant and equipment are maintained in a proper condition; and
- That such measures, plant and equipment are operated in a proper manner.

3.4 Monitoring

Terrequip Environmental is required to:

- Record, compile and keep for a minimum of five years all monitoring results required by the EA and make available for inspection all or any of these records upon request by the administering authority.
- Where monitoring is a requirement of approval, ensure that a competent person(s) conducts all monitoring.

3.5 Storage and Handling of Flammable and Combustible Liquids

Fuel is delivered on an as-needs basis by the local distributor. Deliveries are usually once or twice per week. Diesel is stored onsite in one above-ground bunded tank, of 10,500 L and one portable 2,000 L fuel cell. All spillage of flammable and combustible liquids must be contained within an on-site containment system and controlled in a manner that prevents environmental harm (other than trivial harm) and maintained in accordance with Section 5.9 of AS1940 – Storage and Handling of Flammable and Combustible Liquids of 2004.

The base and walls of all bunded areas must be constructed with a material impervious to its contents and be maintained free from gaps or cracks that may result in the loss of containment.

Flammable and/or combustible liquids are stored adjacent to the roadway between the weighbridge and workshop within Aspinall Pit (ML50146). Lubricants and waste oil are stored in a certified self-bunded dangerous goods storage container adjacent to the workshop. The Contractors' waste oil is temporarily stored in drums in an earthen bund, before regular removal by the mining contractor to an approved disposal facility.

3.6 Environmental Auditing

An internal environmental audit program is in place for the Project. Audits of the Project are used to ensure compliance with the EA (EPML00136213) and monitor environmental performance against Terrequip Environmental's Environment and Sustainability Policy Statement (**Appendix A**) and the commitments contained in this EMP.

3.7 Aesthetic Values

In order to improve the aesthetic appearance of the Site and reduce the visual impact of the mining operations, the following activities have been undertaken:

- Rows of tree screens have been planted along the roadside edge of ML50237 (fronting O'Deas Road)
- Tree screens have been planted along the northern and western boundary of ML50083;
- The office area (ML50146) has been improved by the planting of lawn and trees;
- Progressive rehabilitation is undertaken where possible; and
- Waste heaps are being reprocessed and disused excavations have been backfilled with waste rock wherever economically possible.

Clearing of existing trees will be minimised and suitable treed buffer strips have been provided adjacent to the O'Deas Road frontage to minimise the visual impact from mining use to adjoining properties and the road. Where existing tree cover is inadequate, additional tree planting will be carried out. A visual amenity report has been completed for the Site and is included in **Appendix B**.

4 Existing Environment

4.1 Regional Description

The Site is located in the Southern Downs and Granite Belt of Southeast Queensland, 160 km south-west of Brisbane and 21 km south south-east of the town of Warwick, within the Warwick Shire. The Shire covers an area of 4,725 km² and has a population of more than 21,000 people. With an elevation of approximately 450 m, the region has a temperate climate with mild summers and cold winters. The main industries in the region are agriculture, forestry and fishing.

4.2 Project Site

The Site is situated approximately 21 km south south-east of Warwick. The area consists of rolling hills and is located at the top of the Condamine River catchment which is a sub-basin of the greater Murray Darling and Bulloo Basin.

The nearest habitation is a cluster of buildings including a homestead and other buildings, located approximately 300 m north-west of ML50236 and a homestead approximately 300 m north-east of ML50237. The Cherrabah Resort is located approximately 3 km south-west of the Site. Although there is little through traffic on the public roads passing the operation, it is noted that Keoghs Road along the western side of ML50237 provides the only access to the Cherrabah Resort.

4.3 Site Topography

The Site is characterised by low undulating hills dominated by a mosaic of open pastures and isolated patches of mid-high regrowth open forests on crests. The Site is largely cleared and grassed for grazing purposes. Few large, mature trees are present. Small trees are present throughout, but these mainly appear to be regrowth in previously cleared areas.

4.4 Climate

The Site lies between two weather monitoring stations, Warwick (21 km north-west, Station No. 041525) and Applethorpe (27 km south-west, Station No. 041175). Climate data for these weather monitoring stations is shown in **Table 4**. The prevailing wind direction at the mining operation is south to south-easterly.

Table 4: Climate Data for Warwick and Applethorpe

Data	Units	Warwick	Applethorpe
Mean daily maximum temperature	°C	30.1	28.5
Mean daily minimum temperature	°C	3.0	1.9
Mean annual rainfall	mm	681.6	763.6

Source: Bureau of Meteorology, 2017.

4.4.1 Air Quality

Monitoring of dust deposition gauges has been undertaken at 12 locations around the Project's boundaries. The annual average and maximum monthly average insoluble dust deposition monitoring data is presented in **Table 5** and **Table 6**, respectively.

Table 5: Annual Average Insoluble Dust Deposition Data (g/m²/month)

Dust Gauge	1	2	3	4	5	6	7	8	9	10	11	12
2012	1.6	4.3	1.0	1.1	7.2	1.6	2.9	5.2	1.5	1.3	1.6	1.9
2013	2.0	1.1	1.1	1.4	0.8	1.1	0.6	1.6	2.3	0.7	1.2	1.6
2014	2.0	1.2	1.6	1.8	1.8	0.9	0.7	1.2	2.1	1.2	0.8	0.7
2015	1.7	1.3	1.2	1.7	1.0	0.9	0.9	1.2	1.7	1.8	0.9	1.1
2016	1.3	0.9	0.7	1.2	0.6	0.7	0.5	1.1	1.1	1.0	1.1	0.7
2017	1.2	0.9	0.6	0.9	0.6	0.5	0.5	0.5	0.8	1.0	1.0	0.6
2018 ¹	0.9	0.6	0.6	1.2	0.6	0.5	0.4	0.7	0.6	0.5	0.6	0.4

Note:

¹ 2018 data was collected up to 17 October 2018.

Table 6: Maximum Monthly Average Insoluble Dust Deposition Data (g/m²/month)

Dust Gauge	1	2	3	4	5	6	7	8	9	10	11	12
2012	2.6	8.6	2.8	2.2	5.3	4.2	8.3	3.9	3.0	3.9	2.8	4.5
2013	4.5	4.4	3.4	2.9	2.8	3.4	4.8	3.7	12.7	2.8	2.8	4.2
2014	3.8	2.7	3.2	3.7	4.2	1.5	2.2	2.8	6.3	2.8	1.9	1.4
2015	3.9	2.4	2.5	4.1	2.4	3.5	3.6	2.4	4.9	6.5	2.3	5.8
2016	2.6	1.7	1.1	1.8	1.3	2.5	1.5	3.5	3.4	2.5	2.7	0.9
2017	1.9	1.2	0.9	1.3	1.1	0.9	0.8	0.8	1.3	2.5	1.8	1.2
2018 ¹	1.6	1.1	1.2	3.9	1.0	0.9	0.6	3.3	1.6	0.7	1.2	0.9

Note:

¹ 2018 data was collected up to 17 October 2018.

The most significant pollutant potentially generated from the mining operation is particulate matter (PM₁₀) (particles that have an aerodynamic diameter less than or equal to 10 µm). The EA specifies a limit of 120 mg/m²/day, equivalent to 3.6 g/m²/month, at any sensitive or commercial place. The monitoring locations are all within the boundaries of the mining lease, and so exceeding the limit at

these locations is not a breach of the EA, rather it provides a screening measurement that there may be an issue.

There are less than 35 residential dwellings and businesses within a 5 km radius of the mining operations. Dust gauge 12 is approximately 300 m west south-west from a residential dwelling. Although vegetation on the property would provide some reduction in dust levels, it has been recommended that a directional dust deposition gauge be installed at this location if an exceedance occurs again. This would assist with identification of sources.

There are no other known additional operations in the general vicinity of the mining operations that are considered a major source of dust.

4.4.2 Noise

Sources of noise and vibration at the Site include mining and processing, activities include:

- Vegetation clearing;
- Topsoil stripping and stockpiling;
- Overburden stockpiling;
- Crushing, grinding and screening;
- Movement of trucks;
- Blasting; and
- Mining.

The mine currently operates from 6:00am to 5:00pm on weekdays (extractive activities between 6:30am and 4:30pm). Road truck haulage to/from site is normally between 6:30am to 5:00pm. Blasting is undertaken on average one or two times per month, generally between 10:00am and 3:00pm.

Palmer Acoustics have conducted four noise assessment reports for the processing operations from 2012 to 2016. Based on Palmer Acoustic's reporting, the noise levels from the mobile crusher have been determined to achieve the daytime EA limits but exceed the evening and night limits. Noise from the fixed plant (i.e. crusher and related activities) has been determined to achieve the day, evening and night noise limits.

Mining and crushing (both fixed and mobile) are complaint if restricted to daytime hours (e.g. 7am to 6pm Monday to Saturday).

4.5 Local Watercourses

The Site is located at the top of the Condamine River catchment which is a sub-basin of the greater Murray Darling and Bulloo Basin. There are two key receiving waterways for the Site, namely; Lord John Creek and the Condamine River. Both of these watercourses are recognised under the *Water Act 2000*.

Lord John Creek, an ephemeral creek, is located to the west of the East West Pit (ML50083, ML50236 and ML50239). The Site is located on a ridge line and as such most of the catchment for the East West Pit operational area flows west into Lord John Creek. Lord John Creek flows for approximately 9 km to the confluence with Oaky Creek which is a tributary of the Condamine River.

The Condamine River is located to the north-east of the Site. The Aspinall (ML50146) and Phoenix (ML50237 and ML50238) catchment drain to the Condamine River along several unnamed tributaries.

4.6 Onsite Water Storage

The majority of surface water generated from the Site is surface runoff from disturbed areas such as the product stockpiles and out-of-pit waste dumps. To manage water at the Site, Terrequip Environmental has numerous water storages, drains and pumps to both ensure ongoing supply of water to the Site for on-site dust suppression and to retain and settle any contaminated water prior to any release off-site during rainfall events.

A Water Management Plan exists for the Site and incorporates all operations (**Appendix C**). This plan details the specifications and locations of the sedimentation dams. No Referable Dams, Hazardous Waste Dams or potable water supply dams are planned on the site.

4.7 Stormwater

Stormwater is controlled on the Site through the use of East West Pit (ML50083) which can be pumped to top up site dams as required. Excess water can be pumped to a holding dam on ML50083. The Site currently has a storage capacity of 130 cubic metres (m³) for each hectare of disturbance in the form of catch drains, silt traps and sedimentation ponds.

The Plan of Operations states that stormwater control bunds will be constructed around waste dumps, to separate mine affected water from clean water runoff areas.

4.8 Groundwater

The MLs lie predominantly in an area of aquifer lithology with the following descriptions:

- Acid to intermediate volcanics (e.g. andesite, rhyolite, tuff); and

- Sedimentary strata (e.g. sandstone, shale and conglomerate).

Groundwater resources in the vicinity of the MLs are characterised as suitable for most purposes, marginal for human consumption and low salt-tolerant crops, with a salinity range of 500-1500 mg/L (total dissolved salts) and a bore yield less than 5 litres per second.

The operation uses one sub-artesian bore located on ML50146 to take underground water from a depth of 38 m below the ground surface. This bore is licensed for industrial purposes and has a nominal allocation of 10 megalitres.

4.9 Geology

4.9.1 Regional Geology Description

There are five specific geological formations within the operational area contained by the mining leases as shown in **Table 7**.

Table 7: Geological Formations Within the Mining Leases

Period (oldest to youngest)	Formation	Description
Upper Permian or Triassic (Palaeozoic)	Connolly Volcanics	Coarse andesitic pyroclastics and flows; minor lithic sandstone; limestone lenses near top
Silurian to Lower Devonian (Palaeozoic)	Rosenthal Creek Formation	Sandstone and mudstone, chert, intraformational conglomerate, limestone
Upper Permian or Triassic (Palaeozoic)	Greymore Granodiorite	Diorite
Lower Triassic (Mesozoic)	Stanthorpe Adamellite	Adamellite
Lower Jurassic (Mesozoic)	Marburg Sandstone	Feldspathic to feldspathic sublabile sandstone, pebbly in part, lesser siltstone, mudstone Basal pebbly arkose in west

Source: Australia 1:250,000 Geological Series, Warwick Sheet SH56-2 (1972)

4.9.2 Site Geology Description

The Warwick limestones have been metamorphosed and fault-dissected to form small, scattered lenses of coarse-grained marbles. The marble is mostly near white and generally contains fractures coated with an iron oxide film. There are also large patches of grey marble and a streaky grey-white variety. The host formation consists of sandstones, siltstones and volcanic rocks, intersected by green andesite dykes.

The marbles are generally massive with no visible bedding as they are likely near vertical to steeply dipping. At places along the western side of the existing quarry on ML50083, there is a steep dipping contact between the marbles and the dark greenish-grey shale that strikes roughly north-south. It appears that no limestone occurs beyond this contact. The depth of the marble has not been determined.

4.10 Soils

According to the Soil Map of Australia (Queensland) 5M, the dominant soil type in the immediate vicinity of the mining operations is yellow and yellow-grey duplex soils (Dy). A duplex soil is often characterised by a sandy or loamy surface horizon with a sharp to clear boundary to a clay subsoil (Northcote, K.H., 1979).

4.10.1 Strategic Cropping Land

The purpose of the *Regional Planning Interests Act 2014* (RPI Act) is to identify areas of Queensland that are of regional interest because they contribute to Queensland's economic, social and environmental

prosperity. Strategic Cropping Area (SCA) is defined under the RPI Act as an area of regional interest which is comprised of Strategic Cropping Land (SCL). SCL is land that is or likely to be highly suitable for cropping based on the land's soil, climate and landscape features.

Under the RPI Act, it is an offence to carry out a development on SCL, or potential SCL, that has a permanent or temporary impact on the land without approval. Resource developments must avoid and minimise to the maximum extent possible any temporary or permanent impacts on identified SCL. Where this is not possible, mitigation of permanent impacts may be required.

As shown on

Figure 2 there is no SCL located within the ML areas or within the vicinity of the Project.

4.10.2 Good Quality Agricultural Land

Good Quality Agricultural Land (GQAL) is a system which is used to determine if land is capable of sustaining agricultural use without causing degradation of the land itself or other natural resources. Class A is considered to be GQAL in all locations, however, Class B and C are only conditionally identified as GQAL. The implementation of the State Planning Policy requires Local and State Governments, as well as applicants, to be aware of GQAL.

GQAL for the site was assessed through current mapping data. As shown on **Figure 3** there is no GQAL located within the MLs or within the vicinity of the Project.

Figure 2: Strategic Cropping Land

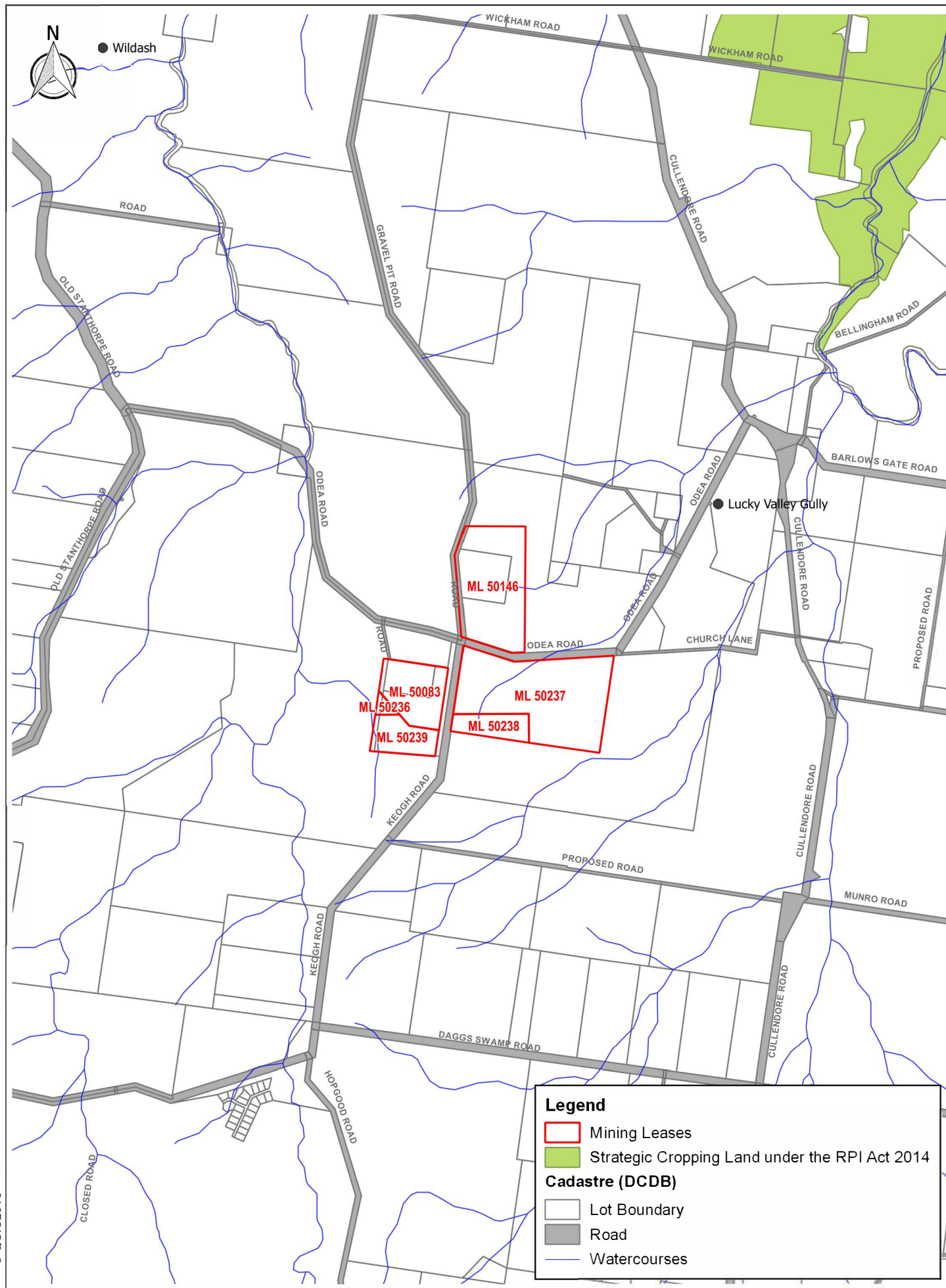
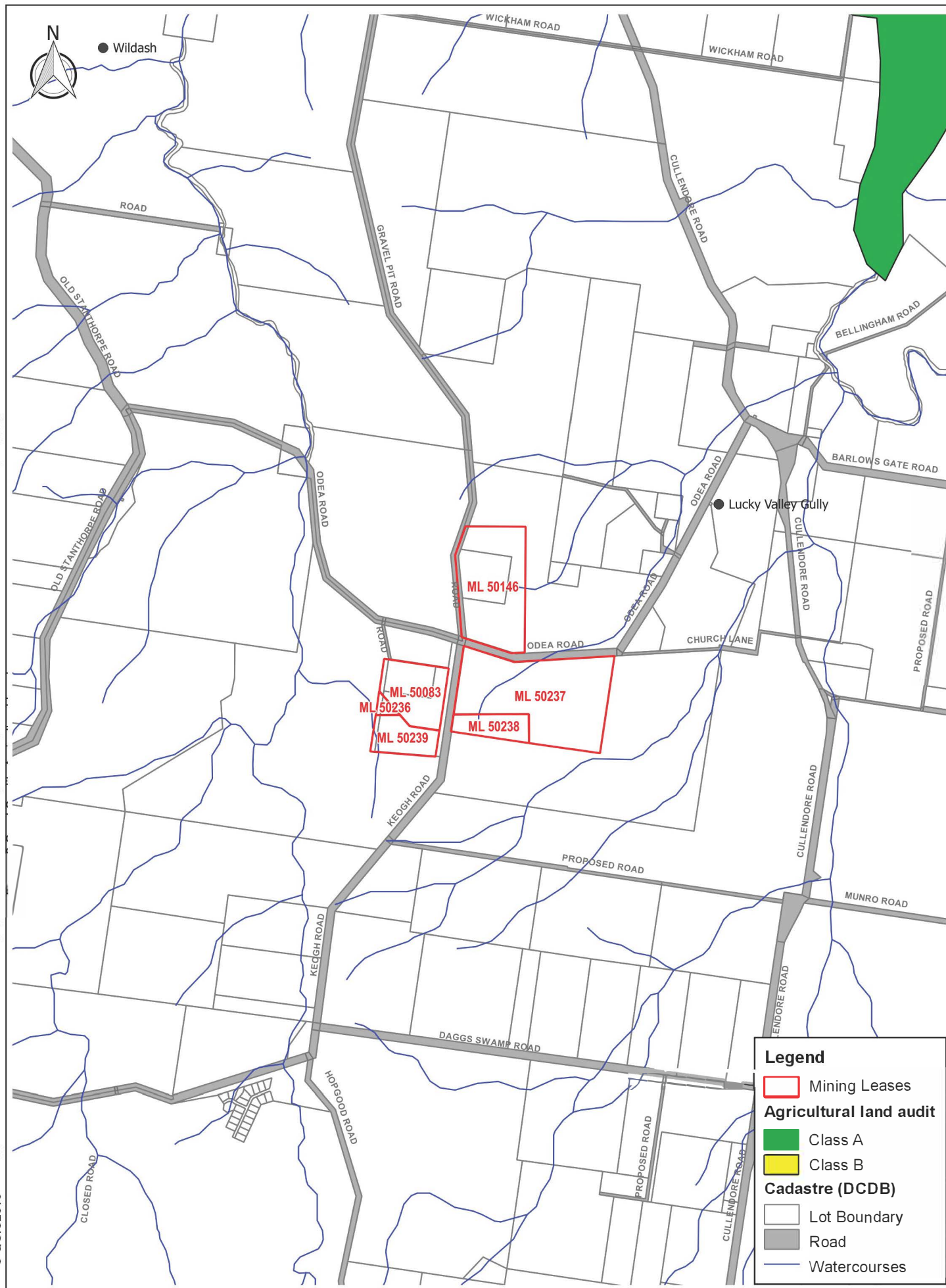


Figure 3: Good Quality Agricultural Land



4.11 Nature Conservation

Three terrestrial flora and fauna surveys and assessments have been undertaken at the Project:

- *Targeted Flora and Terrestrial Vertebrate Fauna Assessment* (Biodiversity Assessment and Management Pty Ltd [BAAM], 2009).
- *Warwick Limestone Mine – Phoenix Pit Ecology Report* (Epic Environmental, 2017) i.e. based on current mining operations only in ML50237 and ML50238.
- *Warwick Limestone Mine – Aspinall Pit Ecology Report* (Epic Environmental, 2018) i.e. based on current mining operations only in ML50146.

The findings from these reports are outlined in the following sections, with a focus on Phoenix Pit and Aspinall Pit (i.e. current focus of mining operations).

The locations of ecological features applicable to the Project can be seen in **Figure 4**.

4.11.1 Flora (Phoenix Pit)

The grassland located north of the existing pit was considered to possibly be the Commonwealth Threatened Ecological Community (TEC) *Natural grasslands on basalt and fine-textured alluvial plains of northern NSW and southern Queensland* (BAAM 2009). Whilst the grassland meets several criteria; it is mapped as occurring on sandstone derived sediments (Land Zone 9) and is not associated with an alluvial area. Therefore, the grassland does not qualify as a TEC.

Historical aerial mapping of the site shows that the grassland area has been untouched for over 20 years and site assessment of species composition suggests that the grassland could be regarded as Remnant under the VM Act and in good condition. If mapped as a grassland it could only be considered to be RE 11.9.3, a Least Concern (VM Act) with a biodiversity status of “No Concern at present”. It is however more likely to be an open patch of grassland formed by historic clearing of the surrounding grassy woodland RE 11.9.9 and is therefore considered to be a “derived” grassland. Being Least Concern under the VM Act and having a No Concern at Present Biodiversity status, this grassland does not represent a development constraint at the State level.

There appears to be no statutory reason for the identification of habitat trees within the Project area. Review of the threatened species likely to occur on the site, either via online searches or by on-ground confirmation of habitat, suggest that the trees do not provide habitat for threatened species and therefore, do not present a constraint to development of the site.

4.11.2 Flora (Aspinal Pit)

Previously the vegetation located on the western side of Aspinal Pit was mapped as RE 11.9.9/11.9.13. A ground-truthing vegetation survey was undertaken of the extant remnant vegetation community (under the *Vegetation Management Act 1999* (VM Act)) within the mapped Essential Habitat area on the west side of Aspinal Pit. This vegetation is described as tall grassy woodland whose canopy is dominated by gum-topped box *Eucalyptus moluccana* with associated occurrences of narrow-leaved ironbark *E. crebra*. The shrub layers of this community are very sparse to almost absent and the ground layer is dominated by a mixture of native grasses with very sparse occurrences of native forbs.

The occurrence of narrow-leaved ironbark throughout this community defines this Regional Ecosystem as the Least Concern (VM Act) RE 11.9.9.

RE 11.9.13 was not present within the area surveyed and was not observed within the neighbouring road reserve. Government based mapping will need to be updated to reflect this ground-truthed mapping change. As at time of writing, a Property Map of Assessable Vegetation (PMAV) Application has not been submitted to DNRME to undertake this change.

4.11.3 Fauna (Phoenix Pit)

No threatened species of fauna were considered likely to occur. The field survey identified a total of 102 fauna species of which none were species of national and/or state-level conservation significance.

4.11.4 Fauna (Aspinal Pit)

In order to adequately address the Essential Habitat mapping and the associated record of Spotted-tailed Quoll *Dasyurus maculatus* located within Aspinal Pit (specifically, -28.3876, 152.1136 with an error of 500 m), a targeted survey was undertaken on 31 May 2018.

Spotted-tailed Quoll is listed as Vulnerable under the *Nature Conservation Act 1992* (NC Act) and Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

It is noted that there is no species-specific survey method for Spotted-tailed Quoll recommended by the Queensland Government. Survey methods are however provided by the Commonwealth in *Survey guidelines for Australia's threatened mammals*. These methods include:

- Daytime searches for habitat resources, including potential den sites;
- Daytime searches for signs of activity, scats and latrines;
- Baited hair funnels (hair tubes); and
- Camera traps.

Hair funnels should be in place for a minimum of 14 consecutive nights and camera traps for three weeks.

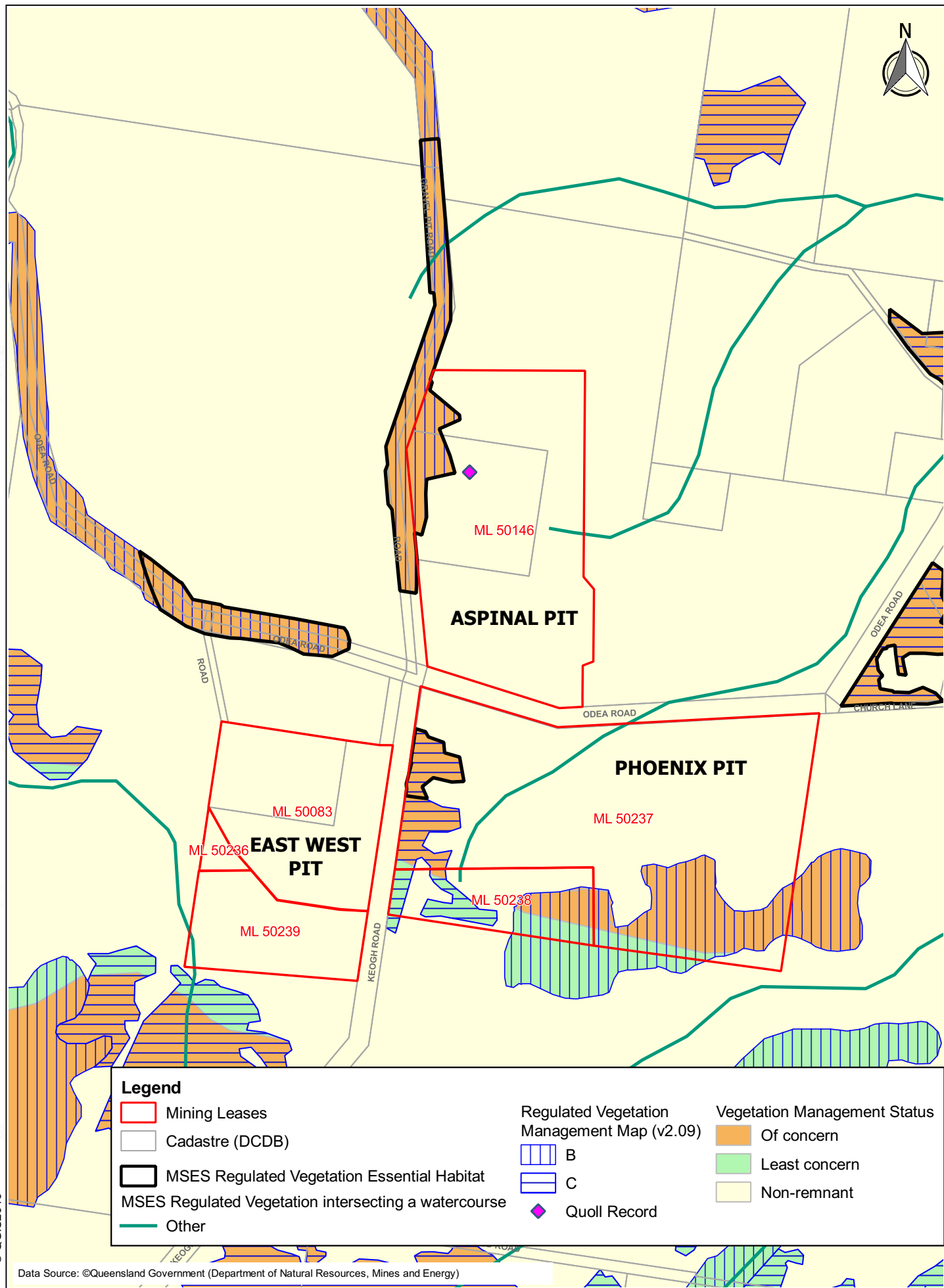
For the fauna survey undertaken on Aspal Pit, five (5) camera traps were installed, and twenty-four (24) baited hair funnels were placed within the Essential Habitat area and direct surrounds. It is noted that Aspal Pit is a current, active mine site and traps were located to concentrate on the area of interest and avoided areas such as the mine pit, stockpiles areas and haul roads. The placement of the camera traps and the baited hair funnels provided a well-covered sampling regime, with the Site being 51.03 ha. Additionally, the site was searched for four hours, with an emphasis on potential den sites and scats / latrines. Hair funnels and camera traps were left onsite for three weeks and collected on 20 June 2018.

No evidence of the presence (either current or historic) of Spotted-tailed Quoll was found on the Site during the presence absence survey.

Furthermore, the Essential Habitat documented factors for Spotted-tailed Quoll in relation to vegetation community requirements were not identified on the Site nor in the adjoining road reserve. There are no rocky areas or ridges present at the site nor are there any coastal heathlands or riparian forests. Whilst hollow logs were present, there were no recent or historic Spotted-tailed Quoll scats or latrines located in their vicinity (or anywhere on the Site). This was further supported by the presence absence survey which did not detect any evidence of Spotted-tailed Quoll at the Site.

Based on area, habitat quality, ongoing disturbance from cattle and the current ongoing, operational mining activity, the Site is not considered to provide essential resources for use by Spotted-tailed Quoll at any stage of its life-cycle and should not be considered Essential Habitat for the species. This assertion has been documented to both DNRME and DES during the 2018 EA Amendment Application process.

Figure 4: Ecological Features



Pest Animals

Pest species recorded on-site are detailed in **Table 8** along with their category listing under the *Biosecurity Act 2014*.

Table 8: Pest Animals

Scientific Name	Common Name	Category under <i>Biosecurity Act 2014</i>
<i>Felis catus</i>	Cat	3, 4, 6
<i>Oryctolagus cuniculus</i>	European Rabbit	3, 4, 5, 6

Both pest animal species are listed as Category 3, 4 and 6 matters under the *Biosecurity Act 2014*, the European Rabbit is also listed under Category 5. These categories mean that you cannot supply these species to another person or release them into the environment. Furthermore, a person cannot spread these pest species nor encourage their presence by feeding them.

4.11.5 Ecology Surveys (2017 and 2018) - Vegetation Communities and Regional Ecosystem Classification

The Herbarium Regional Ecosystem mapping was found to be accurate with RE 11.9.9 and RE Regional Ground-truthed Regional Ecosystems (REs) which occur in both Aspal Pit (ML50146) and Phoenix Pit (ML50237 and ML50238) are tabulated in **Table 9**.

Table 9: Ground-truthed Regional Ecosystems

Regional Ecosystem	Brief Description	VM Act Status*	Biodiversity Status	Total Area within ML (ha)
Aspal Pit (ML50146)				
11.9.9	<i>Eucalyptus crebra</i> woodland on fine-grained sedimentary rocks	LC	NC	5.2
Phoenix Pit (ML50237 and ML50238)				
11.9.9/11.9.13	<i>Eucalyptus crebra</i> woodland on fine-grained sedimentary rocks / <i>Eucalyptus moluccana</i> or <i>E. microcarpa</i> open forest on fine grained sedimentary rocks	OC	OC	11.4
11.9.9	<i>Eucalyptus crebra</i> woodland on fine-grained sedimentary rocks	LC	NC	2.9

*VM Act = *Vegetation Management Act 1999*; LC = Least Concern, OC = Of Concern, NC = No Concern

Of these REs, it is recognised that RE 11.9.9/11.9.13 which occurs within Phoenix Pit is classified as regulated vegetation (Category B).

Habitat Diversity and Connectivity

Most of the Site is composed of non-remnant vegetation with patches of remnant vegetation dominated by ironbark open forests. Minor occurrences of gum-topped box and forest redgum open forest occur scattered throughout the site. Habitat connectivity within the site is slightly fragmented due to current mining operations. Habitat connectivity to the wider landscape is maintained through connection of remnant and regrowth woody vegetation within a soft matrix of open grazing pasture.

4.12 Cultural Heritage

4.12.1 Aboriginal Heritage

Aboriginal cultural heritage remains are a record of the past occupation of the landscape by Aboriginal people. There is the potential for isolated Aboriginal archaeological artefacts (e.g., stone tools) or surface scatters (e.g., shell middens) to be present on land within the project area. These are more likely to occur in areas close to sources of permanent water (rivers, creeks and wetlands) or around stony rises.

There is no recorded Aboriginal cultural heritage on the Site. Terrequip Environmental has a duty of care to take all reasonable and practicable measures to ensure the activities of the Warwick Limestone Mine do not harm Aboriginal cultural heritage. Terrequip Environmental is committed to ensuring that no damage is done to cultural heritage sites of significance in the areas they are responsible for. Due to the previous disturbance by farming activities on the lease areas, it is unlikely that mining activities will impact on any unknown Aboriginal archaeological artefacts.

4.12.2 European Heritage

Searches of State and National databases have indicated that there is no recorded European cultural heritage on site. The property located approximately 330 m north-west of ML50236 is claimed by the owner to be of historical interest. Terrequip Environmental is committed to actions that will protect the environs of the lease area.

4.13 Local Community and Industry

There are less than 35 residential dwellings and businesses within a 5 km radius of the mining operations. Within the last five years, no known complaints have been received from local businesses with regards to mining operations. Terrequip Environmental is pro-actively managing surrounding landowners by keeping them involved and informed throughout ongoing operations.

A traffic survey was conducted on O'Deas Road in July 2009, which measured traffic volumes and average vehicle speeds. The results indicated that the survey is consistent with an earlier survey conducted in 2003. The survey confirmed that traffic volume along O'Deas Road is very low compared to road capacity and that no impact or delays are expected due to haulage vehicles crossing the road. Speed reduction signage (60 km/hr) has been installed at the junction with the haul road to reduce current travel speeds.

4.13.1 Community Consultation

Terrequip Environmental is committed to respecting the rights and interests of individual citizens, relevant organisations and the communities in which it operates. Terrequip Environmental engages with

affected stakeholders (including; adjoining properties, local and State Government, Traditional Owners and local community groups) and the wider regional community through its established procedure on Community and Stakeholder Engagement.

A range of two-way communication tools are being used to engage stakeholders and the community, including, but not limited to; one-on-one meetings, community meetings and Terrequip Environmental's website.

Terrequip Environmental have an approved Cultural Heritage Clearance Statement and associated Cultural Heritage Management Agreement (CHMA), which provides for the protection or relocation of any cultural heritage artefact/s.

4.14 Waste

Waste relates to non-mineral waste and includes regulated waste under the EP Act and general waste. Proposed amendment activities are not expected to significantly change the sources or volumes of waste generated, which are managed on the existing MLs.

4.15 Visual Amenity

In order to improve the aesthetic appearance of the existing Site and reduce the visual impact of mining operations, the following activities have been undertaken:

- Tree screens have been planted along the roadside of ML50237 (fronting O'Deas Road)
- Tree screens have been planted along the northern and western boundary of ML50083;
- The office area on ML50146 has been improved by the planting of lawn and trees;
- Progressive rehabilitation is undertaken where possible; and
- Waste heaps are being reprocessed and disused excavations have been backfilled with waste rock wherever economically possible.

Where existing tree cover is inadequate, additional tree planting will be carried out. A Visual Amenity Report has been appended for further information (**Appendix B**).

5 Environmental Commitments

This section outlines commitments for the relevant environmental values at the Warwick Limestone Mine. These commitments are designed to ensure appropriate strategies are in place for environmental protection.

In addition to these commitments, Terrequip Environmental must comply with the conditions outlined in EA EPML00136213.

5.1 Air

The limestone processing plant is a crushing and grinding plant, consisting of dry processes. Therefore, dust generation is the primary impact of the mining operations related to air quality. There are no other known additional operations in the general vicinity of the mining operations that are considered a major source of dust.

5.1.1 Air Quality Protection Commitments

A Dust Management Plan (DMP) has been developed for the site (**Appendix D**). This includes details of procedures for minimisation of fugitive dust, monitoring of dust emissions, recording and investigation of complaints and other aspects of air emissions management.

Air quality environmental protection commitments for the operation have been provided in **Table 10**. Commitments include objectives, indicators / standards and control strategies to minimise dust emissions.

Table 10: Environmental Protection Commitments – Air

Aspect	Commitment
Objectives	To maintain ambient air quality level within currently measured values for existing operations and ensure that emissions do not affect sensitive sites.
	To minimise the air pollution caused by operational activities and reduce emissions to the lowest practicable level.
	The release of dust or particulate matter or both resulting from the mining activity must not cause an environmental nuisance, at any sensitive or commercial place.
Indicators / Standards	Management of manufacturing process and parameters to reduce emissions.
	The use of well-maintained plant only.
	Compliance with the Queensland <i>Environmental Protection (Air) Policy 2008</i> and other DES air quality guidelines.
Control Strategies	Implementation of and conformance with the Site DMP.
	Minimisation of fugitive dust emissions: ■ Cessation of blasting and removal of topsoil when critical wind speeds of 5.4 m/s in the direction of sensitive receptors are reached. ■ Review of processing on the site when critical wind speeds of 5.4 m/s in the direction of sensitive receptors are reached.

Aspect	Commitment
	▪ Orientation of topsoil and overburden stockpiles in consideration of prevailing wind directions to minimise potential for windblown dust. ▪ Revegetation of topsoil and overburden stockpiles of as soon as practicable to minimise wind erosion. ▪ Extraction of material by excavator and truck at a grade beneath the mine face where practicable (occasionally oversize material is transported to an area where it can be broken outside of the pit and then loaded onto haul trucks). ▪ Regular inspection of cyclones during drilling to ensure that they are functioning properly. ▪ Inspection and maintenance of dust collectors to ensure they are operating properly. ▪ Location of mobile crushing and screening operations in an area with the least potential to result in adverse dust impacts (i.e. use topographical shielding from natural landforms or man-made barriers). ▪ Water spraying of stockpile area as required based on visual inspection, or when wind speeds exceed 5.4 m/s in a direction towards sensitive receptor locations. ▪ Location of stockpiles in areas with natural or alternative shielding whenever and wherever practicable. ▪ Assessment of the need to construct windbreaks along the boundary of stockpiling area(s). ▪ Limitation of stockpile size where possible. Priority should be given to minimising stockpiling for materials with low threshold velocities wherever and whenever practicable. ▪ Watering of haul roads during adverse wind conditions, as assessed by visual inspection. ▪ Covering of haulage trucks transporting materials off site with tarpaulins after being loaded. ▪ Strict adherence to speed limit onsite. ▪ No burning of material will be conducted onsite. ▪ Maintenance of appropriate buffer distances between dust generating activities and sensitive receptors. Monitoring of dust emissions: ▪ Undertaking of air quality monitoring in accordance with the DMP. ▪ Modification of non-compliant dust sources as appropriate. ▪ Regular inspection of plant and equipment operating at the Site to ensure that it is in good working order, with maintenance and repair as required. ▪ Regular monitoring of operators' manner of operation to ensure that potential for dust emissions is minimised. ▪ Recording and investigation of all complaints, with implementation of corrective actions as appropriate, in accordance with the DMP. ▪ Regular review of monitoring data, investigation of any non-conforming results and amendment of operational procedures and activities as appropriate.

5.2 Noise

The mine currently operates between 6:00am to 5:00pm on weekdays (extractive activities between 6:30am and 4:30pm). Road truck haulage to/from site is normally between 6:30am to 5:00pm. Blasting is undertaken on average one-two times per month, generally between 10:00am and 3:00pm.

Sources of noise and vibration at the Site include mining and processing, activities include:

- Vegetation clearing;
- Topsoil stripping and stockpiling;
- Overburden stockpiling;
- Crushing, grinding and screening;
- Movement of trucks;
- Blasting; and
- Mining.

To ensure sensitive receptors are not impacted by noise, Terrequip Environmental has implemented measures such as restricting blasting activities to specific daylight hours and limiting hours of operation.

5.2.1 Noise Protection Commitments

Noise related environmental protection commitments for the operation of the Project are outlined in **Table 11**. Commitments include objectives, indicators / standards and control strategies to minimise noise related complaints and issues.

Table 11: Environmental Protection Commitments – Noise

Aspect	Commitment
Objectives	To avoid or satisfactorily mitigate the industrial deafness and general noise pollution risks.
	To comply with relevant noise limits and relevant legislation, including <i>Environmental Protection (Noise) Policy 2008</i> (EPP Noise) and the <i>Work Health & Safety Regulation 2011</i> .
	Noise from the mining activity must not cause an environmental nuisance, at any sensitive or commercial place.
Indicators / Standards	Compliance with relevant noise limits and relevant legislation, including EPP Noise, Occupational Health & Safety regulations and other DES noise guidelines.
	The provision of appropriate hearing protection (where required) for onsite personnel and contractors.
	No justifiable complaints received about noise.
Control Strategies	To continue to advise DES as soon as practicable on receipt of any environmental noise complaints.
	To conduct investigations of environmental noise complaints if and when received, and amendment of operational procedures and activities as appropriate.
	Management of noise in accordance with the EPP Noise.
	Restriction of blasting activities to specific daylight hours.
	Implementation of Noise Management Program including procedures for responding to noise complaints, identification and assessment of actual and potential sources of noise and corrective and preventive measures to minimise nuisance noise.

5.3 Water

5.3.1 Water Supply

A Site Water Management Plan (**Appendix C**) has been developed for the Project and details the specifications and locations for the sedimentation dams. Stormwater and accumulated groundwater from the existing and proposed operations will be directed as described in the Site Water Management Plan. However, the location and size of some sedimentation dams have been modified as a result of changes to pit and waste dump design.

5.3.2 Water Usage

The processes used to produce limestone products at the Project are generally dry processes. Therefore, site water usage is anticipated to be moderate and limited to stockpile watering, and dust suppression for plant, access roads and haul roads.

Potential impacts of Project activities on existing water resources include run-off from product stockpiles and overburden dumps causing sediment deposition. Acid drainage from the waste dumps is not considered to be a problem, given the type of material mined is limestone.

5.3.3 Water Protection Commitments

Water related environmental protection commitments for the operation of the Project are included in **Table 12**. Commitments include objectives, indicators / standards and control strategies to minimise dust emissions.

Table 12: Environmental Protection Commitments – Water Supply and Usage

Aspect	Commitment
Objectives	Minimisation of water usage.
	To ensure that operations do not impact off-site surface water or groundwater values.
Indicators / Standards	Compliance with QWQG (2013).
	Compliance with <i>Water Act 2000</i> if required.
	Compliance with <i>Environmental Protection (Water) Policy 2009</i> .
	Compliance with relevant ANZECC (2000) water quality and monitoring guidelines where relevant.
	Compliance with Local Authority guidelines for sewage treatment systems where relevant.
Control Strategies	Conformance with the Site Water Management Plan.
	Minimisation of the amount of water discharge from site by maintaining 0.5 m of freeboard on dams by regularly removing sediment.
	Design of sedimentation dams with a capacity to ensure that the dams are capable of containing runoff from a 1:10 year storm event without uncontrolled discharge.
	Ensure that sediment dams onsite comply with relevant design criteria.
	Ensure that the quality of water on site complies with the QWQG (2013) water quality and ANZECC (2000) monitoring guidelines as relevant.
	Ensure that erosion control measures are installed to minimise sedimentation of surface water runoff, for example, on cleared areas and topsoil stockpiles.
	Ensure that material is not deposited in or adjacent to watercourses.
	Monitoring to be undertaken in accordance with the Site Water Quality Monitoring Plan.
	Conduct regular maintenance of runoff control measures, including diversion banks and sediment dams.
	Maintenance of vegetative cover where practicable to minimise erosion and silt generation.
	Regular review of monitoring data, investigation of any non-conforming results and amendment of operational procedures and activities as appropriate.
	To obtain and comply with requirements of <i>Water Act 2000</i> if required in the future for water supply and storage facilities.
	To ensure that all sewage treatment systems are managed in accordance with Local Authority guidelines.

5.4 Waste

Waste material generated by current mining activities includes:

- Comingled office commercial waste;
- Waste stone and overburden,
- Waste oil drums and chemical containers,
- Scrap steel,
- Tyres from heavy machinery and company vehicles, and
- Wooden pallets.

The total waste stone and overburden from the Project was 221,000 t in 2017 and is forecast to be 160,000 t in 2018. This overburden contains low grade limestone which will be crushed for road rubble where feasible and sold to external customers or used to install new all-weather access roads. All remaining materials are deposited on the waste rock dump.

Mining industrial and domestic wastes generated by the current operations are collected from the plant areas in conventional waste receptacles and stored pending disposal in the main plant area on ML50146. These wastes are disposed of as required to an approved waste facility. Scrap steel and batteries are recycled.

5.4.1 Waste Protection Commitments

Waste related environmental protection commitments for the operation of the Project are outlined in **Table 13**. Commitments include objectives, indicators / standards and control strategies to minimise waste.

Table 13: Environmental Protection Commitments – Waste

Aspect	Commitment
Objectives	To implement waste reduction, re-use and recycling measures.
	To dispose of wastes in a manner that does not cause any environmental harm.
Indicators / Standards	To provide appropriate waste storage facilities for wastes prior to their disposal.
	Compliance with DES Waste Management Policy, Regulations and guidelines.
	Provision of appropriate waste storage facilities onsite and the use of approved waste disposal facilities off-site.
	Recycling of scrap steel and batteries (and other materials as practicable).
	Registration of any contaminated land on the DES Contaminated Land Register (CLR).
Control Strategies	Management of all onsite waste handling facilities in accordance with DES waste regulations and guidelines.
	Disposal of all waste at approved waste disposal facilities.
	Handling and disposal of all waste products using methods to avoid contamination of land, surface water and groundwater.
	Establishment of a waste register for the site.
	Maintenance of an onsite register of potential contamination and remediation of any contaminated land prior to surrender of lease.

Aspect	Commitment
	The waste dump shall be reduced and progressively cleaned up by: 1. recycling scrap material; 2. disposing of any hazardous wastes in an approved manner; and 3. disposing of other wastes in an approved waste disposal facility.

5.5 Land

The site is currently characterised by low undulating hills dominated by a mosaic of open pastures and isolated patches of mid-high regrowth open forests on crests. Rehabilitation at the Project generally includes revegetation of the site to a pre-mining condition, suitable for grazing activities. A detailed Rehabilitation Plan for the Project also provides specific objectives and methodology for rehabilitation.

5.5.1 Land Protection Commitments

Land and rehabilitation related environmental protection commitments for the Project are outlined in **Table 14**. Commitments include objectives, indicators / standards and control strategies to minimise impacts to land.

Table 14: Environmental Protection Commitments – Land

Aspect	Commitment
Objectives	To minimise the area of disturbed land that requires rehabilitation, i.e. to rehabilitate the site so it has a stable, self-sustaining, non-polluting landform similar in aspect to surrounding landscapes.
	To minimise visual impacts from mine operations.
	To revegetate the disturbed land areas using self-sustaining vegetation cover similar to that in the surrounding grazing land.
	To ensure successful rehabilitation and lease surrender that satisfies DES, DNRME and landowners is achieved at the cessation of mining.
	To rehabilitate rock surfaces in a manner to minimise potential for erosion.
	To avoid or satisfactorily mitigate the risk of erosion and to ensure sound sediment control practices.
Indicators / Standards	Final quarry and waste dump landforms as stated in the Control Strategies.
	Rehabilitation that satisfies DES and landowners as follows: ■ mined landform of similar topography to surrounding landscapes; ■ minimal visual impacts on surrounding sensitive receptors; and ■ vegetation establishment on rehabilitated areas that is characteristic of similar off-site areas.
	Revegetation using locally endemic species of grasses and trees at densities similar to those that exist in the surrounding grazing land.
	Successful rehabilitation of lease areas to the satisfaction of DES and landowners.
	Lease surrender to the satisfaction of DES, DNRME and landowners.
	Zero/Low incidence of observed erosion to disturbed areas.
Control Strategies	Rehabilitation: The Rehabilitation Program for the existing operations will be updated to accommodate the new lease areas, to provide for the following: ■ Implementation of DES Guidelines, particularly EM1122 'Rehabilitation requirements for mining projects.

Aspect	Commitment
	- Design criteria (e.g. slope angles, surface water drainage) and post-mine use for all mine site domains, including the open pit. Criteria and post-mine domain use will comply with legislative requirements for safety and relevant DES guidelines, and will aim to minimise visual impacts. - Topsoil management including stripping, stockpiling and handling procedures, locations, erosion management and revegetation prior to use. - Identification of reference sites from which to nominate rehabilitation completion or success criteria (e.g. species composition, extent of groundcover, species density). - Nomination of completion criteria and progressive targets based on reference sites, against which to measure rehabilitation success. - Development and implementation of re-vegetation methods including topsoil spreading, contour ripping, species selection and seeding to achieve completion criteria. On-going monitoring of rehabilitation development against completion criteria and nomination of corrective actions to be implemented should rehabilitation not be meeting success targets. - Weed and animal control (e.g. spraying, fencing) to minimise impact on rehabilitated areas. Fencing will be designed to allow native fauna to access rehabilitated areas. - Capping of all exploration drill holes as soon as practicable after use. - Annual internal review of the Rehabilitation Program based on monitoring results. - At the cessation of mining, the site will be rendered safe to the satisfaction of DNRME.
	Erosion Prevention – Disturbed Areas: Reshaped dump faces will be landscaped to minimise the potential for gully erosion. On completion of earthworks, faces will be planted with a combination of pasture and native grasses (in consultation with the landowner). Contour banks will be constructed at the bottom of waste rock emplacements in order to catch run-off.
	Erosion Prevention – Topsoil Stockpiles Topsoil will be stored in windrows no more than 2 m high. If soil is not to be placed immediately, it will be planted with grasses to maintain soil condition and limit erosion (in consultation with the landowner). Disturbed areas and stockpiles will be inspected monthly and after significant rainfall events to identify potential erosion issues.

5.6 Nature Conservation

The Site has been used for grazing or mining purposes for many decades and is not recognised as essential habitat for any flora or fauna of conservation value.

5.6.1 Nature Conservation Protection Commitments

Detailed Vegetation and Fauna Management Plans has been developed for the site (**Appendix E** and **Appendix F** respectively). These include details of monitoring and management measures to minimise potential impacts on significant flora and fauna species.

Protection commitments for nature conservation during the operation of the Project have been included in **Table 15**. Commitments include objectives, indicators / standards and control strategies to minimise potential impacts on flora and fauna species.

Table 15: Environmental Protection Commitments – Nature Conservation

Aspect	Commitment
Objectives	To avoid or minimise the potential impact of the Project on flora and fauna.
Indicators / Standards	No harm to flora of conservation value or to native fauna.
Control Strategies	Vegetation clearing The clearing of trees will be carried out in a manner that ensures that fauna living in or near the site have sufficient time to move away from areas of clearing without human intervention. This will be achieved by adopting the following mitigation strategies: ▪ A pre-clearing vegetation site inspection by an experienced botanist to identify the presence of any conservation significant flora species. ▪ An experienced fauna spotter/catcher will be present during clearing operations. ▪ Damage to native vegetation outside of the extended area will be prevented and no unauthorised disturbance will occur in these areas. Areas identified for vegetation clearance will be clearly defined and detailed in site inductions. ▪ Vegetation clearing will be conducted in sequential stages and only to the extent necessary for safe and effective operations. ▪ The direction of sequential clearing will be away from disturbance areas and towards any retained vegetation or habitat links. ▪ No clearing of vegetation will occur between the hours of 6pm and 7am. ▪ Cleared material will not be deposited within 20 m of any watercourses. ▪ All native vegetation removed will be reused in revegetation areas. Logs and large rocks will be placed in nearby vegetation or adjacent to such vegetation to create shelter habitat for terrestrial fauna species. These ‘stockpiles’ may then be used on mine closure to create artificial habitats within rehabilitation areas. ▪ Any planned disturbance areas not required during the operational phase will be revegetated with native species endemic to the local area. In locations where canopy species cannot be planted, native grasses and shrubs should be used. Strategies for flora and fauna protection during vegetation clearing are included in the Vegetation Management Plan and Fauna Management Plan (Appendix E and Appendix F, respectively). Pest Management Feral animals known or expected to occur on the site are not expected to gain a significant benefit from the proposed actions. However, effective pest management is important in the overall management of the site to reduce potential detrimental impacts, as a result of the proposed works. Refer Appendix G for feral animal management guidelines developed for the Site. Habitat Restoration and Management With appropriate management, over time the disturbed areas will be enhanced and will provide additional and/or supplementary habitats for many of the site’s potential fauna. Strategies for restoration and management of fauna habitats are included in the Vegetation Management Plan and Fauna Management Plan. Monitoring The ongoing monitoring of the site’s fauna population is important in ensuring that the study area and associated lands continue to provide suitable habitat for any resident and migratory species.

5.7 Cultural Heritage

5.7.1 Aboriginal Heritage

There is no recorded Aboriginal cultural heritage on the Project Site. Terrequip Environmental has a duty of care to take all reasonable and practicable measures to ensure the activities of the Warwick Limestone Mine do not harm Aboriginal cultural heritage. Terrequip Environmental is committed to

ensuring that no damage is done to cultural heritage sites of significance in the areas they are responsible for. Terrequip Environmental have an approved Cultural Heritage Clearance Statement and associated Cultural Heritage Management Agreement, which provides for the protection or relocation of any cultural heritage artefact/s.

5.7.2 European Heritage

Searches of State and National databases have indicated that there is no recorded European cultural heritage on site. The property located approximately 330 m north-west of ML50236 is claimed by the owner to be of historical interest. Terrequip Environmental is committed to actions that will protect the environs of the lease area.

5.7.3 Cultural Heritage Protection Commitments

Cultural heritage protection commitments for the operation of the Project are outlined in **Table 16**. Commitments include objectives, indicators / standards and control strategies to minimise potential impacts on Aboriginal and/or European cultural heritage.

Table 16: Environmental Protection Commitments – Cultural Heritage

Aspect	Commitment
Objectives	To avoid or minimise the potential impact of the Project on Aboriginal or European cultural heritage.
Indicators / Standards	Compliance with the <i>Aboriginal Cultural Heritage Act 2003</i> and associated regulations and guidelines. No harm to Aboriginal or European cultural heritage.
Control Strategies	No cultural heritage significance has been identified to date onsite. However, should items be discovered during the course of operations onsite, Terrequip Environmental will: ▪ Immediately notify the Cultural Heritage Coordination Unit (DNRME) of the find; and ▪ Undertake a formal cultural heritage survey of the site.

5.8 Community

Terrequip Environmental endeavours to build positive relationships with neighbouring landowners and the local community in the vicinity of the Site. Permanent employment is provided for 10 full-time people, supported by a further 5-8 contract personnel. In addition, numerous service industries are supported by the operation, including engineering workshops and transport companies.

A school bus route terminates at the O'Deas Road / Keoghs Road intersection. Trucks travelling from the Phoenix Pit to the crushing plant within Aspal Pit cross O'Deas Road east of this intersection. Trucks from East/West Pit also use this intersection, and the following safety features are in place:

- Trucks will not travel along the public road; they will travel on a formed gravel road within the ML boundaries;
- The intersection will be kept clear of vegetation that may obscure visibility;

- Trucks will face (from both directions) a “Give Way” sign at the O’Deas Road / Keoghs Road intersection; and
- Unregistered trucks will hold a “Period Permit” enabling them to travel across the public road.

5.8.1 Community Protection Commitments

Community protection commitments for the operation of the Project have been outlined in **Table 17**. Commitments include objectives, indicators / standards and control strategies to maintain positive relationships with the local community.

Table 17: Community Protection Commitments

Aspect	Commitment
Objectives	To maintain positive relationships with neighbours and the general community.
Indicators / Standards	Zero complaints from neighbours and the general community about the Project.
Control Strategies	To continue a policy of good neighbour and corporate citizenship.
	Fitting of all vehicles with flashing lights to improve their visibility.
	Structuring of working hours to ensure no trucks cross O’Deas Road within 15 minutes of the scheduled school bus run.
	Maintenance of a register / log to record and manage complaints from the community about any aspects of site operations.
	Investigation of any complaints and amendment of operational procedures and activities as appropriate.

5.9 Light

The operation of the mine particularly with regards to security has the potential to cause a nuisance from light emission. This potential is recognised and will be controlled by choosing fittings that have a tightly controlled spill light pattern and placing lighting so that it is directed away from any sensitive source. Light fittings and placement will be selected to comply with the requirements of *Australian Standard AS 4282 -1997 – Control of the Effects of Outdoor Lighting*.

5.10 Staff and Contractor Training

Terrequip Environmental is committed to ensuring that all personnel and contractors on site have a sound level of understanding of their environmental management duties and responsibilities of the operations. In order to achieve this, Terrequip Environmental as a workforce education program for site environmental management. This program is part of all staff and major contractor inductions.

5.11 Energy Efficiency and Cleaner Production

Terrequip Environmental is focused on ensuring that the Project is operated efficiently with respect to its energy requirements. The main sources of energy (electricity and diesel) are monitored monthly to ensure that plant and equipment are running efficiently. Opportunities for reduction in energy

consumption are continually sought. As part of the Terrequip Environmental's internal Greenhouse Gas Management Program, tonnes of CO₂ equivalent emissions are recorded relating to energy use.

6 Rehabilitation and Remediation

Terrequip Environmental propose that the specific areas of disturbance within each ML will be rehabilitated in accordance with the specifications and plans described below. Detailed methodologies for rehabilitation are provided as part of the Vegetation Management Plan (**Appendix E**). Further details of proposed rehabilitation activities to achieve the below will be presented in a Final Land Use and Rehabilitation Plan.

Should the operation cease earlier than expected, then the disturbance figures will be less than those shown in the tables below but will be in accordance with the Plan of Operations current at the time of closure.

6.1 East/West Pit – ML50236, ML50239 and ML50083

Upon closure, any disturbed land will be rehabilitated in accordance with Schedule F of the EA.

Table 18: Final Land Use and Rehabilitation Approval Schedule for ML50236

Tenure ID	Disturbance type	Surface area (ha)	Post mine land description	Post mine land (capability / suitability) classification #	Slope range (degrees°)
ML50236	Main Pit Void	0.00	-	-	-
	Waste Dump	1.62	Re-contoured for drainage, Land not suitable for cultivations but well suited to pasture improvement	vi	Min of 20° Max of 30°
	Sediment Dams	0.00	-	-	-
	Road and Tracks	0.00	-	-	-
	Topsoil	0.00	-	-	-

"land capability" as defined in the DME 1995 Technical Guideline for the Environmental management of Exploration and Mining in Queensland.

Table 19: Final Land Use and Rehabilitation Approval Schedule for ML50239

Tenure ID	Disturbance type	Surface area (ha)	Post mine land description	Post mine land (capability / suitability) classification #	Slope range (degrees°)
ML50239	Main Pit Void	0.38	Water storage / Grazing	vi	70°
	Waste Dump	1.74	General Grazing Land	vi	Min of 20° Max of 30°
	Sediment Dams	0.54	Remain as Stock Dams	vii	20°
	Road and Tracks	0.00	-	-	-
	Topsoil	0.00	-	-	-

"land capability" as defined in the DME 1995 Technical Guideline for the Environmental management of Exploration and Mining in Queensland.

Table 20: Final Land Use and Rehabilitation Approval Schedule for ML50083

Tenure ID	Disturbance type	Surface area (ha)	Post mine land description	Post mine land (capability / suitability) classification #	Slope range (degrees°)
ML50083	Western Open Pit	5.00	Water Storage	viii	70°
	Eastern Open Pit	5.00	Backfilled to RL 524	vi	70°
	Waste Dump	5.00	General Grazing Land	vi	30°
	Sediment Dams and Stormwater Control	1.01	Remain as Stock Dams	viii	30°
	ROM Pad and Stockpiles	1.50	All will be removed	vi	Max of 10°
	Roads and Tracks	1.50	Some tracks to remain as farm access tracks	vi	Max of 10°
	Topsoil	0.33	Respread as required	vi	Max of 10°

"land capability" as defined in the DME 1995 Technical Guideline for the Environmental management of Exploration and Mining in Queensland.

6.2 Aspal Pit – ML50146

Upon closure, any disturbed land will be rehabilitated in accordance with Schedule F of the EA.

Table 21: Final Land Use and Rehabilitation Approval Schedule for ML50146

Tenure ID	Disturbance type	Surface area (ha)	Post mine land description	Post mine land (capability / suitability) classification #	Slope range (degrees°)
ML50146	Open Pit	2.50	Land not suitable for cultivation but well suited to pasture improvement	vi	70°
	Waste Dump	4.50	Re-contoured for drainage. Land not suitable for cultivation but well suited to pasture improvement	vi	Min of 20° Max of 30°
	ROM Pad and Stockpiles	10.00	All will be removed or rehabilitated	vi	Max 10°
	Roads and Tracks	3.15	Some access tracks to remain as farm access tracks	vi	Max 10°
	Sediment and Stormwater Control	2.00	Remain as Stock Dams	viii	Max 20°
	Fixed Plant	1.24	All not required by land holder will be removed	vi	Max 10°
	Office / Maintenance Buildings	0.50	All not required by land holder will be removed	vi	Max 10°
	Topsoil	1.50	Respread as required	vi	Max of 10°

"land capability" as defined in the DME 1995 Technical Guideline for the Environmental management of Exploration and Mining in Queensland.

6.3 Phoenix Pit – ML50237 and ML50238

Upon closure, any disturbed land will be rehabilitated in accordance with Schedule F of the EA.

Table 22: Final Land Use and Rehabilitation Approval Schedule for ML50237

Tenure ID	Disturbance type	Surface area (ha)	Post mine land description	Post mine land (capability / suitability) classification #	Slope range (degrees°)
ML50237	Main Pit Void	11.50	Water storage / Grazing	vi	70°
	Waste Dump	14.50	Re-contoured for drainage, Land not suitable for cultivations but well suited to pasture improvement	vi	Min of 20° Max of 30°
	Sediment Dams and Stormwater Control	3.50	Remain as Stock Dams	viii	20°
	Road and Tracks	5.65	Roads to remain as farm access tracks	vi	Max of 10°
	Topsoil	5.00	Respread as required	vi	Max of 10°
	Mobile Crushing ROM and Product Stockpiles	6.60	All infrastructure to be removed and area re-contoured for drainage. Land not suitable for cultivations but well suited to pasture improvement	vi	Max 10°
	Crib Hut and Parking	1.00	All infrastructure to be removed and area re-contoured for drainage. Land not suitable for cultivations but well suited to pasture improvement	vi	Max 10°

"land capability" as defined in the DME 1995 Technical Guideline for the Environmental management of Exploration and Mining in Queensland.

Table 23: Final Land Use and Rehabilitation Approval Schedule for ML50238

Tenure ID	Disturbance type	Surface area (ha)	Post mine land description	Post mine land (capability / suitability) classification #	Slope range (degrees°)
ML50238	Main Pit Void	1.50	Water storage / Grazing	vi	70°
	Waste Dump	1.00	Re-contoured for drainage, Land not suitable for cultivations but well suited to pasture improvement	vi	Min of 20° Max of 30°
	Sediment Dams and Stormwater Control	0.50	Re-contoured for drainage. Land not suitable for cultivations but well suited to pasture improvement	vi	Max 10°
	Mobile Crushing ROM and Product Stockpiles	2.60	Re-contoured for drainage, Land not suitable for cultivations but well suited to pasture improvement	vi	Max 10°

Tenure ID	Disturbance type	Surface area (ha)	Post mine land description	Post mine land (capability / suitability) classification #	Slope range (degrees°)
	Road and Tracks	2.50	Re-contoured for drainage, Land not suitable for cultivations but well suited to pasture improvement	vi	Max of 10°
	Topsoil	1.00	Respread as required	vi	Max of 10°

"land capability" as defined in the DME 1995 Technical Guideline for the Environmental management of Exploration and Mining in Queensland.

GLOSSARY

Acronym	Definition
ACH Act	<i>Aboriginal Cultural Heritage Act 2003</i>
CHMA	Cultural Heritage Management Agreement
DES	Department of Environment and Science
DNRME	Department of Natural Resources, Mines and Energy
EMP	Environmental Management Plan
EMS	Environmental Management System
EP Act	<i>Environmental Protection Act 1994</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ERA	Environmentally Relevant Activity
LOM Plan	Life of Mine Plan
ML	Mining Lease
MNES	Matters of National Environmental Significance
MR Act	<i>Mineral Resources Act 1989</i>
MSES	Matters of State Environmental Significance
NC Act	<i>Nature Conservation Act 1992</i>
RE	Regional Ecosystem
ROM	Run of Mine
SCL	Strategic Cropping Land
WoNS	Weeds of National Significance

Appendix A – Environment and Sustainability Policy Statement

Appendix B – Visual Amenity Assessment Report

Appendix C – Site Water Management Plan

Appendix D – Dust Management Plan

Appendix E – Vegetation Management Plan

Appendix F – Fauna Management Plan

Appendix G – Feral Animal (Fox and Cat) Management Guidelines