

**Ausrocks Pty Ltd**

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12 February 2025

Attn: Hazel Hughes

Department of Environment, Science, Innovation and Technology

Minerals Business Centre

PO Box 7230

Cairns QLD 4870

via email: [ESCairns@des.qld.gov.au](mailto:ESCairns@des.qld.gov.au)

Dear Hazel,

**EPML00382513 ENVIRONMENTAL AUTHORITY AMENDMENT APPLICATION – INFORMATION REQUEST  
A-EA-AMD-100601215**

On 30 April 2024, and on behalf of Terrequip Miles Pty Ltd (Terrequip), Ausrocks Resource Consultants (ARC) prepared and submitted an amendment application to the environmental authority (EA) EPML00382513 for the Miles Bentonite site. On 29 July 2024, the administering authority<sup>1</sup> issued the attached 'Information Request'.

To respond to the amendment application information request, the following items are enclosed with this letter:

- (a) Original copy of EA Information Request
- (b) Table with individual responses to each item raised.
- (c) Responses to EPP (Air) requirements
- (d) Responses to EPP (Noise) requirements
- (e) Sensitive Receptor Plans
- (f) Updated Stormwater & Erosion Plans
- (g) SRI Assessment
- (h) Final Land Use & Rehabilitation Plan
- (i) Soil Survey Report

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<sup>1</sup> Department of Environment, Science, Innovation and Technology is the administering authority under the *Environmental Protection Act 1994*.

- (j) Landowner Statement
- (k) Land Disturbance Summary

If you have any queries, please do not hesitate to contact me on my mobile (0404 778 394) or by email ([carl.morandy@ausrocks.com.au](mailto:carl.morandy@ausrocks.com.au)). We hope the information provided is sufficient for the administering authority to progress to the decision stage of the amendment application.

Sincerely  
**Ausrocks Resource Consultants**



**Carl Morandy**  
**Managing Director**

*Enc/s:*

- Attachment 1. EA Amendment Information Request*
- Attachment 2. Table 1 - Response to Information Request*
- Attachment 3: EPP (Air) Assessment*
- Attachment 4: EPP (Noise) Assessment*
- Attachment 5. Sensitive Receptor Plans*
- Attachment 6. Updated Stormwater & Erosion Plans*
- Attachment 7: SRI Assessment*
- Attachment 8: Final Land Use & Rehabilitation Plan (FLURP)*
- Attachment 9: Soil Survey Report*
- Attachment 10: Landowner Statement*
- Attachment 11: Land Disturbance Summary*



# **Attachment 1**

EA Amendment Information Request

# Notice

## Environmental Protection Act 1994

### Information request

*This information request is issued by the administering authority under section 140 of the Environmental Protection Act 1994 to request further information needed to assess an amendment application for a site-specific environmental authority.*

To: Terrequip Miles Pty Ltd  
Suite 10A, 19 Lang Parade  
MILTON QLD 4046

ATTN: Jacob Fuller, Carl Morandy  
Email transmission only: [jfuller@terrequip.com](mailto:jfuller@terrequip.com); [carl.morandy@ausrocks.com.au](mailto:carl.morandy@ausrocks.com.au)

Your reference: A-EA-AMD-100601215 | EPML00382513  
Our reference: C-EA-100601271 | 101/0006323

### Further information is required to assess an amendment application for environmental authority

#### 1. Application details

The amendment application for a site-specific environmental authority was received by the administering authority on 30 April 2024.

The application reference number is: **A-EA-AMD-100601215**

Land description: Mining Lease (ML) 5898, ML5900, ML5901, ML5902, ML5905, ML5906, ML5907, ML5909 and ML50058.

#### 2. Information request

The administering authority has considered the abovementioned application and is writing to inform you that further information is required to assess the application (an information request).

The information requested is specified in Attachment 1, attached to this notice.

#### 3. Actions

The abovementioned application will lapse unless you respond by giving the administering authority -

- (a) all of the information requested; or
- (b) part of the information requested together with a written notice asking the authority to proceed with the assessment of the application; or



- (c) a written notice –
- i. stating that you do not intend to supply any of the information requested; and
  - ii. asking the administering authority to proceed with the assessment of the application.

Should the information request require an EIS process or applicant to submit a progressive rehabilitation and closure (PRC) plan then it must be completed and submitted.

A response to the information requested must be provided by **12 February 2025** (the information response period). If you wish to extend the information response period, a request to extend the period must be made at least 10 business days before the last day of the information response period.


The response to this information request or a request to extend the information response period can be submitted to the administering authority by email to [ESCairns@des.qld.gov.au](mailto:ESCairns@des.qld.gov.au).

If the information provided in response to this information request is still not adequate for the administering authority to make a decision, your application may be refused as a result of section 176 of the *Environmental Protection Act 1994*, where the administering authority must have regard to any response given for an information request.

#### 4. Human rights

A human rights assessment was carried out in relation to this decision, and it was determined that the decision is compatible with human rights.

If you require more information, please contact the department on the telephone number listed below.



Signature

29 July 2024

Date

Scott Sullivan  
Department of Environment, Science and Innovation  
Delegate of the administering authority  
*Environmental Protection Act 1994*

**Enquiries:**  
Minerals Business Centre  
PO Box 7230, Cairns QLD 4870  
Phone: (07) 4222 5352  
Email: [ESCairns@des.qld.gov.au](mailto:ESCairns@des.qld.gov.au)

#### Attachments

Attachment 1: Additional information required for major amendment application EA EPML00382513 Terrequip Miles Pty Ltd

Attachment 2: Inspection of Sibelco Australia Limited mine at Gurulmundi, on 22 November 2016 – Environmental Authority EPML00382513

## Attachment 1: Additional information required for major amendment application EA EPML00382513 Terrequip Miles Pty Ltd

| Item    | Reference                                   | Matter   | Information Request  |
|---------|---|--|--|
| General |   |  |  |
|         | EA Amendment Cover Letter (7 February 2024) | The application makes reference to disturbance off mining leases that is historical and does not seek to include the disturbance under the EA amendment. If these structures (i.e. raw water dam east of ML5909 and water supply dams outside of ML5902) form part of the mining operation then they should be contemplated by the EA and would require associated authorisations such as tenure or planning approval. | Confirm, or otherwise, that the structures off the MLs (i.e. raw water dam east of ML5909 and water supply dams outside of ML5902) are not part of the mining activity.  |
|         | Environmentally Relevant Activities         | The disturbance areas proposed within the application show an increase of greater than 10% of the current disturbance authorised (i.e. from 19.5ha to 146.3ha proposed).<br><br>In relation to Terrequip's processing activities, with the potential increase in operational scale it is unclear whether there will be a commensurate increase in throughput rates for the processing activity.                        | Provide details of proposed throughput rates for the processing facility, including clarification on whether the threshold for the Environmentally Relevant Activity (ERA) <i>31 Mineral Processing</i> will be triggered. |
| Air     |   |  |  |

| Item | Reference  | Matter   | Information Request  |
|------|--|--|--|
|      | Environmental Protection (Air) Policy 2019 (EPP (Air)) | <p>In relation to the EPP (Air), the application has not demonstrated the following:</p> <ul style="list-style-type: none"> <li>• How the management hierarchy has been considered in the project design and development of management strategies for the proposed activity and operation.</li> <li>• How the environmental values listed under section 6 and schedule 1 of the EPP (Air) have been considered. The application does not identify the closest sensitive receptors for the mining operations and undertake the assessment of potential impacts on environmental values in consideration of these.</li> <li>• How the air quality objectives listed under section 7 and schedule 1 of the EPP (Air) have been considered and how they will be met. The application supporting material does not refer to contemporary air quality objectives.</li> </ul> | <p>Demonstrate consideration of the following:</p> <ol style="list-style-type: none"> <li>a) The management hierarchy as set out in EPP (Air) in the project design and development of management strategies for the proposed activity and operation.</li> <li>b) The environmental values listed under section 6 and schedule 1 of the EPP (Air) and details on the location, proximity and type of sensitive receptors for each of the mining operations and leases specified under the EA.</li> <li>c) The air quality objectives listed under section 7 and schedule 1 of the EPP (Air) and how they will be met for expanded operations.</li> </ol> |
|      | Site Based Management Plan, 7 February 2024 (SBMP)     | <p>The application material does not provide for a proactive air quality monitoring program to demonstrate adherence to contemporary standards or objectives established in the SBMP. Nor has the application demonstrated how the air quality objectives will be achieved, noting the air quality objectives specified in the SBMP are not in accordance with contemporary standards prescribed under the EPP (Air). (i.e. PM10 health and wellbeing air quality objective under the EPP</p>  | <p>In conjunction with the matter above, undertake an assessment of the proposed activity and demonstrate how the air quality objectives will be achieved with consideration of a proactive monitoring program or an assessment in support of a complaints based approach as proposed.</p> <p>Refer to the Technical Guideline for information on the assessment: <a href="https://www.des.qld.gov.au/technical-guidelines/application-requirements-for-activities-with-impacts-to-air">Application requirements for activities with impacts to air (des.qld.gov.au)</a></p>   |

| Item  | Reference   | Matter  | Information Request   |
|-------|---|---|---|
|       |   | (Air) is 50 µg/m <sup>3</sup> for 24 hours and 25 µg/m <sup>3</sup> for 1 year, whilst the application refers to the limit in the current EA of 150 µg/m <sup>3</sup> for 24 hours).  |   |
| Noise |   |   |   |
|       | Environmental Protection (Noise) Policy 2019 (EPP (Noise))  | <p>In relation to the (EPP Noise), the application has not demonstrated the following:</p> <ul style="list-style-type: none"> <li>• How the management hierarchy has been considered in the project design and development of management strategies for the proposed activity and operation.</li> <li>• How the environmental values listed under section 6 and schedule 1 of the EPP (Noise) have been considered. The application does not identify the closest sensitive receptors for the mining operations and undertake the assessment of potential impacts on environmental values in consideration of these.</li> <li>• The acoustic quality objectives listed under section 7 and schedule 1 of the EPP Noise have been considered.</li> </ul> | <p>In relation to the EPP (Noise) and the proposed operation, demonstrate consideration of the following:</p> <ol style="list-style-type: none"> <li>a) How the management hierarchy as set out in EPP (Noise) has been considered in the project design and development of management strategies for the proposed activity and operation.</li> <li>b) How the environmental values listed under section 6 and schedule 1 of the EPP Noise have been considered and details on the location, proximity and type of sensitive receptors for each of the mining operations and leases specified under the EA.</li> <li>c) The acoustic quality objectives listed under section 7 and schedule 1 of the EPP Noise have been considered.</li> </ol> |
| Water |   |   |   |
|       | <p>Amendment 1: Schedule C – Table 4 (Storage Design)</p> <p>Not properly made (NPM) response (30 April 2024)</p> <p>Attachment 2 – Inspection of Sibelco Australia Limited mine at</p> | <p>No discharge to environmental waters is proposed for ML5900 and ML5901 as outlined in the NPM response letter.</p> <p>Attachment 3 of the NPM response identifies discharge points on both MLs.</p> <p>If a discharge of any nature is proposed an</p>   | <p>a) Clarify whether there will be a discharge to environmental waters on ML5900 and ML5901. Where any discharge is proposed, provide an assessment of releases of water to the receiving environment pursuant to departmental guideline <a href="#">ESR/2015/1837</a> <a href="#">Application requirements for activities with</a></p>  |



| Item | Reference   | Matter   | Information Request  |
|------|---|--|--|
|      | <p>Gurulmundi, on 22 November 2016 – Environmental Authority EPML00382513</p> | <p>assessment must be undertaken for consideration by the department to approve this as a discharge location.</p> <p>The supporting information for the site is not consistent with the EA authorisations and as has been previously advised by the department the EA should be amended to reflect current discharge locations.</p> <p>A compliance inspection undertaken by the department on 22 November 2016 indicated inconsistencies with the current conditions of the EA, being:</p> <ul style="list-style-type: none"> <li>• Schedule C Table 2 lists a monitoring point AB-WMP-D. This monitoring point no longer exists due to the progression of mining activities. An amendment application of the EA was advised to provide a new monitoring location for the outlet of ML5909.</li> <li>• Schedule C Table 2 lists two monitoring points AB-WMP-E for ML5909 sediment dam and AB-WMP-F for ML5909 outlet. Both of these monitoring points have the same coordinates which is located approximately 80m south of the railway dam in a vegetated area, not in a waterway. An amendment of the EA was advised to provide the correct monitoring location for the outlet of ML5909.</li> </ul> | <p><a href="http://des.qld.gov.au">impacts to water (des.qld.gov.au)</a></p> <p>b) Demonstrate the current site monitoring and release authorisations are consistent with the EA or otherwise undertake necessary reviews and assessments to support this EA application, noting a change application may be required.</p> |
|      | <p>Amendment 1: Schedule C –</p>  | <p>The application supporting document identifies that <i>“the voids and water storage structures are</i></p>  | <p>Provide evidence that the voids and water storage structures are not regulated structures by</p>  |

| Item | Reference  | Matter   | Information Request  |
|------|--|--|--|
|      | <p>Table 4 (Storage Design)<br/>EA Amendment Cover Letter (7 February 2024)</p>  | <p><i>not high hazard dams and are in-ground excavations which do not put human life at risk for wall failures”</i></p> <p>Evidence has not been provided to support that the voids and water storage structures are not high-hazard structures. The department’s <a href="#">Manual for assessing consequence categories and hydraulic performance of structures</a> provides for the standard for assessing the consequence category of dams.</p>  | <p>completing a consequence category assessment consistent with the requirements set out in the manual for assessing consequence categories <a href="#">Manual for assessing consequence categories and hydraulic performance of structures</a>.</p>   |
|      | <p>Not properly made (NPM) response (30 April 2024)<br/>SBMP<br/>Site Water Management and Monitoring Plan<br/>Sediment and Erosion Control Plan</p> | <p>The application identifies that <i>“to ensure the EA holder maintains adequate erosion and sediment control structures wherever necessary to prevent or minimise the erosion of disturbed areas and the sedimentation of any waters, it is necessary that the imposed limit on the quantity and location of the sediment dams is removed”</i>.</p> <p>The NPM response identifies that there will not be releases to the environment from the operations based on size of the proposed excavations and provides an assessment based on rainfall and runoff information.</p> <p>The application is supported by a proposed addendum to the Site Water Management and Monitoring Plan for the proposed operations. This addendum provides summary information for structures including some general dimensions, however it is unclear how this addendum</p> <ul style="list-style-type: none"> <li>- Deals with the progressive nature of mining operations and if the sizing of</li> </ul> | <p>Provide:</p> <ul style="list-style-type: none"> <li>a) a table summarising the water structures and voids proposed that details the specific details for each tenure/mining operation for the dimensions for all water control structures and water holding structures.</li> <li>b) an updated Site Water Management and Monitoring Plan for the proposed operations, including a sediment and erosion control plan that complies with the International Erosion Control Association (IECA) guidelines.</li> <li>c) Certification and sign off by a suitably qualified person that the water balance calculations and assessments are consistent with contemporary design and construction standards, including ICEA and requirements of the EA and the <a href="#">Manual for assessing consequence categories and hydraulic performance of</a></li> </ul> |

| Item | Reference  | Matter   | Information Request  |
|------|--|--|--|
|      |  | <p>proposed structures allows for the progressive nature of mining and backfilling, and</p> <ul style="list-style-type: none"> <li>- is consistent with current standards sediment and erosion control for sediment basins.</li> </ul> <p>The number, locations and dimensions of sediments dams and voids is required to be confirmed to allow for clearly defined assessment of the potential impacts and to clarify the authorisation.</p> <p>The application material refers to the Code of Environmental Compliance for mining lease projects in relation to proposed changes to the capacity and spillway design capacity of structures. This is not a relevant or contemporary reference for structure design. The spillway design and capacity of the dam must be informed by contemporary standards for the structures.</p> <p><i>Note: Should an expansion to the sediment dams or additional sediment dams or pits be required for the Project in the future, an application to amend the environmental authority can be made to the administering authority.</i></p> | <p><a href="#">structures.</a></p> <p>d) a timeline and plan for the update and review of the Site Water Management and Monitoring Plan, inclusive of sediment and erosion control requirements, that aligns to proposed mining operations and includes a certification sign off process by a suitably qualified person.</p> |
|      | <p>Amendment 2: Schedule F – Table 1 Final Land Use and Rehabilitation Approval Schedule</p> | <p>The water quality analysis provided as part of the water storage PMLU evaluation in the NPM response does not include values relating to sulphate, calcium and magnesium as required by</p>   | <p>Provide:</p> <p>a) water quality monitoring results for all EA analytes from 2016 to present to demonstrate compliance with condition</p>   |

| Item | Reference   | Matter   | Information Request  |
|------|---|--|--|
|      | <p>NPM response</p> <ul style="list-style-type: none"> <li>Attachment 4 – Water Storage Post Mine Land Use (PMLU) evaluation</li> </ul> | <p>EA EPML00382513.</p> <p>The average total dissolved solids (TDS) provided in Table 4-A: Miles Bentonite Mine water quality summary of the NPM response currently exceeds the limits specified in Schedule 3 – Table 3 (End of pipe contaminant release limits) of the EA.</p> <p>The NPM notice requested water quality analysis of site surface waters that identifies the water is suitable for the proposed use of agricultural water storage. This was not provided in the NPM response.</p> <p>The application proposes changes to the post mine land use currently prescribed within the EA. The Landholder Statement currently on file is date 5 May 2022. This Landholder Statement relates to Mining Leases ML5902, ML50058, ML5909 &amp; ML5907. It is noted that the Landholder Statement does not include Mining Leases ML5898, ML5900, ML5901, ML5905 or ML5906.</p> <p>Condition F6-1 states <i>“All infrastructure, constructed by or for the environmental authority holder during the mining activities including water storage structures, must be removed from the site prior to mining lease surrender, except where agreed in writing by the post mining land owner/holder.”</i></p> | <p>C1-1 and C1-2 and C1-3 of the EA.</p> <p>b) Information on the measures that will be taken to ensure the water quality of the current and proposed water storage dams are compliant with the EA limits.</p> <p>c) evidence to demonstrate how site water structures (ML50058 pit, ML5909 and ML5907 ROM Pad and Sediment Dams) will be made suitable and compliant for its intended purpose post mining (stock water storage for grazing activities).</p> <p>d) a landholder statement which includes all proposed infrastructure to be retained post mining for all mining leases within the EA in addition to identifying a post mine land use should the landholder agreement not be received or maintained.</p> |
| Land |   |  |  |
|      | Land disturbance  | The application provides figures and a summary   | Provide:   |

| Item | Reference         | Matter  | Information Request   |
|------|-------------------|---|---|
|      |                   | <p>of the total area to be disturbed on each lease. The application does not clearly identify the type, location and area of disturbance proposed and there is insufficient information on the potential impacts to environmental values from the activities and the proposed mitigation measures.</p>  | <ul style="list-style-type: none"> <li>a) a table summarising the disturbance type for each lease, existing versus proposed disturbance, the areas for each disturbance type, the rehabilitation outcome and the applicability of any landholder agreement.</li> <li>b) detailed maps of the project area which include the locations of all site infrastructure/disturbance current and proposed for inclusion into the EA.</li> <li>c) the location of sensitive receptors and environmental values for land and an assessment of potential impacts to environmental values, including sensitive receptors, from the proposed activities.</li> <li>d) information on the mitigation measures to be implemented to reduce potential impacts to the environmental values, including sensitive receptors.</li> </ul> <p>Information should be provided in accordance with <a href="https://www.des.qld.gov.au/industry/energy-and-mining/energy-and-mining-activities/energy-and-mining-activities-application-requirements-for-activities-with-impacts-to-land">ESR/2015/1839 Application requirements for activities with impacts to land (des.qld.gov.au)</a></p> |
|      | Cultural Heritage | <p><i>Condition (I1-1) - The environmental authority holder must act in accordance with the cultural heritage management plan, signed in consultation with the traditional custodian for active mining lease 5909.</i></p> <p>No information has been provided regarding the consideration and assessment of heritage matters across the leases for the proposed operations and as it relates to the existing</p> | <ul style="list-style-type: none"> <li>a) Provide an assessment of cultural heritage matters relevant to existing and proposed mining activities, across all mining leases.</li> <li>b) Demonstrate how all heritage matters and associated approvals have been considered and acquired to facilitate mining.</li> <li>c) Provide updated management plans for existing and proposed operations.</li> </ul>   |

| Item | Reference                                   | Matter  | Information Request  |
|------|---|---|--|
|      |   | operations.   |  |
|      | Matters of State Environmental Significance | <p>Matters of State Environmental Significance (MSES) – Regulated Vegetation defined watercourse is located within ML50058.</p> <p>The application states that the water course will be avoided during clearing</p> <p>Matters of State Environmental Significance (MSES) – Wildlife Habitat (special least concern animal) Echidna Habitat is located within the project area.</p>   | <p>Demonstrate that the proposed mining activities will not cause a Significant Residual Impact to MSES Regulated Vegetation defined watercourse and MSES Wildlife Habitat special least concern animal in accordance with the guideline <i>Significant Residual Impact Guideline December 2014</i>.</p>   |
|      | Rehabilitation                              | <p>The application does not sufficiently describe how the site will be rehabilitated. Nor does the application demonstrate how rehabilitation will ensure an end use that is safe, non-polluting, stable and able to sustain the proposed post mine land use.</p> <p>The application is required to</p> <ul style="list-style-type: none"> <li>- provide for the effective management of actual and potential environmental impacts for the rehabilitation of disturbed land resulting from the proposed activities.</li> <li>- Identify the proposed monitoring strategy which will be used to verify rehabilitation success. The information provided must include justification as to the options and management measures proposed.</li> </ul> <p>A landholder statement or agreement does not preclude the need to meet the above</p> | <p>Provide information for rehabilitation that meets the requirements specified in with <a href="https://www.des.qld.gov.au/ESR/2015/1839">ESR/2015/1839 Application requirements for activities with impacts to land (des.qld.gov.au)</a></p> <p>Noting the current transition to the Progressive Rehabilitation and Closure Plan (PRCP) Framework, relevant information requirements, outcomes and best practice guidance and standards should also be considered.</p> |

| Item | Reference | Matter        | Information Request |
|------|-----------|---------------|---------------------|
|      |           | requirements. |                     |



# Attachment 2

Response to Information Request – Table



**Table 1: Summary of actions and responses to the Information Request Notice**

| Item           | Reference  | Matter   | Information Request   | Action / Response  |
|----------------|--|--|---|--|
| <b>General</b> |  |  |   |  |
| 1.1            | <b>EA Amendment Cover Letter (7 February 2024)</b> | The application makes reference to disturbance off mining leases that is historical and does not seek to include the disturbance under the EA amendment. If these structures (i.e. raw water dam east of ML5909 and water supply dams outside of ML5902) form part of the mining operation then they should be contemplated by the EA and would require associated authorisations such as tenure or planning approval. | Confirm, or otherwise, that the structures off the MLs (i.e. raw water dam east of ML5909 and water supply dams outside of ML5902) are not part of the mining activity.   | <p>Previous instruction from the department has been that no disturbance outside the ML is able to be included in the PRCP, regardless of whether it was included in the EA. Predominantly this EA amendment has been driven by the PRCP requirements. It is still intended to apply for Mining Lease over these areas. At present Mineral Development Licence (MDL) 430 is held over the area by Surat Coal Pty Ltd.</p> <div data-bbox="1381 613 1906 699" style="border: 1px solid black; background-color: yellow; padding: 5px; text-align: center;"> <p><b>Commercially Sensitive Information</b></p> </div> <p>Whilst it may be possible to include these 'off lease' areas within the current EA amendment it may cause further conflict when assessing the ERC for the site. Further discussion is encouraged on the matter if the department has a suitable solution.</p>  |
| 1.2            | <b>Environmentally Relevant Activities</b>         | The disturbance areas proposed within the application show an increase of greater than 10% of the current disturbance authorised (i.e. from 19.5ha to 146.3ha proposed). In relation to Terrequip's processing activities, with the potential increase in operational scale it is unclear whether there will be a commensurate increase in throughput rates for the processing activity.                               | Provide details of proposed throughput rates for the processing facility, including clarification on whether the threshold for the Environmentally Relevant Activity (ERA) 31 Mineral Processing will be triggered. | <p>Whilst the disturbance areas recorded in the EA are proposed to change to reflect the intention to mine more of the resource within the ML, the instantaneous areas disturbed are likely to remain relatively consistent with the current levels. There is no significant change anticipated in processing activity, with levels around 50,000t/a occurring regularly over the last 10 years. It is noted that structurally the site is limited in throughput by plant size and available area for drying pads, no significant increase in production is possible without major upgrades to the plant – which would trigger an additional EA amendment and are not currently contemplated.</p> <p>The activity ERA 31 Mineral Processing is not currently or likely to be triggered in future for the operation. Regardless of the threshold, the processing activity does not meet the definition of Mineral Processing under the Environmental Protection Regulation 2008 Schedule 2 Part 7 section 31.</p> |

| Item       | Reference   | Matter   | Information Request   | Action / Response   |
|------------|---|--|---|---|
| <b>Air</b> |   |  |   |   |
| 2.1        | <b>Environmental Protection (Air) Policy 2019 (EPP (Air))</b> | <p>In relation to the EPP (Air), the application has not demonstrated the following:</p> <ul style="list-style-type: none"> <li>How the management hierarchy has been considered in the project design and development of management strategies for the proposed activity and operation.</li> <li>How the environmental values listed under section 6 and schedule 1 of the EPP (Air) have been considered. The application does not identify the closest sensitive receptors for the mining operations and undertake the assessment of potential impacts on environmental values in consideration of these.</li> <li>How the air quality objectives listed under section 7 and schedule 1 of the EPP (Air) have been considered and how they will be met. The application supporting material does not refer to contemporary air quality objectives.</li> </ul> | <p>Demonstrate consideration of the following:</p> <ol style="list-style-type: none"> <li>The management hierarchy as set out in EPP (Air) in the project design and development of management strategies for the proposed activity and operation.</li> <li>The environmental values listed under section 6 and schedule 1 of the EPP (Air) and details on the location, proximity and type of sensitive receptors for each of the mining operations and leases specified under the EA.</li> <li>The air quality objectives listed under section 7 and schedule 1 of the EPP (Air) and how they will be met for expanded operations.</li> </ol> | <ol style="list-style-type: none"> <li>Refer EPP (Air) Assessment in <b>Attachment 3</b>.</li> <li>Please refer to <b>Attachment 5</b> for sensitive receptor maps. A brief summary of receptors are provided below: <ul style="list-style-type: none"> <li>SR1 – Occupied, [Redacted]</li> <li>[Redacted] <b>Landholder Information</b></li> <li>SR2 – Occupied.</li> <li>SR3 – Vacant, Landfill - not operational.</li> <li>SR4 &amp; SR5 – Occupied [Redacted]</li> <li>[Redacted] <b>Landholder Information</b></li> <li>SR6 – Vacant, [Redacted]</li> <li>SR7 – Vacant.</li> <li>SR8 – [Redacted] <b>Landholder Information</b> occupied</li> <li>SR9 – Occupied [Redacted]</li> <li>SR10 – Occupied [Redacted] <b>Landholder Information</b></li> <li>SR11 – Occupied, [Redacted]</li> </ul> </li> <li>Refer EPP (Air) Assessment in <b>Attachment 3</b></li> </ol> |
| 2.2        | <b>Site Based Management Plan, 7 February 2024 (SBMP)</b>     | <p>The application material does not provide for a proactive air quality monitoring program to demonstrate adherence to contemporary standards or objectives established in the SBMP. Nor has the application demonstrated how the air quality objectives will be achieved, noting the air quality objectives specified in the SBMP are not in accordance with contemporary standards prescribed under the EPP (Air). (i.e. PM10 health and wellbeing air quality objective under the EPP (Air) is 50 µg/m3 for 24 hours and 25 µg/m3 for 1 year, whilst the application refers to the limit in the current EA of 150 µg/m3 for 24 hours).</p>   | <p>In conjunction with the matter above, undertake an assessment of the proposed activity and demonstrate how the air quality objectives will be achieved with consideration of a proactive monitoring program or an assessment in support of a complaints based approach as proposed. Refer to the Technical Guideline for information on the assessment: <a href="https://des.qld.gov.au">Application requirements for activities with impacts to air (des.qld.gov.au)</a></p>  | <p>Based on the significant distance to sensitive receptors and the historical operations not triggering any air quality complaints it is considered reasonable to adopt a complaints based approach to monitoring air quality. Whilst operations are proposed to encroach closer to sensitive receptors in future, proactive monitoring is still not considered necessary given the separation distances. Ongoing visual monitoring is proposed by site management (refer SBMP Table 3) which includes operational considerations for periods where dry weather or excessive wind are recorded. Terrequip Miles &amp; ARC have reviewed the contemporary standards prescribed under the EPP (Air) and are prepared to accept revised conditions in the EA that reflect these objectives. The SBMP will be updated to</p>   |

| Item | Reference | Matter | Information Request | Action / Response   |
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|      |           |        |                     | reflect the revised objectives within 1 month of EA Amendment approval. |

#### Noise

|     |   |   |  |  |
|-----|---|---|--|--|
| 3.1 | <b>Environmental Protection (Noise) Policy 2019 (EPP (Noise))</b> | <p>In relation to the (EPP Noise), the application has not demonstrated the following:</p> <ul style="list-style-type: none"> <li>How the management hierarchy has been considered in the project design and development of management strategies for the proposed activity and operation.</li> <li>How the environmental values listed under section 6 and schedule 1 of the EPP (Noise) have been considered. The application does not identify the closest sensitive receptors for the mining operations and undertake the assessment of potential impacts on environmental values in consideration of these.</li> <li>The acoustic quality objectives listed under section 7 and schedule 1 of the EPP Noise have been considered.</li> </ul> | <p>In relation to the EPP (Noise) and the proposed operation, demonstrate consideration of the following:</p> <ol style="list-style-type: none"> <li>How the management hierarchy as set out in EPP (Noise) has been considered in the project design and development of management strategies for the proposed activity and operation.</li> <li>How the environmental values listed under section 6 and schedule 1 of the EPP Noise have been considered and details on the location, proximity and type of sensitive receptors for each of the mining operations and leases specified under the EA.</li> <li>The acoustic quality objectives listed under section 7 and schedule 1 of the EPP Noise have been considered.</li> </ol> | <ol style="list-style-type: none"> <li>Refer EPP (Noise) Assessment in <b>Attachment 4</b>.</li> <li>Please refer to <b>Attachment 5</b> for sensitive receptor maps.</li> <li>Refer EPP (Noise) Assessment in <b>Attachment 4</b>.</li> </ol> |
|-----|---|---|--|--|

#### Water

|     |  |   |  |   |
|-----|--|---|--|---|
| 4.1 | <b>Amendment 1: Schedule C – Table 4 (Storage Design) Not properly made (NPM) response (30 April 2024) Attachment 2 – Inspection of Sibelco Australia Limited mine at Gurulmundi, on</b> | <p>No discharge to environmental waters is proposed for ML5900 and ML5901 as outlined in the NPM response letter. Attachment 3 of the NPM response identifies discharge points on both MLs. If a discharge of any nature is proposed an assessment must be undertaken for consideration by the department to approve this as a discharge location. The supporting information for the site is not consistent with the EA authorisations and as has been previously advised by the department the EA should be amended to reflect current discharge locations.</p> | <ol style="list-style-type: none"> <li>Clarify whether there will be a discharge to environmental waters on ML5900 and ML5901. Where any discharge is proposed, provide an assessment of releases of water to the receiving environment pursuant to departmental guideline <a href="https://www.des.qld.gov.au/ESR/2015/1837">ESR/2015/1837 Application requirements for activities with impacts to water (des.qld.gov.au)</a></li> <li>Demonstrate the current site monitoring and release authorisations are consistent with the EA or otherwise undertake necessary reviews and assessments to support this EA application, noting a change application may be required.</li> </ol> | <ol style="list-style-type: none"> <li>We can confirm that ML5900 and ML5901 each require a new discharge point. Refer <b>Attachment 6</b> for co-ordinates of these points. The design criteria for these basins will be in accordance with Schedule C- Table 4 of the EA for sediment dams (1:10 yr storage &amp; 1:20yr spillway). Discharges proposed will be in accordance with existing discharge criteria in Schedule C – Table 3 of the EA. Environmental values for the site relating to water include: <ul style="list-style-type: none"> <li>Stock water quality for surrounding users</li> <li>Water bores in the vicinity</li> <li>Wetlands</li> </ul> Mitigation Measures include: <ul style="list-style-type: none"> <li>Diverting upstream clean water away from disturbed area.</li> </ul> </li> </ol> |
|-----|--|---|--|---|

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|      | <p><b>22 November 2016 – Environmental Authority EPML00382513</b></p>  | <p>A compliance inspection undertaken by the department on 22 November 2016 indicated inconsistencies with the current conditions of the EA, being:</p> <ul style="list-style-type: none"> <li>Schedule C Table 2 lists a monitoring point AB-WMP-D. This monitoring point no longer exists due to the progression of mining activities. An amendment application of the EA was advised to provide a new monitoring location for the outlet of ML5909.</li> <li>Schedule C Table 2 lists two monitoring points AB-WMP-E for ML5909 sediment dam and AB-WMP-F for ML5909 outlet. Both of these monitoring points have the same coordinates which is located approximately 80m south of the railway dam in a vegetated area, not in a waterway. An amendment of the EA was advised to provide the correct monitoring location for the outlet of ML5909.</li> </ul> |   | <ul style="list-style-type: none"> <li>No operations in areas where acid producing or acid sulphate soils exist.</li> <li>Provide sediment control structures sized appropriately as per design criteria.</li> <li>Provide training for site water quality monitoring and water quality awareness.</li> </ul> <p>Further detailed assessment is provided in the submission documents under Water (page 23 of EA Amendment cover letter)</p> <p>b) <b>Attachment 6</b> and co-ordinates for the site discharge points including co-ordinates for point AB-WMP-D which appear reasonable as they represent the spillway of SD2, the further downstream basin inside the ML.</p>  |
| 4.2  | <p><b>Amendment 1: Schedule C – Table 4 (Storage Design) EA Amendment Cover Letter (7 February 2024)</b></p> | <p>The application supporting document identifies that <i>“the voids and water storage structures are not high hazard dams and are in-ground excavations which do not put human life at risk for wall failures”</i></p> <p><i>Evidence has not been provided to support that the voids and water storage structures are not high-hazard structures. The department’s <a href="#">Manual for assessing consequence categories and hydraulic performance of structures</a> provides for the standard for assessing the consequence category of dams.</i></p>   | <p>Provide evidence that the voids and water storage structures are not regulated structures by completing a consequence category assessment consistent with the requirements set out in the manual for assessing consequence categories <a href="#">Manual for assessing consequence categories and hydraulic performance of structures</a>.</p> | <p>The vast majority of site structures are exempt from the requirements of the manual under Section 2.1.1a), by meeting the five specific requirements. These are predominantly sediment basins which are dry at least once per year due to evaporation, store &lt;2.5ML, are clay lined to prevent seepage, are made from clay materials which have low risk of wetting front passage, and have cleanwater diversions &amp; spillway to manage overtopping.</p> <p>The remaining structures are considered voids (excavated basins into in-situ ground) with nil risk of dam break/failure. A consequence category assessment of the structures on ML5902 (southern water storage dam), ML50058 (in-pit storage) and ML5909 (in-pit storage) has been undertaken.</p> <ul style="list-style-type: none"> <li>Harm to Humans: <b>Low</b> - all storages are located in a remote location with no immediate</li> </ul> |

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|      |   |  |   | <p>downstream personnel risk due to dam break. Risk of contamination to downstream surface or groundwater are also negligible due to basins being in-pit below natural ground level. The quantity of water released in a break event would be insignificant and no direct personnel would be affected as there are no immediate downstream drinking water supplies.</p> <ul style="list-style-type: none"> <li>• General Environmental Harm: <b>Low</b> - the potential for release is negligible given the creek elevation is higher than the average water level in the dams. There are no wetlands within 50km of the downstream environment. Release of contaminants to the downstream would not trigger any of the thresholds identified in the significant or high categories. In reality site waters released during significant rain events is likely to be similar quality to the runoff from the local area.</li> <li>• General Economic Loss or Property Damage: <b>Low</b> – no specific assets are located in the downstream area, certainly none that would require &gt;\$1M to rectify.</li> </ul> <p>This assessment has been completed by Carl Morandy, RPEQ 22981.</p> |
| 4.3  | <p><b>Not properly made (NPM) response (30 April 2024) SBMP Site Water Management and Monitoring Plan Sediment and Erosion Control Plan</b></p> | <p>The application identifies that “to ensure the EA holder maintains adequate erosion and sediment control structures wherever necessary to prevent or minimise the erosion of disturbed areas and the sedimentation of any waters, it is necessary that the imposed limit on the quantity and location of the sediment dams is removed”. The NPM response identifies that there will not be releases to the environment from the operations based on size of the proposed excavations and provides an assessment based on rainfall and runoff information.</p> | <p>Provide:</p> <ol style="list-style-type: none"> <li>a) a table summarising the water structures and voids proposed that details the specific details for each tenure/mining operation for the dimensions for all water control structures and water holding structures.</li> <li>b) an updated Site Water Management and Monitoring Plan for the proposed operations, including a sediment and erosion control plan that complies with the International Erosion Control Association (IECA) guidelines.</li> <li>c) Certification and sign off by a suitably qualified person that the water balance calculations and</li> </ol> | <ol style="list-style-type: none"> <li>a) Refer <b>Attachment 6</b> which includes a table of water structures and voids. This represents the current and future footprint for the site, however it is acknowledged that interim plans may provide additional detail for the progression of mining operations. At this stage of the operation preparing detailed extraction schedules is not viable, generally detailed resource drilling, pit planning and resourcing would be completed up to 12 months in advance of operations. It would be impractical to plan out the next 50+ years of site works in this way and maintain any measure of accuracy. Instead, it is proposed that Terrequip Miles adopt the contemporary standards</li> </ol>  |

| Item   | Reference                    | Matter   | Information Request   | Action / Response   |             |                          |                              |              |                          |              |                        |              |  |                              |
|--|------------------------------|--|---|---|-------------|--------------------------|------------------------------|--------------|--------------------------|--------------|------------------------|--------------|--|------------------------------|
|  |                              | <p>The application is supported by a proposed addendum to the Site Water Management and Monitoring Plan for the proposed operations. This addendum provides summary information for structures including some general dimensions, however it is unclear how this addendum</p> <ul style="list-style-type: none"> <li>Deals with the progressive nature of mining operations and if the sizing of proposed structures allows for the progressive nature of mining and backfilling, and</li> <li>is consistent with current standards sediment and erosion control for sediment basins.</li> </ul> <p>The number, locations and dimensions of sediments dams and voids is required to be confirmed to allow for clearly defined assessment of the potential impacts and to clarify the authorisation.</p> <p>The application material refers to the Code of Environmental Compliance for mining lease projects in relation to proposed changes to the capacity and spillway design capacity of structures. This is not a relevant or contemporary reference for structure design. The spillway design and capacity of the dam must be informed by contemporary standards for the structures.</p> <p><i>Note: Should an expansion to the sediment dams or additional sediment dams or pits be required for the Project in the future, an application to amend the environmental authority can be made to the administering authority.</i></p> | <p>assessments are consistent with contemporary design and construction standards, including IECA and requirements of the EA and the <a href="#">Manual for assessing consequence categories and hydraulic performance of structures</a>.</p> <p>d) a timeline and plan for the update and review of the Site Water Management and Monitoring Plan, inclusive of sediment and erosion control requirements, that aligns to proposed mining operations and includes a certification sign off process by a suitably qualified person.</p> | <p>for both the spillway design and capacity of site dams in all proposed construction.</p> <p>b) The Addendum to the SWMMP included a number of suggestions including reducing the design wet period storage to 1:20 yrs and spillway to 1:50 yr. These have been proposed considering the risks associated with the location, size and consequence of dam failure. The IECA guidelines for sediment basins indicates that a spillway of &gt;1:50yr is only required where dams are elevated (ie not fully recessed below ground) and where failure is expected to result in loss of life. In this instance there is negligible risk of dam failure resulting in loss of life as all dams with appreciable volume are sub-surface excavations as opposed to built dams. Regardless, the site is considered likely to comply with the existing EA requirement for the pit voids.</p> <p><b>Table 7 – Recommended design standard for emergency spillways</b></p> <table border="1" data-bbox="1436 792 1906 896"> <thead> <tr> <th>Design life</th> <th>Minimum design storm ARI</th> </tr> </thead> <tbody> <tr> <td>Less than 3 months operation</td> <td>1 in 10 year</td> </tr> <tr> <td>3 to 12 months operation</td> <td>1 in 20 year</td> </tr> <tr> <td>Greater than 12 months</td> <td>1 in 50 year</td> </tr> <tr> <td>If failure is expected to result in loss of life</td> <td>Probable Maximum Flood (PMF)</td> </tr> </tbody> </table> <p>c) The addendum to the SWMMP was prepared and signed by Carl Morandy RPEQ 22981. Detailed design work confirming site specific construction requirements for new basins will be produced prior to commencement of works, these can be conditioned as part of the EA approval. The reference to the code of environmental compliance was not intended to be to justify the change in design criteria, it was to justify the requirement for additional sediment basins to be conditioned on site.</p> <p>d) The SWMMP will be reviewed annually by site management to assess against the current and proposed mining operation in the next 12 months. Where the existing or proposed conditions have changed significantly, the document will be updated</p> | Design life | Minimum design storm ARI | Less than 3 months operation | 1 in 10 year | 3 to 12 months operation | 1 in 20 year | Greater than 12 months | 1 in 50 year | If failure is expected to result in loss of life | Probable Maximum Flood (PMF) |
| Design life                                      | Minimum design storm ARI     |  |   |   |             |                          |                              |              |                          |              |                        |              |  |                              |
| Less than 3 months operation                     | 1 in 10 year                 |  |   |   |             |                          |                              |              |                          |              |                        |              |  |                              |
| 3 to 12 months operation                         | 1 in 20 year                 |  |   |   |             |                          |                              |              |                          |              |                        |              |  |                              |
| Greater than 12 months                           | 1 in 50 year                 |  |   |   |             |                          |                              |              |                          |              |                        |              |  |                              |
| If failure is expected to result in loss of life | Probable Maximum Flood (PMF) |  |   |   |             |                          |                              |              |                          |              |                        |              |  |                              |

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|             |   |   |  | within 3 months of the audit and signed off by an AQP.   |
| 4.4         | <b>Amendment 2: Schedule F – Table 1 Final Land Use and Rehabilitation Approval Schedule NPM response Attachment 4 – Water Storage Post Mine Land Use (PMLU) evaluation</b> | <p>The water quality analysis provided as part of the water storage PMLU evaluation in the NPM response does not include values relating to sulphate, calcium and magnesium as required by EA EPML00382513.</p> <p>The average total dissolved solids (TDS) provided in Table 4-A: Miles Bentonite Mine water quality summary of the NPM response currently exceeds the limits specified in Schedule 3 – Table 3 (End of pipe contaminant release limits) of the EA.</p> <p>The NPM notice requested water quality analysis of site surface waters that identifies the water is suitable for the proposed use of agricultural water storage. This was not provided in the NPM response.</p> <p>The application proposes changes to the post mine land use currently prescribed within the EA. The Landholder Statement currently on file is date 5 May 2022. This Landholder Statement relates to Mining Leases ML5902, ML50058, ML5909 &amp; ML5907. It is noted that the Landholder Statement does not include Mining Leases ML5898, ML5900, ML5901, ML5905 or ML5906.</p> <p>Condition F6-1 states <i>“All infrastructure, constructed by or for the environmental authority holder during the mining activities including water storage structures, must be removed from the site prior to mining lease surrender, except where agreed in writing by the post mining land owner/holder.</i></p> | <p>Provide:</p> <p>a) water quality monitoring results for all EA analytes from 2016 to present to demonstrate compliance with condition C1-1 and C1-2 and C1-3 of the EA.</p> <p>b) Information on the measures that will be taken to ensure the water quality of the current and proposed water storage dams are compliant with the EA limits.</p> <p>c) evidence to demonstrate how site water structures (ML50058 pit, ML5909 and ML5907 ROM Pad and Sediment Dams) will be made suitable and compliant for its intended purpose post mining (stock water storage for grazing activities).</p> <p>d) a landholder statement which includes all proposed infrastructure to be retained post mining for all mining leases within the EA in addition to identifying a post mine land use should the landholder agreement not be received or maintained.</p> | <p>a) Refer <b>Attachment 5</b> with water quality data for in-situ sampling. Note that conditions C1-1, C1-2 and C1-3 only relate to waters that are released from site, not water contained in site basins. Many of the results are not contextually understood as to whether they were sampled during release events or not.</p> <p>b) There is no requirement for water quality in the water storage dams to meet the limits in Schedule C - Table 3, these are only release limits. In the event in-situ water quality does not meet these limits measures to prevent access by livestock and minimise access by fauna will be implemented.</p> <p>c) Post mining all stockpiles of clay will be removed and sold, sediment within the dams will be removed and used for rehabilitation. Disturbed land, including the dam catchments and batters, will be rehabilitated with vegetation and appropriately ameliorated subsoil and topsoil (see <b>Attachment 9</b>), resulting in significantly lower sediments in stormwater runoff reporting to the dams.</p> <p>d) For the majority of disturbance, the operator is the landowner, an updated landowner agreement has been supplied in <b>Attachment 10</b>. It should be noted that no infrastructure is proposed to remain on land that is not owned by the operator.</p> |
| <b>Land</b> |   |   |  |  |
| 5.1         | <b>Land disturbance</b>   | The application provides figures and a summary of the total area to be disturbed on each lease.   | Provide:   | a) Refer table summarising disturbance in <b>Attachment 11</b> .   |

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|      |           | <p>The application does not clearly identify the type, location and area of disturbance proposed and there is insufficient information on the potential impacts to environmental values from the activities and the proposed mitigation measures.</p> | <p>a) a table summarising the disturbance type for each lease, existing versus proposed disturbance, the areas for each disturbance type, the rehabilitation outcome and the applicability of any landholder agreement.</p> <p>b) detailed maps of the project area which include the locations of all site infrastructure/disturbance current and proposed for inclusion into the EA.</p> <p>c) the location of sensitive receptors and environmental values for land and an assessment of potential impacts to environmental values, including sensitive receptors, from the proposed activities.</p> <p>d) information on the mitigation measures to be implemented to reduce potential impacts to the environmental values, including sensitive receptors.</p> <p>Information should be provided in accordance with <a href="http://des.qld.gov.au">ESR/2015/1839 Application requirements for activities with impacts to land (des.qld.gov.au)</a></p> | <p>b) Site Layout plans were included in the original submission – Attachment 1 including Drawings MIL003, MIL004 &amp; MIL005.</p> <p>c) Refer sensitive receptor plans <b>Attachment 5</b>. An assessment of environmental values for land concluded that the following values are most relevant:</p> <ul style="list-style-type: none"> <li>i. Soil Health &amp; Function</li> <li>ii. Flora (Native Wildflowers)</li> <li>iii. Fauna (special least concern species)</li> <li>iv. Cultural (aboriginal heritage)</li> <li>v. Sensitive Receptors (where &lt;500m from operations)</li> </ul> <p>d) Mitigation measures for each of the environmental values is listed below:</p> <ul style="list-style-type: none"> <li>i) Soil management is critical for the site and a soil survey of the whole operation has been completed to map the areas, soil types and provide mitigation measures for managing soils. An ESCP has been developed to prevent soil erosion from disturbed areas on site and remediation actions have been recommended in line with rehabilitation activities to provide for soil health outcomes.</li> <li>ii) Native wildflowers occur in the general mine region with signage on Gurulmundi road indicating their presence. Site maintains an awareness and identification process to minimise impacts with native wildflowers. New areas are surveyed prior to clearance to minimise risks.</li> <li>iii) The echidna is mapped in the general locality with potential habitat overlapping some proposed operating areas. These animals are highly mobile and have a large home range. The proposed disturbance impacts will be minimised through fauna spotter catcher presence during</li> </ul> |



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|      |                          |   |  | <p>clearing and effective rehabilitation post operation.</p> <p>iv) Cultural agreements are required where aboriginal heritage exists, representatives of the native title party are invited to site to assist with monitoring clearing activities and minimise impacts to cultural values associated with the land.</p> <p>v) Sensitive receptors in close proximity to proposed future operations(&lt;500m) will be consulted to assist with minimising impacts. Where potential for land impacts exist such as for localised agriculture, Terrequip will work with the landowner to find a mutual solution.</p>  |
| 5.2  | <b>Cultural Heritage</b> | <p><i>Condition (11-1) - The environmental authority holder must act in accordance with the cultural heritage management plan, signed in consultation with the traditional custodian for active mining lease 5909.</i></p> <p>No information has been provided regarding the consideration and assessment of heritage matters across the leases for the proposed operations and as it relates to the existing operations.</p> | <p>a) Provide an assessment of cultural heritage matters relevant to existing and proposed mining activities, across all mining leases.</p> <p>b) Demonstrate how all heritage matters and associated approvals have been considered and acquired to facilitate mining.</p> <p>c) Provide updated management plans for existing and proposed operations.</p> | <p>a) Engagement with the Western Wakka Wakka People and the Barunggam People has been undertaken by former mine operators (Sibelco &amp; Unimin) which covers the current disturbance footprint of the mine within the Ausben Leases.</p> <p>b) Past operations on ML5909, ML5907 and M50058 has been facilitated through agreements with the cultural heritage parties in 2004 and 2016.</p> <p>c) Site operations abide by the Aboriginal Cultural Heritage Act 2003. Section 23(1) of the Act states that a person who carries out an activity must take all reasonable and practicable measures to ensure the activity does not harm Aboriginal cultural heritage (the "cultural heritage duty of care").</p> <div data-bbox="1423 1078 1923 1354" style="border: 1px solid black; background-color: yellow; padding: 10px; text-align: center;"> <p><b>Cultural Heritage<br/>Private Information</b></p> </div> |

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|      |  |  |   | <div data-bbox="1556 488 1745 548" style="border: 1px solid black; padding: 5px; display: inline-block;">           Cultural Heritage<br/>Private Information         </div>   |
| 5.3  | <b>Matters of State Environmental Significance</b> | <p>Matters of State Environmental Significance (MSES) – Regulated Vegetation defined watercourse is located within ML50058. The application states that the water course will be avoided during clearing</p> <p>Matters of State Environmental Significance (MSES) – Wildlife Habitat (special least concern animal) Echidna Habitat is located within the project area.</p>   | <p>Demonstrate that the proposed mining activities will not cause a Significant Residual Impact to MSES Regulated Vegetation defined watercourse and MSES Wildlife Habitat special least concern animal in accordance with the guideline <i>Significant Residual Impact Guideline December 2014</i>.</p>  | <p>Refer <b>Attachment 7</b> with SRI assessment. No significant residual impacts have been identified.</p>  |
| 5.4  | <b>Rehabilitation</b>                              | <p>The application does not sufficiently describe how the site will be rehabilitated. Nor does the application demonstrate how rehabilitation will ensure an end use that is safe, non-polluting, stable and able to sustain the proposed post mine land use.</p> <p>The application is required to</p> <ul style="list-style-type: none"> <li>• provide for the effective management of actual and potential environmental impacts for the rehabilitation of disturbed land resulting from the proposed activities.</li> <li>• Identify the proposed monitoring strategy which will be used to verify rehabilitation</li> </ul> | <p>Provide information for rehabilitation that meets the requirements specified in with <a href="#">ESR/2015/1839 Application requirements for activities with impacts to land (des.qld.gov.au)</a></p> <p>Noting the current transition to the Progressive Rehabilitation and Closure Plan (PRCP) Framework, relevant information requirements, outcomes and best practice guidance and standards should also be considered.</p> | <p>The operator is undertaking this EA amendment in order to progress the PRCP. Therefore rehabilitation documents are being collated to meet the requirements of the PRC planning guidelines and are still in draft form. In lieu of the final versions (likely to be finalised after the EA amendment is approved) refer <b>Attachment 8</b> which includes the latest version of the Final Land Use and Rehabilitation Plan (FLURP) for the site. This document includes management and monitoring strategies for rehabilitation.</p> |

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|      |           | <p>success. The information provided must include justification as to the options and management measures proposed.</p> <p>A landholder statement or agreement does not preclude the need to meet the above requirements.</p> |                     |                   |





# **Attachment 3**

EPP (Air) Assessment

# Miles Bentonite – EA Amendment Information Request

## Air 2.1

Demonstrate consideration of the following:

a) Management hierarchy as set out in the EPP (Air) in the project design and development of management strategies for the proposed activity and operation.

### 1. Overview of the Management Hierarchy:

- Section 8 of the EPP (Air) establishes a hierarchy for the management of air emissions that prioritises:
  - **Avoidance:** Minimise emissions through design choices and operational planning.
  - **Recycling:** Reduce emissions by re-using air emissions in another industrial process.
  - **Minimization:** Reduce emissions where avoidance isn't feasible through best-practice technologies and operational controls.
  - **Management:** Mitigate impacts using containment/isolation measures, monitoring, treatment or dispersal of emissions.

### 2. Project Design Alignment:

- **Avoidance:**
  - The proposed changes to the EA are designed to limit the potential for air emissions by minimising or eliminating the need to use all the space available within the leases for activities ancillary to the extraction of the resource. This includes using the existing infrastructure areas for material processing and storage of overburden materials so that the need to open new areas for these purposes is not required. This generally reduces the proposed new areas to topsoil stockpiles, safety bunding, access tracks (roads) and pits.
- **Recycling:**
  - The processing plant already captures and recycles air emissions from the plant area via a baghouse extraction system. The captured material is recycled into saleable products. There are no additional viable identified methodologies to capture and recycle the predicted emissions from the proposed changes to the EA with this amendment application.
- **Minimisation:**
  - The site currently uses, and will continue to use dust suppression via water cart on all active roads and tracks. This ensures that dust generation from vehicular traffic is minimised, which may also include the use of a suppressant such as Polo Citrus Haulage DC.
  - Terrequip Miles has a plant selection policy which includes criteria relating to engine efficiency and emissions.
  - Terrequip Miles utilises management measures to assist with dust minimisation on the site including training for personnel, dust suppression policies, and protocols regarding operation in windy and dry conditions.
- **Management:**
  - The plan for the proposed areas of the EA Amendment application has been developed to minimise the site disturbances as much as possible.

- The site is remote with minimal neighbours, and much of the surrounding land is owned by the landowners of the mine, is of limited agricultural use at present and is considered to have low desirability for residential accommodation.

b) Environmental values listed under section 6 and schedule 1 of the EPP (Air) and details on the location, proximity, and type of sensitive receptors for each of the mining operations and leases specified under the EA

- Environmental Values to Be Protected as specified in section 6 and schedule 1 of the EPP (Air):
  - The protection of ecosystems and biodiversity.
  - The health and well-being of humans.
  - The amenity of the community.
  - The protection of agricultural uses.
- 2. Sensitive Receptors:
  - See **Attachment 5** for the sensitive receptor plans.
- 3. Site-Specific Context:
  - Gurulmundi Leases (ML5898, ML5902, ML5905, ML5906) will be extracted with a basic pit to approximately 12 to 15m depth. These pits will be backfilled and rehabilitated in a progressive manner to minimise material movement of overburden. Stockpiling of topsoil will take place on these leases which will be vegetated with cover crops to minimise dust mobilisation. Stockpiling of overburden will either take place on ML5902, or as backfill depending on the stage of extraction. The leases are surrounded by non-remnant or least concern regional ecosystems. To the NW is SR3 which is the uninhabited landfill operation. To the north of ML5902 is the village of Gurulmundi with 2 residential properties (SR 4 & SR5) owned by family of the mine's main machinery contractor and one Terrequip/SFT owned property (SR6). To the East is SR7 an uninhabited house on Lot 72 owned by Terrequip/SFT, SR11 on Lot 59 which is rented and SR8 on Lot 74 which is also rented. SR11 is located within relatively close proximity to proposed mine workings and engagement with the landowner will be required to facilitate mitigation measures.
  - Ausben Leases (ML5907, ML5909, ML50058) will be extracted with a basic pit to approximately 12 – 15m depth. These pits will be backfilled and rehabilitated in a progressive manner to minimise material movement of overburden. Stockpiling of topsoil will take place on these leases which will be vegetated to minimise dust mobilisation. Stockpiling of overburden will occur in temporary stockpiles if necessary or as backfill depending on the stage of extraction. SR1 is located to the north and is owned by Terrequip/SFT and is utilised by an employee. SR2 is occupied and located significant distance to the east away from operations.
  - Woleebee Leases (ML5900, ML5901) will be extracted with a basic pit to approximately 8 – 14m depth. These pits will be backfilled and rehabilitated in a progressive manner to minimise material movement of overburden. Stockpiling of topsoil will take place on these leases which will be vegetated to minimise dust mobilisation. Stockpiling of overburden will occur in temporary stockpiles if necessary or as backfill depending on the stage of extraction. SR8 & SR9 are located at the Woleebee Leases, with SR8 to the south, centrally located between the two leases. This location is >250m from proposed mining operations. SR9 is a significant distance to the NE and is unlikely to be at risk of air quality impacts from the operation.
  - General: The identified potential exposure pathways for air emissions are wind-blown dust from stockpiles, vehicle emissions, and dust from vehicular travel on unsealed access tracks. Given the distance to, and unconcentrated nature of the identified sensitive receptors, the likelihood of the impact on these receptors is low whilst the potential impact is also low due to the low intensity of mining expected.

4. Mitigation Measures:

- Low emission mobile plant selection, regular scheduled plant maintenance.
- Cover crops on topsoil stockpiles.
- Water cart spraying down roads and overburden stockpiles regularly during dry weather.
- Use of dust suppressant additives on roads and long-term overburden stockpiles.

c) Air quality objectives listed under section 7 and schedule 1 of the EPP (Air) and how they will be met for expanded operations

1. Air Quality Objectives:

- The EA amendment does not include changes to the manner in which the site processes material and therefore schedule B – Table 1 of the EA should not be amended.
- The specific air quality objectives for the proposed amendment to the EA should be limited to particulate matter [PM10, PM2.5] with limits at a sensitive receptor as set out in schedule 1 of the EPP (Air).
- Monitoring for these pollutants should take place if a complaint is raised from a sensitive receptor. Given that no known air quality complaints have been raised in the past, this is considered a reasonable approach.

2. Control Measures:

- Terrequip Miles will meet the air quality objectives by utilising operational controls, including:
  - Use of low-emission equipment and vehicles.
  - Comprehensive dust suppression strategies, especially during extraction and material transport.
  - Limiting activities during adverse weather conditions, such as high winds.
  - Maintaining a cover crop on topsoil stockpiles.

3. Continuous Improvement:

- Terrequip Miles undertakes an adaptive management approach that involves periodic reviews of emissions performance and updates to control strategies as required.

4. Contingency Planning:

- If complaints are received and monitoring delivers results in exceedance of set limits, then Terrequip Miles will conduct a thorough investigation into the source of these exceedances and deploy practicable additional or improved mitigation measures as soon as possible.
- Once these additional or improved mitigation measures are in place, confirmatory monitoring will take place to ensure the efficacy of these measures.
- Once efficacy is understood and monitoring shows dust levels under the limit, Terrequip Miles management will communicate with DETSI and affected sensitive receptors about the investigation, additional measures, monitoring results and long-term planning to ensure effective control of the source of the dust.



# **Attachment 4**

EPP (Noise) Assessment



# Miles Bentonite – EA Amendment Information Request

## Noise 3.1

Demonstrate consideration of the following:

a) How the management hierarchy as set out in EPP (Noise) has been considered in the project design and development of management strategies for the proposed activity and operation.

### 1. Overview of the Management Hierarchy:

- Section 8 of the EPP (Noise) establishes a hierarchy for the management of air emissions that prioritises:
  1. **Avoidance:** Avoid noise impacts through design choices and operational planning.
  2. **Minimisation:** Reduce noise where avoidance isn't feasible by orienting the activity to lower the impact on a sensitive receptor and through best-practice technologies and operational controls.
  3. **Management:** Mitigate impacts by managing noise generation on the site such that it minimises the possibilities for noise generation.

### 2. Project Design Alignment:

- **Avoidance:**
  - The proposed changes to the EA have been designed in consideration of avoiding the generation of noise where possible. This generally is lent to the design of progressive clearing and rehabilitation and limiting of double handling and/or material movement to limit the generation of engine noise as much as practicable.
  - Where possible, vegetation surrounding the areas proposed to change in the EA amendment will remain intact and provide a good sound buffer to sensitive receptors.
  - The areas proposed within the EA amendment are no closer to built-up areas (including the township of Gurulmundi) and are generally isolated from sensitive receptors by way of distance. It is acknowledged that the location of the resource and the location of pre-existing residences is not able to be controlled.
  - The EA amendment does not propose any increase in intensity of mining over that which is already practiced at the site and is considered a low-intensity form of mining owing to the demand for the resource and its derivative products.
- **Minimisation:**
  - Equipment selection practices/policies prioritise low-noise machinery and/or noise suppression technology.
  - Operational practices such as limiting idling time and hours of operation.
  - Implementation of engineering controls such as acoustic barriers, bunding, and vegetation screens where necessary.
- **Management:**
  - Noise monitoring will be undertaken to assess compliance with EA requirements when a complaint is received from a sensitive receptor.
  - A complaints management system and community engagement plan will be implemented to address concerns and mitigate impacts.
  - Potential agreements with affected stakeholders, such as noise mitigation for nearby residences will be considered.

b) How the environmental values listed under section 6 and schedule 1 of the EPP Noise have been considered and details on the location, proximity and type of sensitive receptors for each of the mining operations and leases specified under the EA

- **Human Health & Wellbeing:** Ensuring noise levels remain within acceptable limits to prevent adverse health effects such as stress, sleep disturbance, and hearing impairment for nearby communities.
- Operational controls to minimise peak noise events, particularly during early morning and night-time periods.
- **Environmental Values:** No noise-sensitive ecosystems or essential habitats have been identified within the mining leases of the EA.
- **Community Amenity:** The proximity and type of sensitive receptors have been mapped for all mining leases under the Environmental Authority (EA). These include:
  - Residential properties located approximately 2 km from the lease boundary.
  - Nearby rural dwellings and farmsteads within 2 km.
  - Public spaces within 2km.
- It is not predicted that the noise generated from activities associated with the proposed EA amendment will impact community amenity.

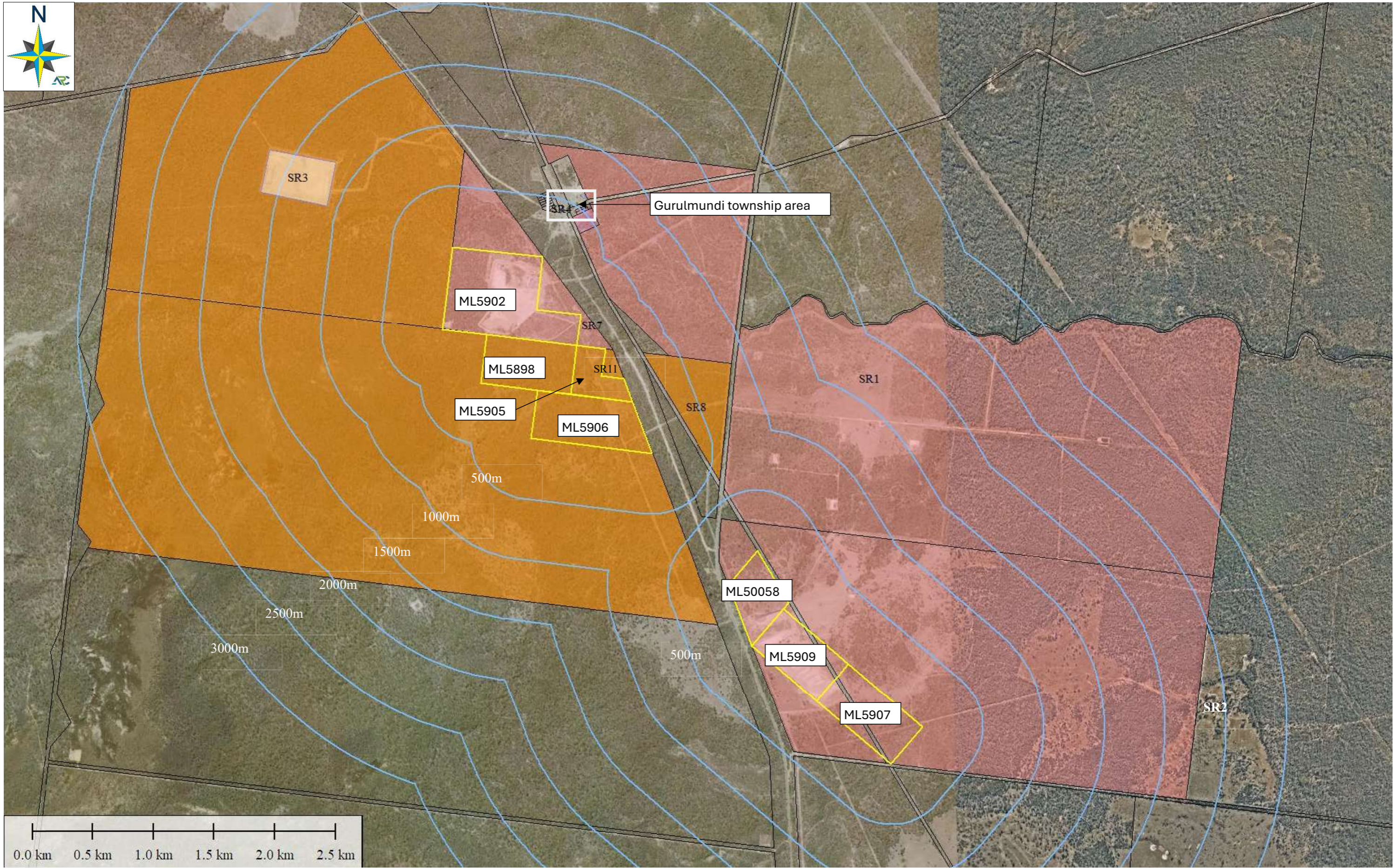
c) The acoustic quality objectives listed under section 7 and schedule 1 of the EPP Noise have been considered.

- **Specific dB(A) Levels for Different Time Periods & Receptor Types:** There are limited sensitive receptors identified for the areas affected by the EA amendment (eleven residences). 3 of these residences do not have occupants, 1 is a residence owned by a landowner with common ownership to Terrequip Miles Pty Ltd, 2 are residences for family of the main site contractor and another 2 are used by landowners where an agreement exists between operator and landowner for mining operations. Only 3 residences (SR2, SR8 & SR11) are located on independently owned property with no direct connection with the mine.
- Noise monitoring programs will be carried out upon receipt of a legitimate complaint from a sensitive receptor to ensure compliance with the applicable row of Schedule 1 of the EPP (Noise). Note that no noise complaints have been received since the mine commenced, over 20 years ago.
- **Noise Mitigation & Monitoring Strategies to Achieve Compliance:** A noise monitoring and compliance framework has been incorporated into the mine's site based management plan (SBMP).
- Where exceedances are detected from a noise monitoring program, management will carry out an investigation into the source of the noise creating the impact and decide the most practicable approach to modify existing or adopt new mitigation measures in aim to reduce and minimise noise impacts at the sensitive receptor where the complaint arose.
- Once new or improved mitigation measures are implemented, management will carry out a monitoring program at the sensitive receptor to ensure that the new measures are effective and compliant with Schedule 1 of the EPP (Noise).
- Once compliance has been achieved with Schedule 1 of the EPP (Noise), Terrequip Miles will inform DETSI and the sensitive receptor about the investigation, changes to mitigation measures, and the outcome of noise monitoring which demonstrates compliance.

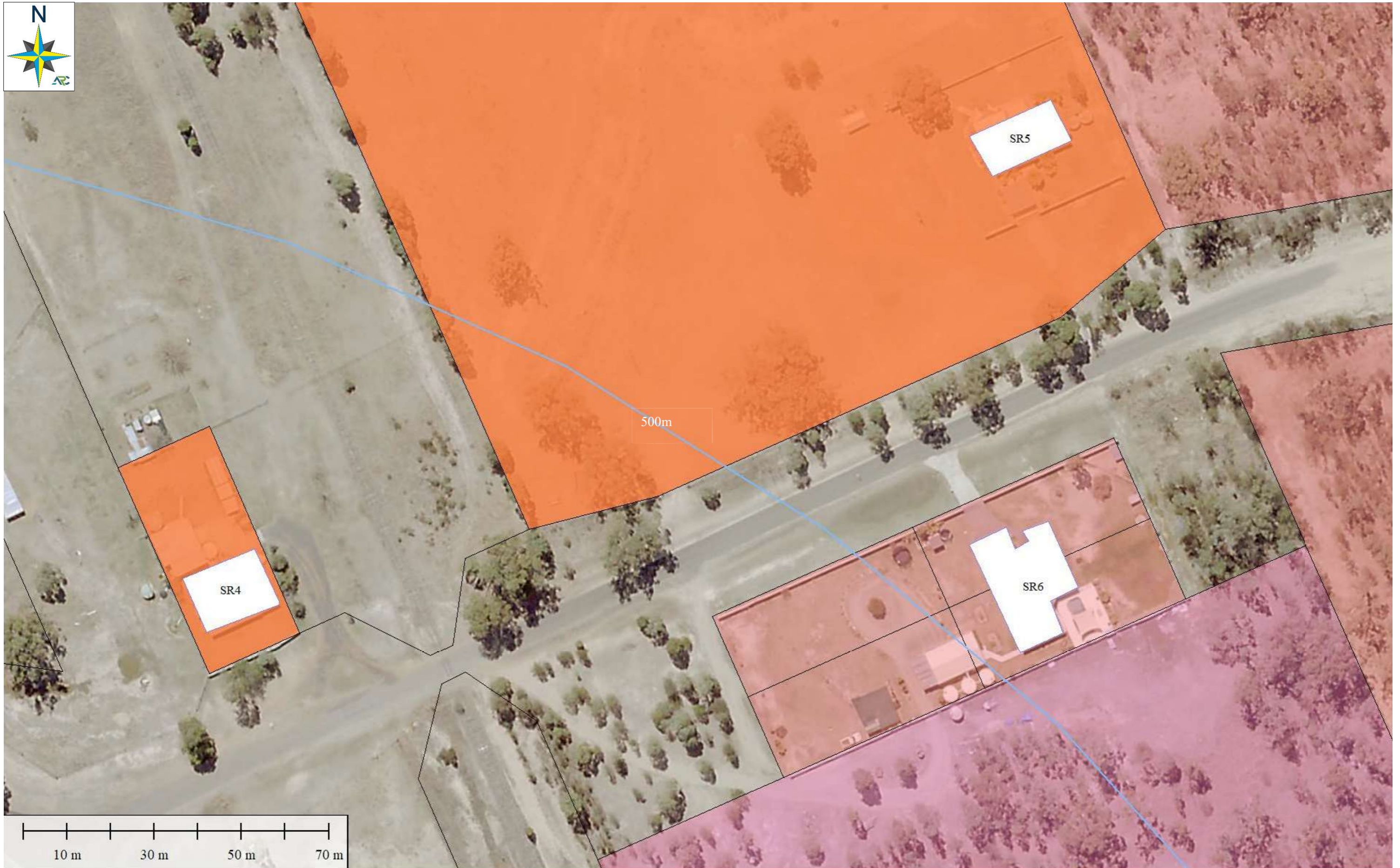


# **Attachment 5**

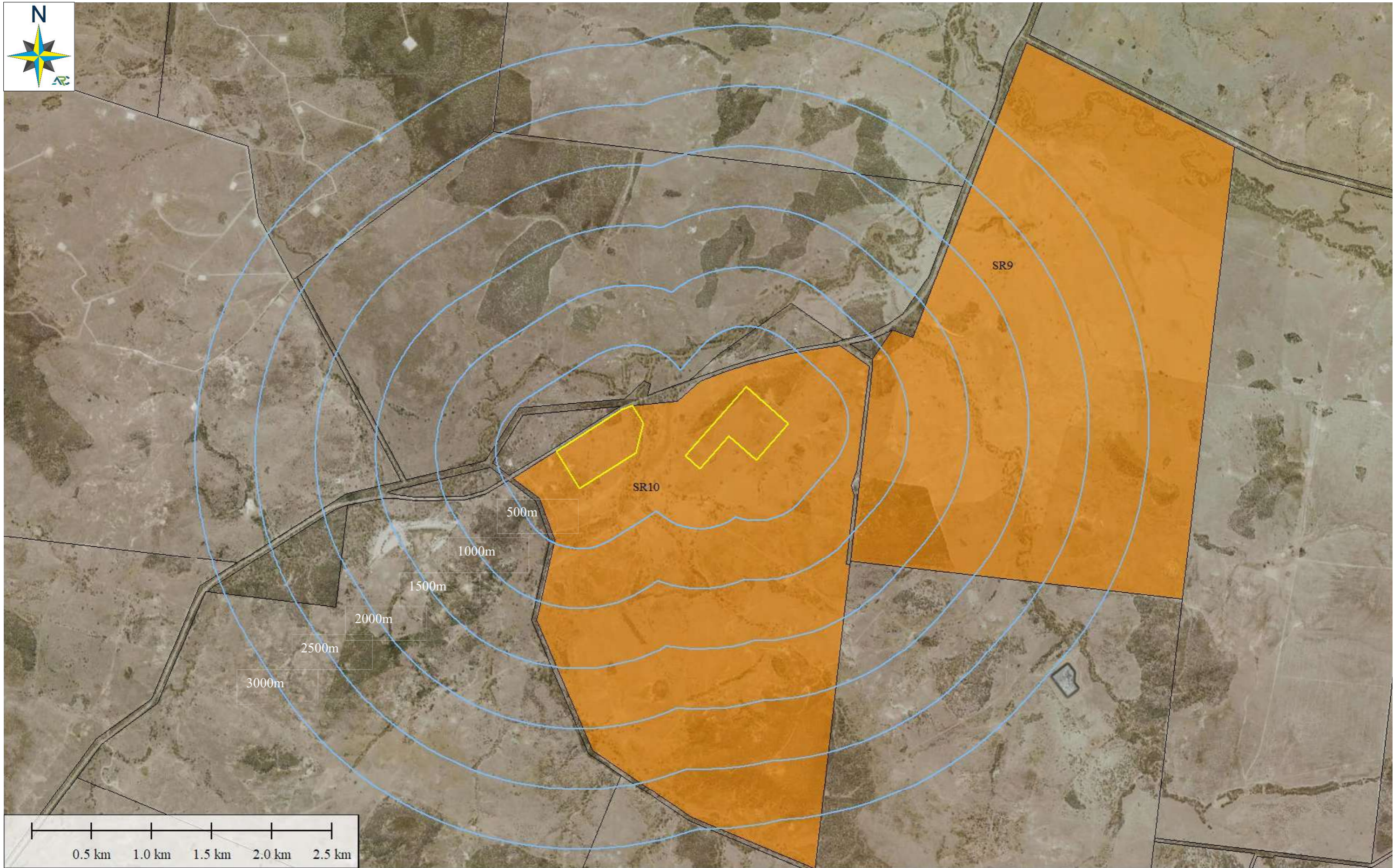
Sensitive Receptor Plans



Legend: Red parcels = Landowner Information owned; Orange parcels: Other landowner with SR present; Pink parcels: Landowner Information; Blue lines: 500m ML buffers; Yellow lines: ML boundaries; Black lines: Land parcel boundaries



Gurulmundi township area



Sensitive Receptor Summary Table

| SR ID | Lot | Plan  | Tenure Type | Landowner             | Approx. Distance to Nearest ML (m) | Comment                                    |                       |
|-------|-----|-------|-------------|-----------------------|------------------------------------|--|-----------------------|
| 1     | 39  | AU188 | Freehold    | Landowner Information | 1675                               | Occupied                                   | Landowner Information |
| 2     | 37  | AU35  | Freehold    |                       | 2387                               | Occupied                                   | Landowner Information |
| 3     | 67  | AU67  | Reserve     |                       | 1088                               | Former Gurulmundi Secure Landfill facility | Landowner Information |
| 4     | 78  | AU201 | Freehold    |                       | 410                                | Occupied                                   | Landowner Information |
| 5     | 75  | AU202 | Freehold    |                       | 588                                | Occupied                                   | Landowner Information |
| 6     | 315 | G6651 | Freehold    |                       | 506                                | Vacant                                     |                       |
|       | 316 | G6651 | Freehold    |                       |                                    |  |                       |
| 7     | 72  | AU177 | Freehold    |                       | 92                                 | Vacant                                     |                       |
| 8     | 74  | AU188 | Freehold    |                       | 472                                |  |                       |
| 9     | 24  | FT908 | Freehold    |                       | 2212                               | Occupied                                   | Landowner Information |
| 10    | 23  | FT946 | Freehold    |                       | 278                                | Occupied                                   |                       |
| 11    | 59  | AU55  | Freehold    | 76                    | Occupied                           |  |                       |



# **Attachment 6**

Water Management Summary



| Water Management Infrastructure Summary - Terrequip Miles |          |   |                     |   |                       |                     |           |                 |           |   |
|---|----------|---|---------------------|---|-----------------------|---------------------|-----------|-----------------|-----------|---|
| Location  | Basin ID | Description   | Timeframe           | Rehabilitation Objective                      | Surface Area (volume) | Centre Co-ordinates |           | Discharge Point |           | Comments  |
|   |          |   |                     |   |                       | Easting             | Northing  | Easting         | Northing  |   |
| ML5902  | Pit Dam  | Large excavated mine void with perimeter drain/spillway | Existing            | Rehabilitated to PMLU water storage           | 5.4429ha (150-300ML)  | 205,539             | 7,073,815 | N/A             |           | AB-WMP-B  |
|   | SPW1     | sediment basin north of main infrastructure             |                     | Rehabilitated to PMLU water storage           | 0.024ha (<1ML)        | 205,641             | 7,074,301 | N/A             |           |   |
|   | SD1      | sediment basin north of main infrastructure             |                     | Rehabilitated to PMLU water storage           | 0.0474ha (<1-2ML)     | 205,700             | 7,074,298 | N/A             |           |   |
|   | SD2      | sediment basin north of main infrastructure             |                     | Rehabilitated to PMLU water storage           | 0.1247ha (1-3ML)      | 205,765             | 7,074,305 | 205,798         | 7,074,300 |   |
|   | WS1      | water storage north of main infrastructure              |                     | Rehabilitated to PMLU water storage           | 0.0907ha (1-2ML)      | 205,794             | 7,074,233 | N/A             |           |   |
|   | WS2      | clean water dam far-eastern portion of ML.              |                     | excluded, not on lease                        | N/A                   | 206,148             | 7,073,883 | N/A             |           |   |
|   | WS3      | clean water dam far-eastern portion of ML.              |                     | rehabilitated to PMLU grazing                 | 0.0889ha(1-2ML)       | 206,166             | 7,073,811 | N/A             |           |   |
|   | WS4      | Off-lease, east of site office, called 'turnaround dam' |                     | excluded, not on lease                        | N/A                   | 205,901             | 7,074,127 | N/A             |           |   |
| ML5898,<br>ML5905 &<br>ML5906                             | GL_Pit 1 | Western most pit, directly south of Pit Dam             | Proposed, <15 years | Rehabilitated to PMLU grazing (free-draining) | 10.8585ha (300-500ML) | 205,775             | 7,073,492 | No Discharge    |           | volume capacity assuming <1/2 of surface area open at any one time for progressive rehabilitation |
|   | GL_Pit 2 | Central pit   |                     | Rehabilitated to PMLU grazing (free-draining) | 3.253ha (80-150ML)    | 206,162             | 7,073,192 |                 |           |   |
|   | GL_Pit 3 | South eastern elongated pit                             |                     | Rehabilitated to PMLU grazing (free-draining) | 7.1845ha (200-350ML)  | 206,437             | 7,072,932 |                 |           |   |
|   | GL_Pit 4 | Eastern pit   |                     | Rehabilitated to PMLU grazing (free-draining) | 1.4563ha (30-70ML)    | 206,587             | 7,073,072 |                 |           |   |
| ML50058,<br>ML5909 &<br>ML5907                            | WS1      | water storage north of current extraction               | Existing            | Rehabilitated to PMLU water storage           | 0.0934 ha (1-2ML)     | 207,599             | 7,071,425 | No Discharge    |           | AB-WMP-D  |
|   | WS2      | water storage north of current extraction               |                     | Rehabilitated to PMLU water storage           | 0.0752 ha (<1-2ML)    | 207,594             | 7,071,373 | No Discharge    |           |   |
|   | SD1      | sediment basin adjacent to main operations              |                     | Rehabilitated to PMLU water storage           | 0.0510262 ha (<1-2ML) | 208,109             | 7,071,060 | No Discharge    |           |   |
|   | SD2      | sediment basin adjacent to main operations              |                     | Rehabilitated to PMLU water storage           | 0.3506652 ha (4-8ML)  | 208,038             | 7,071,159 | 208,077         | 7,071,159 |   |
|   | SD3      | sediment basin adjacent to main operations              |                     | Rehabilitated to PMLU grazing (free-draining) | 0.2618233 ha (3-6ML)  | 207,980             | 7,071,177 | No Discharge    |           |   |
|   | SD4      | sediment basin adjacent to main operations              |                     | Rehabilitated to PMLU water storage           | 0.078553 ha (<1-2ML)  | 207,896             | 7,071,124 | No Discharge    |           |   |
|   | SD5      | sediment basin adjacent to main operations              |                     | Rehabilitated to PMLU water storage           | 1.5930ha (30-60ML)    | 207,786             | 7,071,011 | No Discharge    |           |   |
|   | RW1      | external water storage                                  |                     | excluded, not on lease                        | N/A                   | 208,208             | 7,071,202 | N/A             |           |   |
|   | AL_Pit 1 | Northern Pit  | Proposed, <10 years | Rehabilitated to PMLU grazing (free-draining) | 4.428 ha (50-90ML)    | 207,643             | 7,071,697 | No Discharge    |           | volume capacity assuming <1/2 of surface area open at any one time for progressive rehabilitation |
|   | AL_Pit 2 | Central Pit - North                                     | Existing            | Rehabilitated to PMLU water storage           | 1.572 ha (15-30ML)    | 207,711             | 7,071,414 |                 |           |   |
|   | AL_Pit 3 | Central Pit - South                                     | Proposed, <10 years | Rehabilitated to PMLU water storage           | 4.405 ha (50-90ML)    | 208,311             | 7,070,600 |                 |           |   |
|   | AL_Pit 4 | South East Pit  | Proposed, <10 years | Rehabilitated to PMLU grazing (free-draining) | 14.339 ha (150-280ML) | 208,626             | 7,070,620 |                 |           |   |
| ML5900  | 5900_SB  | sediment basin northeast corner of site                 | Proposed, <20 years | Rehabilitated to PMLU grazing (free-draining) | 0.1187 ha (2-3ML)     | 778,488             | 7,084,195 | 778,492         | 7,084,214 | Zone 55 - all ML5900 & ML5901 co-ordinates.   |
|   | 5900_Pit | main pit void   | Proposed, <20 years | Rehabilitated to PMLU grazing (free-draining) | 16.903 ha (300-600ML) | 778,461             | 7,083,935 | No Discharge    |           | volume capacity assuming <1/2 of surface area open  |
| ML5901  | 5901_SB  | sediment basin northeast corner of site                 | Proposed, <20 years | Rehabilitated to PMLU grazing (free-draining) | 0.061 ha (0.7-1.8ML)  | 777,503             | 7,084,099 | 777,483         | 7,084,102 |   |
|   | 5901_Pit | main pit void   | Proposed, <20 years | Rehabilitated to PMLU grazing (free-draining) | 16.728 ha (300-600ML) | 777,255             | 7,083,783 | No Discharge    |           | volume capacity assuming <1/2 of surface area open  |

### Water Management Lat/Long Co-ordinates - Terrequip Miles

| Location                 | Basin ID | Centre Co-ordinates |            | Discharge Point |            |
|--------------------------|----------|---------------------|------------|-----------------|------------|
|                          |          | Lat                 | Long       | Lat             | Long       |
| ML5902                   | Pit Dam  | -26.425498          | 150.047746 | N/A             |            |
|                          | SPW1     | -26.421139          | 150.048883 | N/A             |            |
|                          | SD1      | -26.421176          | 150.049472 | N/A             |            |
|                          | SD2      | -26.421134          | 150.050125 | -26.421182      | 150.050456 |
|                          | WS1      | -26.421786          | 150.050401 | N/A             |            |
|                          | WS2      | -26.425013          | 150.053868 | N/A             |            |
|                          | WS3      | -26.425664          | 150.054029 | N/A             |            |
|                          | WS4      | -26.422764          | 150.051445 | N/A             |            |
| ML5898, ML5905 & ML5906  | GL_Pit 1 | -26.428464          | 150.050038 | No Discharge    |            |
|                          | GL_Pit 2 | -26.431253          | 150.053842 |                 |            |
|                          | GL_Pit 3 | -26.433651          | 150.056539 |                 |            |
|                          | GL_Pit 4 | -26.432423          | 150.058075 |                 |            |
| ML50058, ML5909 & ML5907 | WS1      | -26.447477          | 150.067837 | No Discharge    |            |
|                          | WS2      | -26.447943          | 150.067776 | No Discharge    |            |
|                          | SD1      | -26.450874          | 150.072865 | No Discharge    |            |
|                          | SD2      | -26.449964          | 150.072175 | -26.449975      | 150.072563 |
|                          | SD3      | -26.449789          | 150.071592 | No Discharge    |            |
|                          | SD4      | -26.450256          | 150.070739 | No Discharge    |            |
|                          | SD5      | -26.451249          | 150.069610 | No Discharge    |            |
|                          | RW1      | -26.449614          | 150.073889 | N/A             |            |
|                          | AL_Pit 1 | -26.445031          | 150.068342 | No Discharge    |            |
|                          | AL_Pit 2 | -26.447604          | 150.068960 |                 |            |
|                          | AL_Pit 3 | -26.455065          | 150.074778 |                 |            |
|                          | AL_Pit 4 | -26.454953          | 150.077939 |                 |            |
| ML5900                   | 5900_SB  | -26.335101          | 149.790013 | -26.334932      | 149.790048 |
|                          | 5900_Pit | -26.337459          | 149.789797 | No Discharge    |            |
| ML5901                   | 5901_SB  | -26.336160          | 149.780171 | -26.336136      | 149.779974 |
|                          | 5901_Pit | -26.339060          | 149.777759 | No Discharge    |            |

# Attachment 7

SRI Assessment





# MSES SIGNIFICANT RESIDUAL IMPACT ASSESSMENT

## Terrequip Miles

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For Terrequip Miles Pty Ltd  
Prepared by Ausrocks Resource Consultants

AUQ00238F



**TERREQUIP MILES PTY LTD**

**MSES SIGNIFICANT RESIDUAL IMPACT  
ASSESSMENT – MILES BENTONITE  
MINE**

11 FEBRUARY 2025

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## Document Control

### General Information

| Item            | Detail  |
|-----------------|---|
| Project Name    | Terrequip Miles   |
| Project Number  | AUQ00238F   |
| Document Title  | MSES Significant Residual Impact Assessment   |
| File Name       | EMPL00382513-Terrequip Miles-MSES-SRI-Assessment  |
| File Location   | 00238F_Terrequip\F - Miles\Mine Planning\Environmental Authority\EA Amendment\Approval Process\Information Request\SRI Assessment |
| Revision Status | 1.1   |

### Revision History

| Revision | Issue                   | Prepared by | Reviewed by | Date       |
|----------|-------------------------|-------------|-------------|------------|
| 1.0      | Internal Draft          | CM          | NV          | 24/01/2025 |
| 1.1      | Draft for Client Review | CM          | NV          | 11/02/2025 |
|          |                         |             |             |            |
|          |                         |             |             |            |

### Issue Register

| Date       | Distribution List   |
|------------|---|
| 11/02/2025 | Terrequip Miles Pty Ltd (Draft)                           |
| 12/02/2025 | Department of Environment, Tourism, Science, & Innovation |
|            |   |



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This document has been reviewed and signed off by the undersigned:

A handwritten signature in black ink, appearing to read 'Carl Morandy'.

Carl Morandy (RPEQ22981)

Managing Director, Ausrocks Pty Ltd



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## Terms & Abbreviations

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|                    |   |
|--------------------|---|
| <b>ALA</b>         | Atlas of Living Australia   |
| <b>ARC</b>         | Ausrocks Resource Consultants (Ausrocks Pty Ltd)  |
| <b>DES (DETSI)</b> | Department of Environment and Science<br>(now Department of Environment, Tourism, Science and Innovation) |
| <b>EA</b>          | Environmental Authority   |
| <b>EPBC Act</b>    | <i>Environment Protection and Biodiversity Conservation Act 1999</i>                                      |
| <b>Koala SPRP</b>  | Koala Conservation State Planning Regulatory Provisions   |
| <b>MSES</b>        | Matters of State Environmental Significance   |
| <b>NC Act</b>      | <i>Nature Conservation Act 1992</i>   |
| <b>PMAV</b>        | Property Map of Assessable Vegetation   |
| <b>RE</b>          | Regional Ecosystem  |
| <b>RPI Act</b>     | <i>Regional Planning Interests Act 2014</i>   |
| <b>SEA</b>         | Strategic Environmental Area  |
| <b>Site</b>        | Miles Bentonite Mine (ML5898, 5900, 5901, 5902, 5905, 5906, 5907, 5909 & 50058)                           |
| <b>SPA</b>         | <i>Sustainable Planning Act 2009</i>  |
| <b>SRI</b>         | Significant Residual Impact   |
| <b>VM Act</b>      | <i>Vegetation Management Act 1999</i>   |



# 1 INTRODUCTION

Ausrocks Resource Consultants (ARC) has prepared this report on behalf of Terrequip Miles Pty Ltd for the Miles Bentonite Mine located at Gurulmundi, QLD 4415. The project is located in three zones, with the Gurulmundi Leases (ML5902, 5898, 5905 & 5906) west of Gurulmundi Road, the Ausben Leases (ML5907, 5909 & 50058) east of the Leichhardt Highway and the Woleebee Leases (ML5900 & 5901) located south of the Jackson-Wandoan Road. This report only relates to Matters of State Environmental Significance (MSES) in the Gurulmundi Leases within Lot 72 AU177, 59 AU55 and Ausben Leases area located within Lot 38 AU184 in the Western Downs Regional Council, refer **Figure 1**. There are no MSES within 500m of the Woleebee Leases and no further assessment is required at these locations.

This report contains assessments to determine the significant residual impact for the proposed increase to the maximum disturbance footprint, with the maximum impact area for the Gurulmundi Leases are provided in **Figure 2** Ausben Leases are provided in **Figure 3**.

It is important to note that the following assessments are not to be used to determine if the site requires assessment for potential impacts on Matters of National Environmental Significance (MNES) protected by the Commonwealth *Environment Protection and Biodiversity Act 1999* (EPBC Act) or if an offset would be required under that Act. Additionally, no ground truthing surveys were undertaken as part of this SRI assessment.

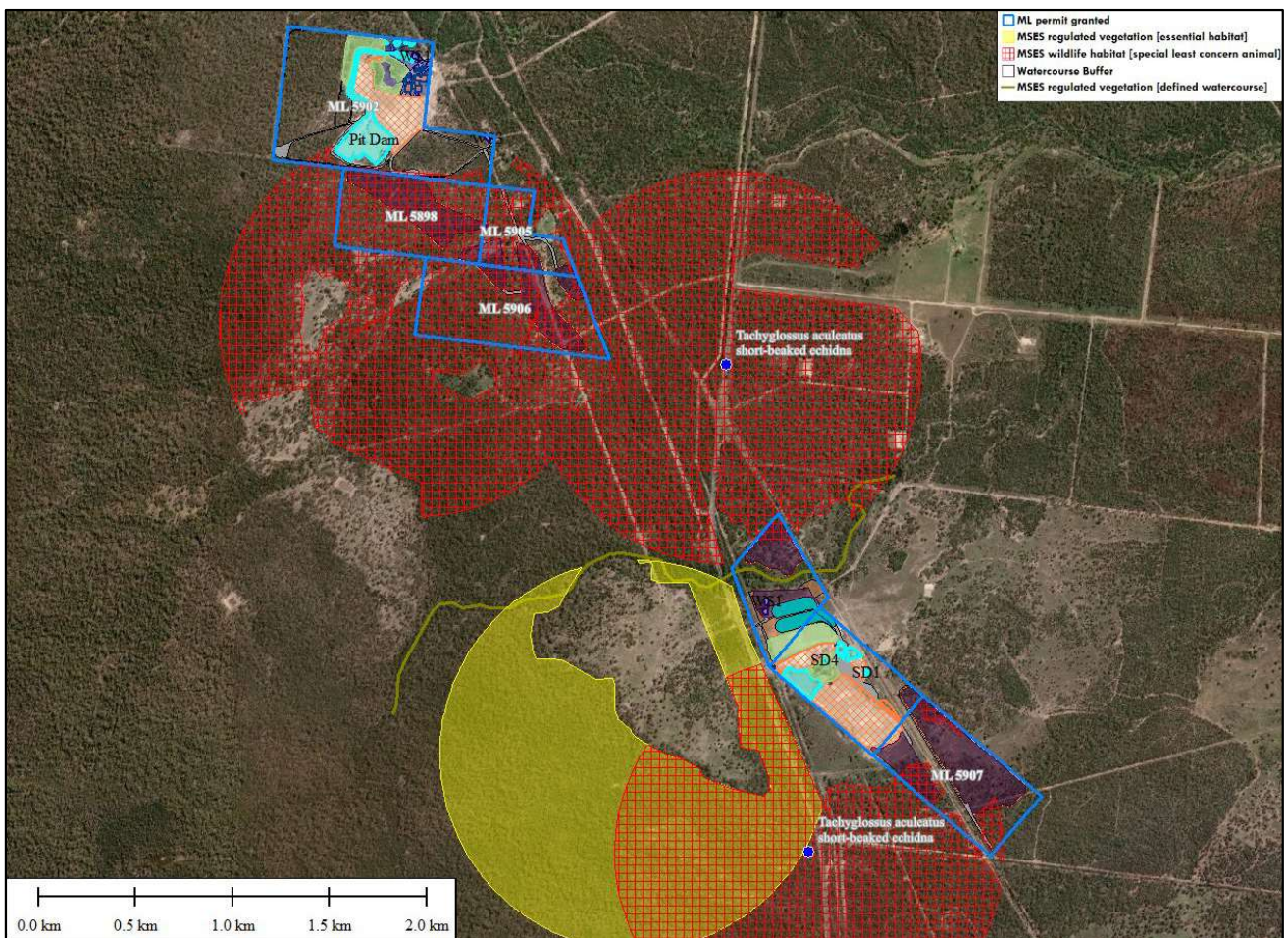


Figure 1: MSES Mapping

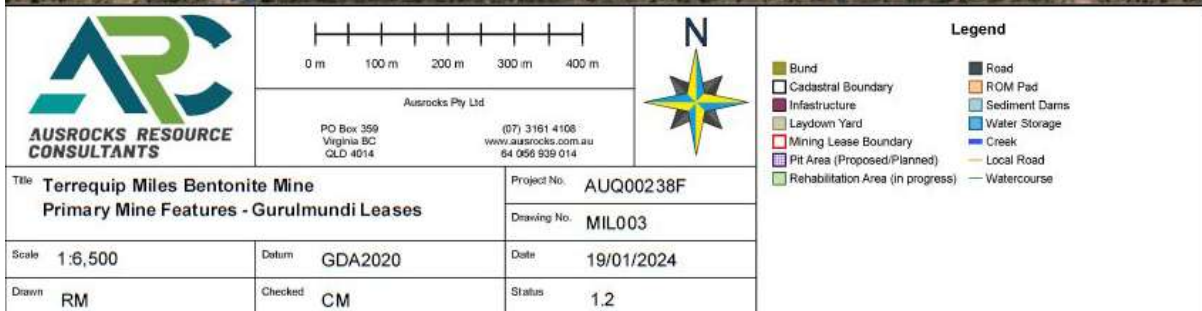
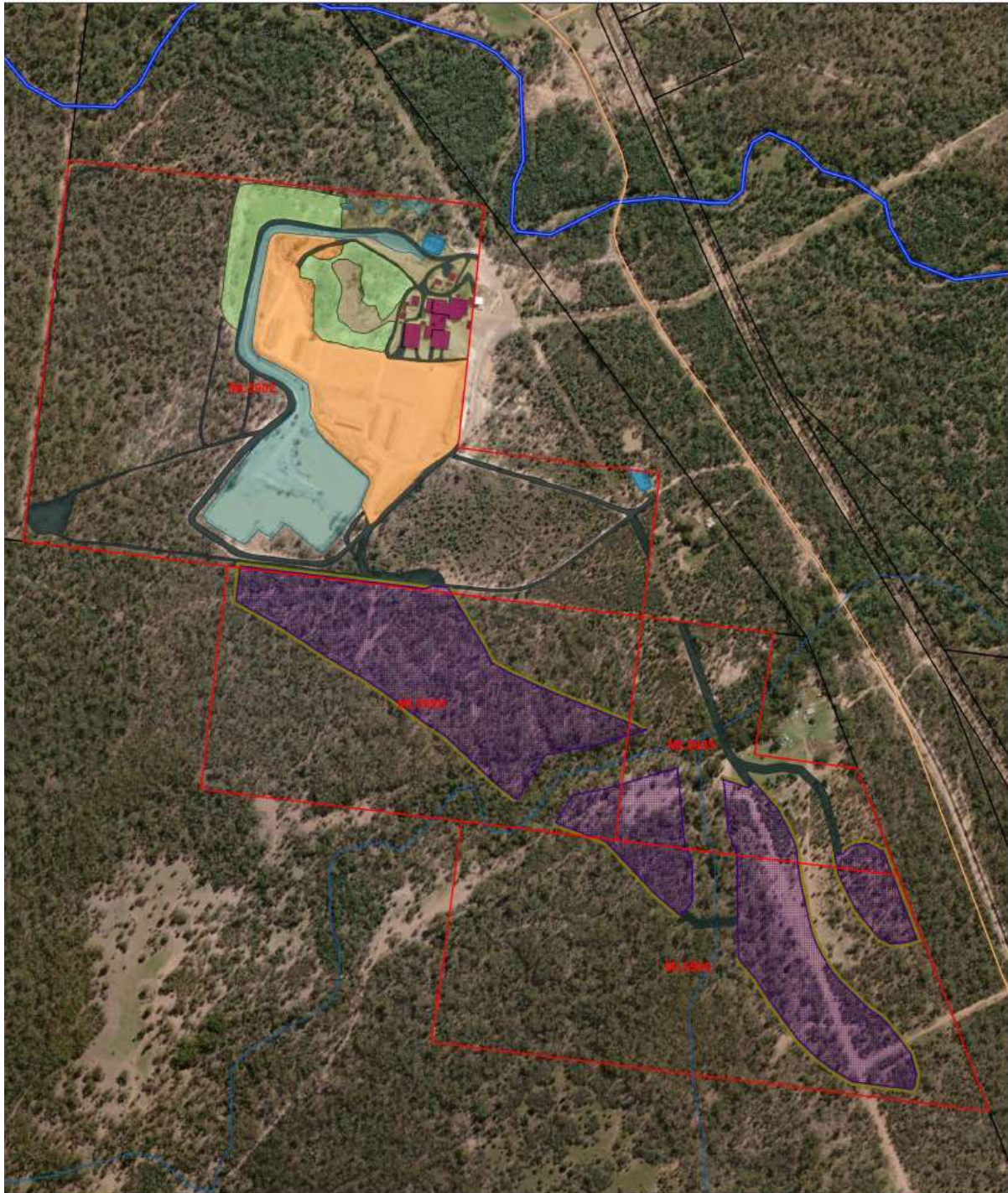


Figure 2: Proposed maximum disturbance area – Gurulmundi Leases

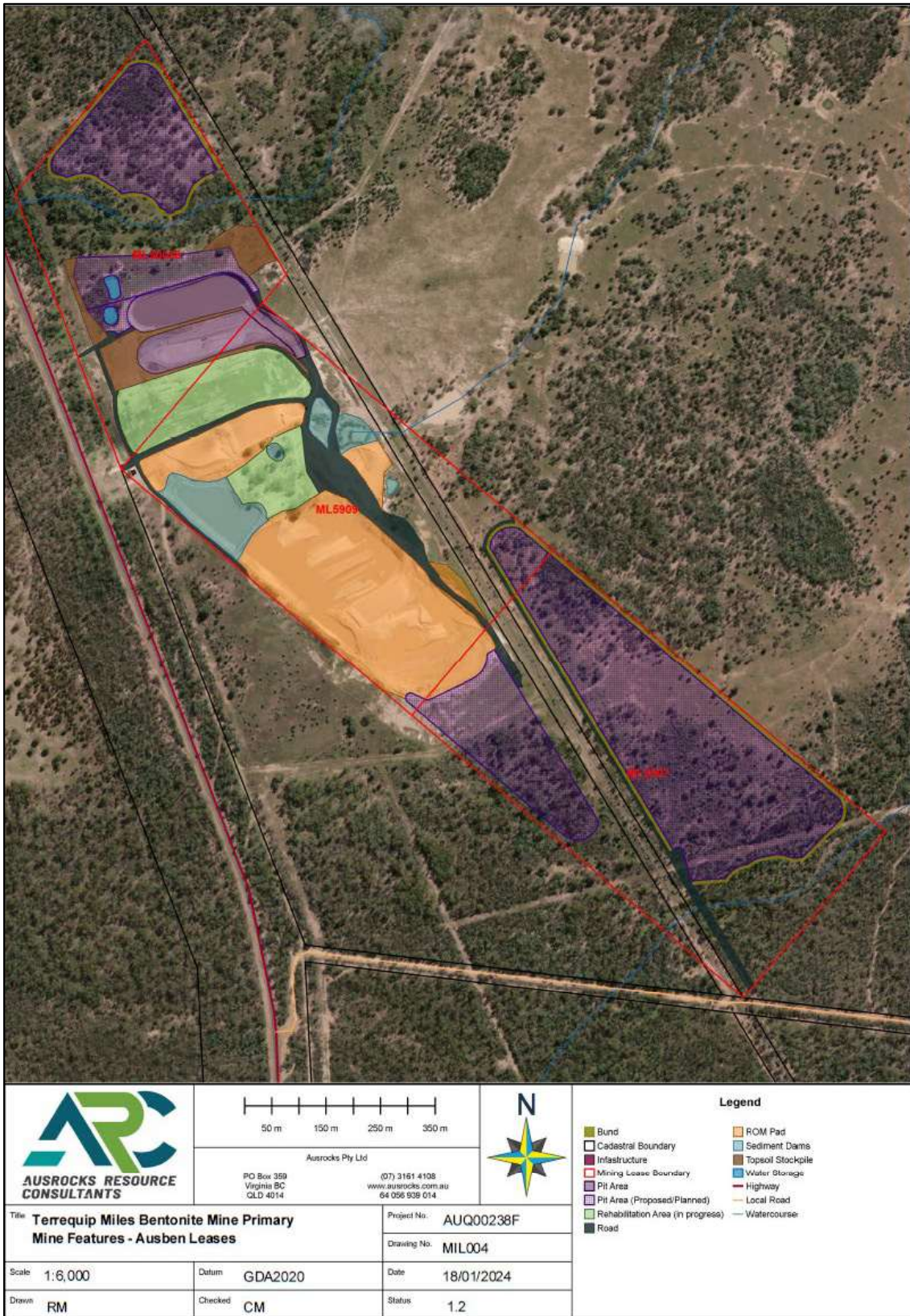


Figure 3: Proposed maximum disturbance area – Ausben Leases



## 2 SRI ASSESSMENT

### 2.1 Prescribed activities assessable under SPA

#### 2.1.1 Regulated vegetation

Regulated vegetation excludes regrowth vegetation and has been defined as Category B areas on the regulated vegetation map that are:

- 'endangered' or 'of concern' regional ecosystems (REs); or
- remnant vegetation within the defined distance of a water course identified on the vegetation management watercourse map; or
- remnant vegetation that intersects with an area shown as a wetland on the vegetation management wetlands map; or
- essential habitat as identified on the essential habitat map.

The proposed operation area is partially mapped as non-remnant Category B vegetation, with the remainder being regrowth or Category X. A portion of the area covered by the expansion is mapped as regional ecosystem (RE) code 11.7.6/11.5.21 (60/40) Least Concern and a portion is mapped as RE 11.5.21/11.7.4/11.5.4 (40/40/20) Least Concern vegetation under the *Vegetation Management Act 1999* (VM Act).

##### 2.1.1.1 'Of Concern' REs

**There are no areas of mapped 'Endangered' or 'Of Concern' REs within the proposed operation area.**

The Project footprint is within an area of 'Least Concern' RE (100% compacted percentage for RE).

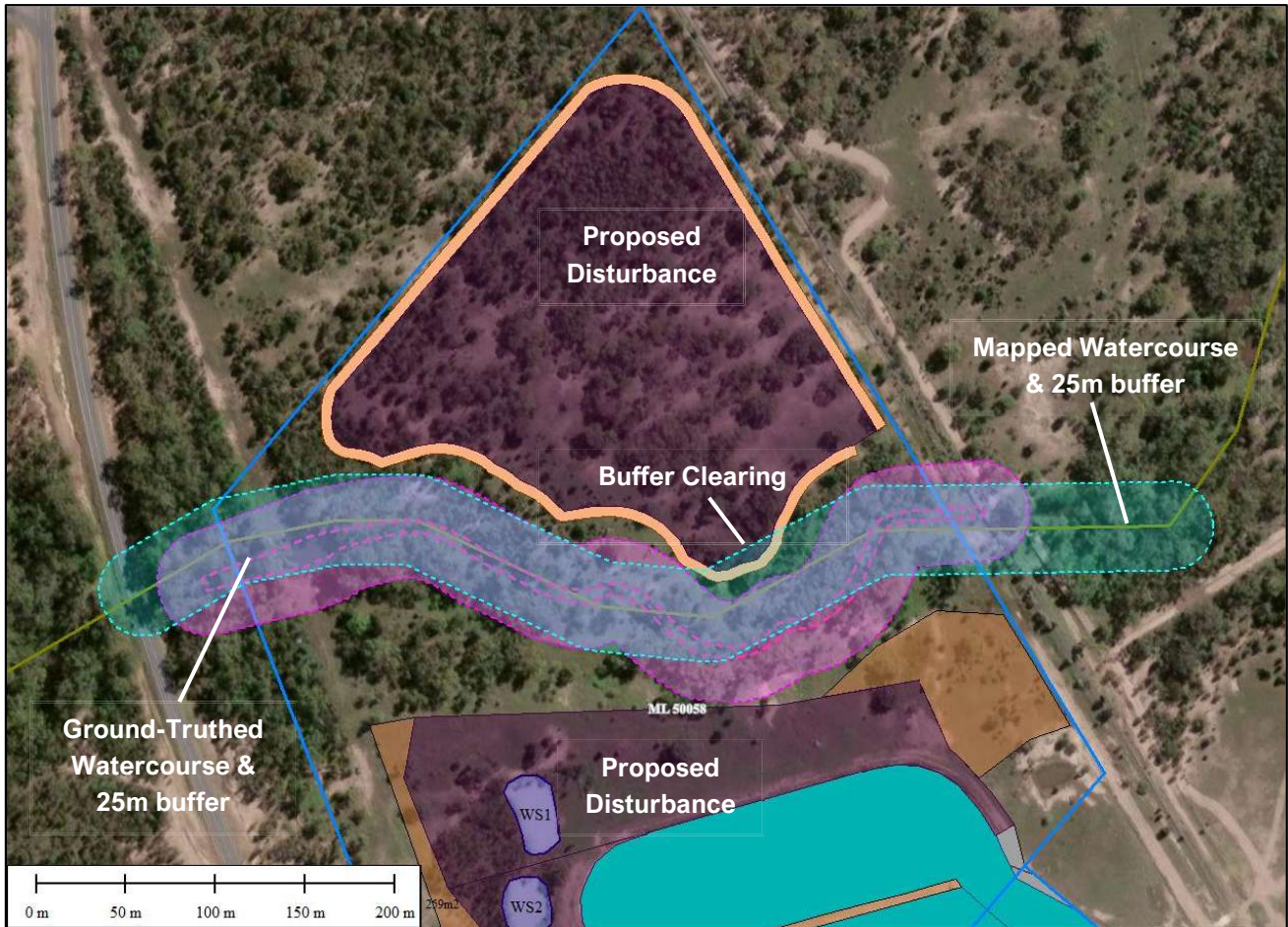
##### 2.1.1.2 REs within the defined distance of a watercourse

For impact assessment to regulated vegetation within the defined distance of a watercourse, the thresholds in **Table 1** were used.

**Table 1: Distance from defining banks of watercourses and drainage features**

| Stream order | Distance from the defining bank of a watercourse or drainage feature (m) | Impact / Proposed Solution  |
|--------------|--|---|
| 1 or 2       | 25   | Within a 25m buffer from the mapped watercourse (Blue line in <b>Figure 4</b> ) an area of approximately 0.06ha of least concern RE is proposed to be cleared. However, following the ground-truthed location of the watercourse, no proposed clearing falls within a 25m buffer of the watercourse (Pink area in <b>Figure 4</b> ) |
| 3 or 4       | 50   | NA – none triggered   |
| 5 or greater | 100  | NA – none triggered   |

<sup>1</sup>Refer to the *Vegetation management Coastal & Non-coastal bioregions and sub-regions layer in QLD Globe*  
Source: DSDIP 'Significant Residual Impact Guideline' (December 2014) & DILGP SDAP Module 8: *Vegetation Clearing V1.8*.



**Figure 4: Clearing near watercourse buffer**

Source: QLD Globe & Ground-truth survey data.

Based on the SRI guideline, clearing of <math><0.06\text{ha}</math> remnant ‘least concern’ vegetation within the defined distance of a watercourse is unlikely to have an SRI. The thresholds provided for triggering an SRI (Section 3.1.1 of the SRI Guideline) are;

- Permanent removal of vegetation within the defined distance of a stream order 2 or higher where no rehabilitation is proposed; Note this clearing is adjacent to a stream order 2 but rehabilitation is a requirement so no permanent removal is proposed.
- building of an online detention basin greater than 1ha in size or other similar works that result in the clearing of vegetation which fragments up and downstream remnant areas on any stream order; this is not proposed.
- permanent clearing of more than 0.5ha of an endangered or of concern RE, within the defined distance of a watercourse: clearing <math><0.06\text{ha}</math> of ‘least concern’ only vegetation is proposed.

The proposed clearing has also been assessed against Table 2.1 of the DEHP significant residual impact guideline and it does not trigger any of the requirements for an SRI. All other areas of the mine maintain at least a 25m buffer to vegetation within defined distances of mapped watercourses, and therefore are not subject to SRI assessment.

**The proposed area of mapped REs within the defined distance of a watercourse is well below the SRI trigger thresholds and therefore is considered unlikely to have an SRI.**



#### 2.1.1.3 *Remnant vegetation intersection with a wetland*

**There are no areas of mapped wetlands within or adjacent to the proposed operation area.**

#### 2.1.1.4 *Essential habitat*

**There are no areas of mapped essential habitat within or adjacent to the proposed operation area.**

## 2.2 **Connectivity areas**

Connectivity areas are areas of remnant vegetation outside urban areas containing prescribed REs that are required for ecosystem functioning (i.e. a connectivity area).

The land within and surrounding the proposed expansion areas are mapped as remnant vegetation 'Least Concern' and regrowth vegetation 'Least Concern' RE 11.7.6, 11.5.21 & 11.5.4. A number of zones around the site are mapped as 'MSES wildlife habitat (special least concern - echidna)'. The Ausben Leases only interact with an insignificant portion of the MSES wildlife habitat. The Gurulmundi leases contain a larger proportion of MSES wildlife habitat. However progressive development and rehabilitation are proposed on all areas, which will limit the overall impact. The impact significance of how the proposed expansion will change the size and configuration of remnant vegetation levels is considered to have a low significance at the local (5km radius) and regional (20km radius) scale. The proposed expansion will not result in fragmented and/or disjointed landscapes and does not obstruct wildlife access to the remaining areas of mapped MSES wildlife habitat.

The applicant does not have the required software to run the Landscape Fragmentation and Connectivity (LFC) Tool. If the department prefers assessment via this tool the applicant encourages the department to run the assessment on the applicants behalf as all shapefiles have been provided in the application supporting material.

**It is unlikely the proposed development will result in an SRI to connectivity areas.**

## 2.3 **Wetlands and watercourses**

An offset may be required for the following wetlands and watercourses:

- wetland in a wetland protection area;
- wetland of high ecological significance; and
- wetland or watercourse in a high ecological value water.

**There are no areas of mapped wetlands or watercourses that trigger these requirements within or adjacent to the proposed operation area.**

## 2.4 **Designated precincts in strategic environmental areas**

The *Regional Planning Interests Act 2014* (RPI Act), which commenced on 13 June 2014, repealed the *Wild Rivers Act 2005*. The river systems that were declared under the Wild Rivers legislation have been rolled in to the RPI Act framework as Strategic Environmental Areas (SEAs).

The RPI Act SEAs are:

- the Cape York Strategic Environmental Area;
- the Channel Country Strategic Environmental Area;





- the Frazer Island Strategic Environmental Area;
- the Gulf Rivers Strategic Environmental Area; and
- the Hinchinbrook Island Strategic Environmental Area.

**The proposed operation area does not occur in areas of designated precincts in SEAs.**

## 2.5 Protected wildlife habitat

Protected wildlife habitat is defined as an area of habitat (e.g. foraging, roosting, nesting or breeding habitat) for an animal or plant that is Endangered or Vulnerable, or a Special Least Concern (non-migratory) animal under the *Nature Conservation Act 1992* (NC Act). As of 9 May 2018, under the *Vegetation Management and Other Legislation Amendment Bill 2018*, the definition of protected wildlife has been extended to include Near Threatened wildlife.

Offsets may be required for the following protected wildlife habitat:

- an area that contains plants that are ‘endangered’, ‘vulnerable’ or ‘near threatened’ wildlife;
- a habitat for an animal that is ‘endangered’, ‘vulnerable’ or ‘near threatened’ wildlife or a special least concern animal (non-migratory), including areas or features used by an animal for foraging, roosting, nesting or breeding;
- koala habitat that is classified as essential habitat on the essential habitat map; and
- an area shown as bushland habitat, high value rehabilitation habitat or medium value rehabilitation habitat on the map called ‘Map of Assessable Development Area Koala Habitat Values’ that applies under the South East Queensland Koala Conservation State Planning Regulatory Provisions (Koala SPRP).

A desktop study was undertaken using the ‘*Protected Matters Search Tool*’ using the ML boundaries for the operation — known or likely presence of identified protected matters are summarised in **Table 2** and **Table 3**. The desktop study returned a total of forty two (42) species listed as ‘Endangered or Vulnerable’ (excluding migratory species). No ALA or WildNet records for endangered or vulnerable species (**Table 3**) occurs within ML Boundaries of the operation. However both the Gurulmundi and Ausben Lease areas overlap with the MSES wildlife habitat for special least concern animal Echidna (*Tachyglossus aculeatus*).

An assessment against the ‘*Significant Residual Impact Guideline (for MSES and prescribed activities assessable under SPA)*’ is provided in **Table 4** and **Table 5**. As a result of the assessment, no significant residual impacts are identified.

**Table 2: Listed threatened ecological communities within the ML boundary**

| Community name   | Threatened category | 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 may occur within area       |
| Poplar Box Grassy Woodland on Alluvial Plains  | Endangered          | Community likely to occur within area |

Source: DCCEEW ‘*Protected Matters Search Tool*’ (accessed February 2025).



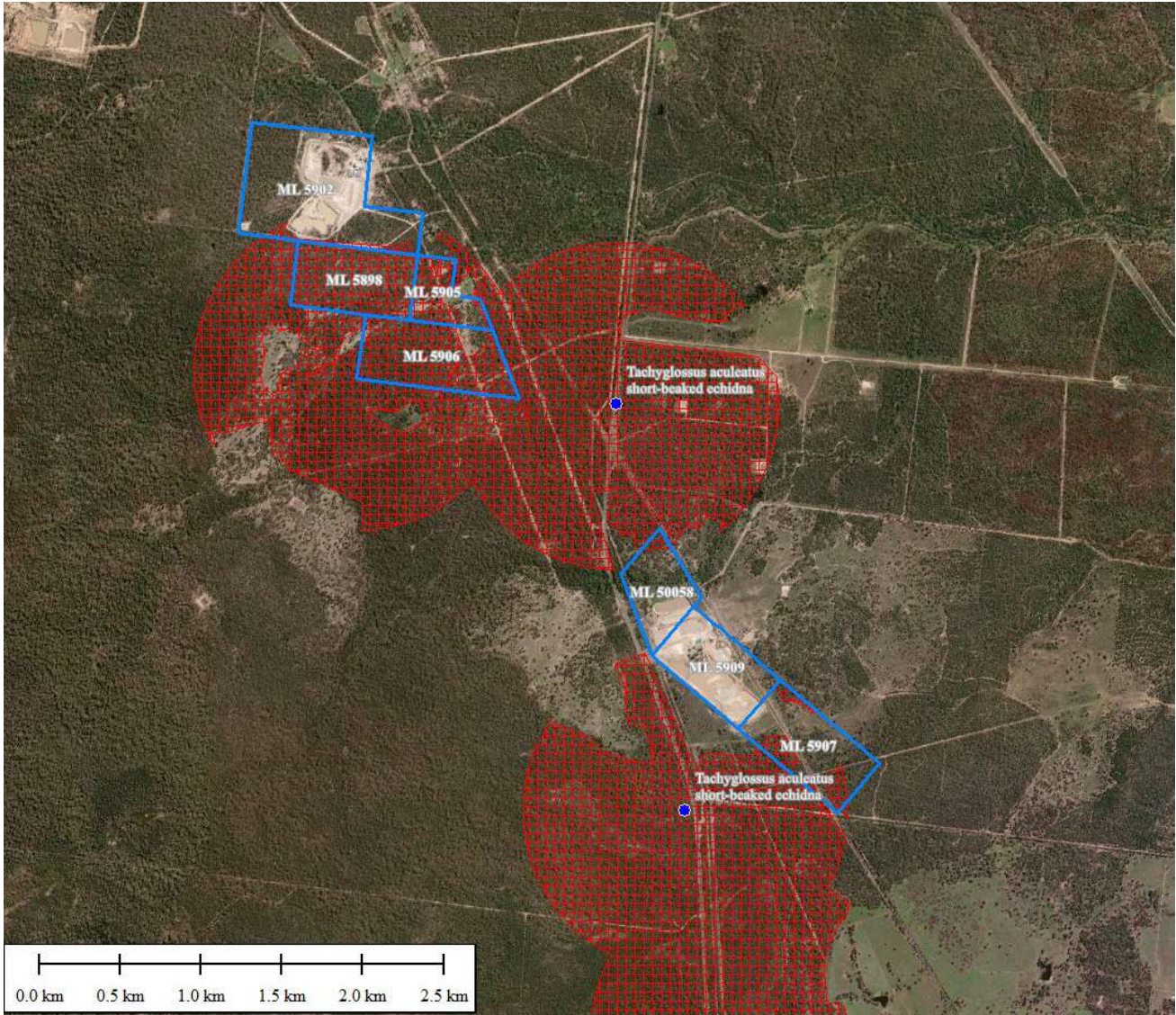
**Table 3: Listed threatened species known or likely to exist within the ML boundary**

| Scientific name   | Common name  | Threatened category   | Presence   |
|---|--|-----------------------|--|
| <b>BIRD</b>   |  |                       |  |
| Lathamus discolor   | Swift Parrot   | Critically Endangered | Species or species habitat may occur within area       |
| Calidris ferruginea   | Curlew Sandpiper   | Critically Endangered | Species or species habitat may occur within area       |
| Rostratula australis  | Australian Painted Snipe   | Endangered            | Species or species habitat likely to occur within area |
| Erythrotriorchis radiatus   | Red Goshawk  | Endangered            | Species or species habitat may occur within area       |
| Stagonopleura guttata   | Diamond Firetail   | Vulnerable            | Species or species habitat may occur within area       |
| Calyptorhynchus lathami lathami                                       | South-eastern Glossy Black-Cockatoo  | Vulnerable            | Species or species habitat may occur within area       |
| Climacteris picumnus victoriae  | Brown Treecreeper (south-eastern)  | Vulnerable            | Species or species habitat may occur within area       |
| Gallinago hardwickii  | Latham's Snipe, Japanese Snipe   | Vulnerable            | Species or species habitat may occur within area       |
| Geophaps scripta scripta  | Squatter Pigeon (southern)   | Vulnerable            | Species or species habitat likely to occur within area |
| Aphelocephala leucopsis   | Southern Whiteface   | Vulnerable            | Species or species habitat may occur within area       |
| Calidris acuminata  | Sharp-tailed Sandpiper   | Vulnerable            | Species or species habitat may occur within area       |
| Falco hypoleucos  | Grey Falcon  | Vulnerable            | Species or species habitat likely to occur within area |
| Grantiella picta  | Painted Honeyeater   | Vulnerable            | Species or species habitat likely to occur within area |
| Hirundapus caudacutus   | White-throated Needletail  | Vulnerable            | Species or species habitat likely to occur within area |
| <b>MAMMAL</b>   |  |                       |  |
| Petauroides volans  | Greater Glider (southern and central)  | Endangered            | Species or species habitat likely to occur within area |
| Chalinolobus dwyeri   | Large-eared Pied Bat, Large Pied Bat   | Endangered            | Species or species habitat may occur within area       |
| Dasyurus hallucatus   | Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu]                 | Endangered            | 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) | Endangered            | Species or species habitat likely to occur within area |
| Nyctophilus corbeni   | Corben's Long-eared Bat, South-eastern Long-eared Bat  | Vulnerable            | Species or species habitat likely to occur within area |
| Macroderma gigas  | Ghost Bat  | Vulnerable            | Species or species habitat may occur within area       |



| Scientific name                     | Common name  | Threatened category                               | Presence   |
|-------------------------------------|--|---|--|
| <i>Petaurus australis australis</i> | Grey-headed Flying-fox   | Vulnerable  | Species or species habitat likely to occur within area |
| <b>PLANT</b>                        |  |   |  |
| <i>Lepidium monoplacoides</i>       | Winged Pepper-cress  | Endangered  | Species or species habitat may occur within area       |
| <i>Homoranthus decumbens</i>        | a shrub  | Endangered  | Species or species habitat may occur within area       |
| <i>Xerothamnella herbacea</i>       | null   | Endangered  | Species or species habitat may occur within area       |
| <i>Vincetoxicum forsteri</i>        | null   | Endangered (listed as <i>Tylophora linearis</i> ) | Species or species habitat may occur within area       |
| <i>Cadellia pentastylis</i>         | Ooline   | Vulnerable  | Species or species habitat likely to occur within area |
| <i>Polianthion minutiflorum</i>     | null   | Vulnerable  | Species or species habitat may occur within area       |
| <i>Calytrix gurlmundensis</i>       | null   | Vulnerable  | Species or species habitat likely to occur within area |
| <i>Acacia curranii</i>              | Curly-bark Wattle  | Vulnerable  | Species or species habitat known to occur within area  |
| <i>Arthraxon hispidus</i>           | Hairy-joint Grass  | Vulnerable  | Species or species habitat may occur within area       |
| <i>Thesium australe</i>             | Austral Toadflax, Toadflax   | Vulnerable  | Species or species habitat may occur within area       |
| <i>Dichanthium setosum</i>          | bluegrass  | Vulnerable  | Species or species habitat likely to occur within area |
| <i>Homopholis belsonii</i>          | Belson's Panic   | Vulnerable  | Species or species habitat may occur within area       |
| <b>REPTILE</b>                      |  |   |  |
| <i>Eseya albagula</i>               | Southern Snapping Turtle, White-throated Snapping Turtle                       | Critically Endangered                             | Species or species habitat may occur within area       |
| <i>Hemiaspis damelii</i>            | Grey Snake   | Endangered  | Species or species habitat likely to occur within area |
| <i>Rheodytes leukops</i>            | Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver | Endangered  | Species or species habitat may occur within area       |
| <i>Delma torquata</i>               | Adorned Delma, Collared Delma  | Vulnerable  | Species or species habitat may occur within area       |
| <i>Egernia rugosa</i>               | Yakka Skink  | Vulnerable  | Species or species habitat likely to occur within area |
| <i>Anomalopus mackayi</i>           | Five-clawed Worm-skink, Long-legged Worm-skink                                 | Vulnerable  | Species or species habitat may occur within area       |
| <i>Furina dunmalli</i>              | Dunmall's Snake  | Vulnerable  | Species or species habitat may occur within area       |
| <b>SNAIL</b>                        |  |   |  |
| <i>Adclarkia cameroni</i>           | Brigalow Woodland Snail  | Endangered  | Species or species habitat may occur within area       |
| <i>Adclarkia dulacca</i>            | Dulacca Woodland Snail   | Endangered  | Species or species habitat known to occur within area  |

Source: DCCEEW 'Protected Matters Search Tool' (accessed February 2025).



**Figure 5: Reported presence / sightings of Echidna (*Tachyglossus aculeatus*)**  
 Source: QLD Globe Wildnet (February 2025).

**Table 4: SRI assessment for PLANTS — protected wildlife habitat**

Source: DSDIP 'Significant Residual Impact Guideline' (December 2014).

| Impact criteria   | Assessment  |
|---|---|
| <b>An action is UNLIKELY to have a SRI on a plant that is 'endangered' or 'vulnerable' wildlife if the action will result in:</b>   |   |
| (a) clearing of plants that are threatened wildlife and not located within a natural setting (i.e. does not meet the definition of 'in the wild' under the <i>Nature Conservation Act 1992</i> ) where the proposal includes translocation; | <b>No—</b><br>There are no reported recordings of listed ecological communities 'known to' or are 'likely to' occur within the area. Due to the age of the operation and the proximity of the proposed expansion area to operations it is considered unlikely to result in clearing of plants that are threatened wildlife and not located within a natural setting. The proposed development does not include translocation. |
| (b) clearing of up to 10% of the total number of plants that are threatened wildlife occurring on a site where the proposal results in 90% of all plants that are threatened wildlife being retained and protected as a reserve or similar; | <b>No—</b><br>There are no reported recordings of listed ecological communities 'known to' or are 'likely to' occur within the area. The proposed development does not include clearing plants that are threatened wildlife.  |



|   |  |
|---|--|
| (c) clearing of regenerating plants that are threatened wildlife which have previously been cleared within the last 5 years and that are historically maintained through slashing or grazing; <b>OR</b>   | <b>No—</b><br>The proposed development does not include clearing of regenerating plants that are threatened wildlife which have previously been cleared within the last 5 years. The proposed development is planned for a category X, undisturbed remnant 'least concern' vegetation and regrowth 'least concern' within the ML boundary. |
| (d) the proposed relocation of an area of plants that are threatened wildlife less than 1000m <sup>2</sup> not occurring in a relatively natural ecological situation (e.g. bushland), to a permanent retention area via an approved management plan. | <b>No—</b><br>The proposed development does not include planned relocation of an area of plants that are threatened wildlife. The proposed development is planned for areas containing category X, undisturbed remnant 'least concern' and regrowth 'least concern' vegetation within the ML boundary.                                     |

**Table 5: SRI assessment for ANIMALS — protected wildlife habitat (excluding Koala habitat)**

Source: DSDIP 'Significant Residual Impact Guideline' (December 2014).

| Impact criteria  | Assessment   |
|--|--|
| <b>An action is LIKELY to have a SRI on habitat for an animal that is 'special least concern' wildlife if the action will:</b> |  |
| (a) lead to a long-term decrease in the size of a local population;  | <b>No—</b><br>Whilst listed species have been observed by the site operator in the region, limited site observations have occurred. It is assumed the animals travel around the site via watercourses and densely vegetated scrub. Due to the age of the operation >20yrs and the proximity of the proposed expansion area to operations it is considered unlikely to cause a significant reduction in the foraging or breeding success of any local populations or a long-term decrease in the size of any local populations. The proposed expansion area will not fragment or obstruct wildlife movement to neighbouring environments. |
| (b) reduce the extent of occurrence of the species;  | <b>No—</b><br>Due to the age of the operation and the proximity of the proposed expansion area to operations it is considered unlikely to reduce the extent of occurrence of any local species. The proposed expansion area will not fragment or obstruct wildlife movement to neighbouring environments therefore it is unlikely the extent of occurrence of any local species will be reduced.   |
| (c) fragment an existing population;   | <b>No—</b><br>The proposed expansion area will not fragment or obstruct wildlife movement to neighbouring environments. Access to mapped areas of MSES wildlife habitat is maintained on all sides of the mine boundary. Therefore the proposed expansion area is unlikely to result in fragmenting any existing populations.  |
| (d) Reduce gene flow among populations;  | <b>No—</b><br>The proposed expansion area will not result in reduction of gene flow among populations as it does not block any through passage from key habitat features. The echidna is highly mobile with a large territory <sup>1</sup> . The proposed expansion will not impede wildlife movement to neighbouring environments. Access to mapped areas of MSES wildlife habitat is maintained on all sides of the mine boundary. Therefore the proposed expansion area is unlikely to result in habitat isolation.   |
| (e) cause disruption to ecologically significant locations (breeding, feeding or nesting sites) of a species.                  | <b>No—</b><br>The proposed expansion area will not fragment or obstruct wildlife movement to neighbouring environments and no significant locations are known to occur within the clearing areas. Pre-clearing surveys will detect any of these sites and allow appropriate mitigation action. Access to mapped areas of MSES wildlife habitat is maintained on all sides of the mine boundary. Therefore the proposed expansion area is unlikely cause disruption to ecologically significant locations of species.   |

<sup>1</sup> Echidna Profile (NSW Government)



## 2.6 Protected areas

Protected areas are declared under the NC Act for the conservation of Queensland's natural and cultural resources. An offset may be required for the following classes of protected areas:

- national parks;
- national parks (Aboriginal land);
- national parks (Torres Strait Islander land);
- national parks (Cape York Peninsula Aboriginal land);
- regional parks; and
- nature refuges.

**There are no mapped protected areas within or adjacent to the proposed operation area.**

## 2.7 Declared Fish Habitat Areas and highly protected zones of State marine parks

Fish Habitat Areas are declared under the *Fisheries Act 1994* for the protection and management of high value fish habitat along the Queensland coast.

**There are no declared fish habitat areas and highly protected zones of State marine parks within or adjacent to the proposed operation area.**

## 2.8 Waterway providing for fish passage

An environmental offset may be required for any part of a waterway that provides for passage of fish (other than that part of a waterway within an urban area) if construction, installation or modification of waterway barrier works carried out under an authority will limit the passage of fish along a waterway. Barriers to fish passage can restrict and/or isolate fish communities, preventing access to, and benefits of fish habitats otherwise available to them. Poorly designed structures can injure or kill fish moving over or around them, or fish may become stranded and subjected to inappropriate water quality, lack of food, increased predation, crowding or other conditions that impact on their health, wellbeing and productivity.

**There are no areas of mapped waterway providing for fish passage within or adjacent to the proposed operation area.**

## 2.9 Marine plants

Marine plants are protected under the *Fisheries Act 1994*. Marine plants are part of the mosaic of fish habitats and are an integral and usually highly visible feature of the coastline. Effective management and protection of all marine plants and adjacent coastal areas is important in ensuring sustainable fish habitats and fisheries production.

**There are no areas of mapped marine plants within or adjacent to the proposed operation area.**

## 2.10 Legally secured offset areas

Legally secured offset areas are any areas declared as an environmental offset protection area, high nature conservation value under the VM Act or another area prescribed under a regulation.

**There are no areas of mapped legally secured offsets within or adjacent to the proposed operation area.**



### 3 CONCLUSION

This SRI assessment was prepared for the Miles Bentonite Mine at Gurulmundi QLD 4415 to support the increased maximum disturbance footprint under the Mining Leases & Environmental Authority. This assessment was undertaken in accordance with SRI criteria for prescribed environmental matters (MSES) in the Department of State Development, Infrastructure and Planning '*Significant Residual Impact Guideline*' (published December 2014).

The outcome of the SRI assessment considers the proposed development is unlikely to result in an SRI to the mapped areas of MSES Regulated Vegetation defined watercourse and MSES wildlife habitat.



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# Attachment 8

FLURP





# FINAL LAND USE & REHABILITATION PLAN

## TERREQUIP MILES BENTONITE MINE

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prepared by Ausrocks Resource Consultants  
for Department of Environment and Science

AUQ00238F



**TERREQUIP MILES PTY LTD**

**MILES BENTONITE MINE – FINAL LAND  
USE & REHABILITATION PLAN**

7 FEBRUARY 2024

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This document has been reviewed and signed off by the undersigned:

A handwritten signature in black ink, appearing to read 'Carl Morandy'.

Carl Morandy (RPEQ22981)

Managing Director, Ausrocks Pty Ltd



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## Terms & Abbreviations

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|                  |  |
|------------------|--|
| <b>ARC</b>       | Ausrocks Resource Consultants (Ausrocks Pty Ltd) |
| <b>EA</b>        | Environmental Authority                          |
| <b>ML</b>        | Mining Lease                                     |
| <b>Terrequip</b> | Terrequip Miles Pty Ltd                          |
| <b>Sibelco</b>   | Sibelco Australia Ltd                            |
| <b>Site</b>      | Miles Bentonite Mine                             |
| <b>FLURP</b>     | Final Land Use and Rehabilitation Plan           |



# 1 INTRODUCTION

This Final Land Use and Rehabilitation Plan (FLURP) is prepared for the Miles Bentonite Mine (site) owned and operated by Terrequip Miles Pty Ltd (Terrequip) for mining leases (MLs) ML5898, ML5900, ML5901, ML5902, ML5905, ML5906, ML5907, ML5909, ML50058 under environmental authority (EA) EPML00382513. Mine rehabilitation is the return of disturbed land to a safe, stable, non-polluting condition that supports a post-mining land use (PMLU).<sup>1</sup> This FLURP ensures that all areas disturbed by mining activities shall be suitably and progressively rehabilitated in accordance with the requirements of the site EA.

From herein the mining leases shall be referred to as:

- Ausben Leases – ML5907, ML5909, ML50058
- Gurulmundi Leases – ML5898, ML5902, ML5905, ML5906
- Woleebee Leases – ML5900, ML5901

## 1.1 Scope

This FLURP provides for the effective long-term rehabilitation management strategy for mining activities conducted at Terrequip Miles. The FLURP may be updated from time to time based on advances in rehabilitation methodologies, changes to proposed mining activities, changes to legal requirements, and/or the correction of accidental omissions/errors.

## 1.2 Objectives

The objectives of this plan are to ensure rehabilitation of land disturbed by mining activities is:

- safe for humans and wildlife;
- non-polluting;
- stable;
- able to sustain an agreed post-mining land-use in accordance with the site's FLURP;
- revegetated with species endemic appropriate to achieve the agreed post-mining land use and is free of declared pest species;
- compliant with the site's FLURP; and
- compliant with all conditions of the site's EA (EPML00328513).

In accordance with the site EA, this FLURP must include, but is not limited to the following:

- a description of rehabilitation management techniques incorporating works and monitoring programs and timetables;
- indicators for success; and

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<sup>1</sup> Office of the Queensland Mine Rehabilitation Commissioner. <https://www.qmrc.qld.gov.au/research/post-mining-land-uses>



- keeping of appropriate records or rehabilitation measures implemented including taking of photographs demonstrative of rehabilitation achieved and the preparation of annual rehabilitation progress reports.

## 2 GOVERNING DOCUMENTS

### 2.1 Relevant legislation

Federal, State and/or Local Government legislation applicable to this FLURP include:

- *Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)*
- *Environmental Protection Act 1994 (EP Act)*
- *Environmental Protection Regulation 2019 (EP Regulation)*
- *Environmental Protection (Rehabilitation Reform) Amendment Regulation 2019*

### 2.2 Other resources

- Mine Land Rehabilitation Policy
- DES (May 2014) Rehabilitation Requirements for Mining Resource Activities Guideline (ESR/2016/1875)
- QMRC (March 2023) Evaluating Methods for Assessing Native Ecosystem Mine Rehabilitation Success
- DSITI (2015) Queensland Herbarium BioCondition Assessment Manual
- DSITI (2017) Method for the Establishment and Survey of Reference Sites for BioCondition

### 3 SITE DESCRIPTION

The Gurulmundi and Ausben leases are positioned within 1km of each other and are accessible via the Leichhardt Highway and Gurulmundi Road in the Western Downs Regional Council Local Government Area (LGA). These leases are approximately 30km north of Miles and approximately 4.5km southeast of another bentonite mine (Amcol Australia Gurulmundi Mine, operated by Minerals Technologies Incorporated). The Woleebee leases are located approximately 30km north west of the processing facility (ML59002) and are accessible via Jackson Wandoan Road in the Maranoa Regional Council LGA.

The table below summarises the primary mine features and infrastructure as approved under the EA.

**Table 1: Primary mine features and infrastructure at Miles Bentonite**

| Mine domain                     | Mine feature name   |
|---------------------------------|---|
| <b>Ancillary infrastructure</b> | <ul style="list-style-type: none"> <li>• Mining footprint</li> <li>• Mine infrastructure</li> <li>• Access tracks, ancillary roads and haul roads</li> <li>• Administration, office buildings, carparks and amenities</li> <li>• Laydown areas (including vehicle manoeuvring)</li> <li>• Material storage</li> <li>• Weighbridge</li> <li>• Potable water (bottled)</li> </ul> |
| <b>Dams</b>                     | <ul style="list-style-type: none"> <li>• Sediment dams (including sediment controls)</li> <li>• Onsite raw water storage</li> </ul>   |
| <b>Combined stockpile areas</b> | <ul style="list-style-type: none"> <li>• Topsoil stockpiles</li> <li>• Waste rock dumps and overburden stockpiles</li> <li>• Storage pads</li> </ul>  |
| <b>Non-mining areas</b>         | <ul style="list-style-type: none"> <li>• Undisturbed land</li> <li>• Rehabilitation areas (complete and in progress)</li> </ul>   |
| <b>Utilities / Services</b>     | <ul style="list-style-type: none"> <li>• Non-potable water (rainwater tanks)</li> <li>• Septic sewage</li> <li>• Power lines</li> <li>• Communications</li> </ul>   |

#### 3.1 Area and disturbance type

Mining activities conducted within the mining leases described in **Table 2** are currently authorised under environmental authority (EA) EPML00382513.



Table 2: Terrequip Miles lease and tenure details

| Mining lease             | Permit name     | EA holder               | Purpose                     | Area (ha)     |
|--------------------------|-----------------|-------------------------|-----------------------------|---------------|
| <b>Ausben Leases</b>     |                 |                         |                             |               |
| ML5909                   | AUSBEN NO. 1    | Terrequip Miles Pty Ltd | Mining                      | 28.00         |
| ML5907                   | AUSBEN NO 2     | Terrequip Miles Pty Ltd | Reserves; undisturbed land  | 31.94         |
| ML50058                  | AUSBEN NO.3     | Terrequip Miles Pty Ltd | Mining                      | 19.76         |
| <b>Gurulmundi Leases</b> |                 |                         |                             |               |
| ML5898                   | SLIPPERY        | Terrequip Miles Pty Ltd | Reserves; undisturbed land  | 30.70         |
| ML5902                   | CLAYMUNDI       | Terrequip Miles Pty Ltd | Processing facility; mining | 60.70         |
| ML5905                   | BENTON NO 1     | Terrequip Miles Pty Ltd | Reserves; undisturbed land  | 13.75         |
| ML5906                   | BENTON NO 2     | Terrequip Miles Pty Ltd | Reserves; undisturbed land  | 36.00         |
| <b>Woleebbee Leases</b>  |                 |                         |                             |               |
| ML5900                   | WOLEEBBEE NO. 1 | Terrequip Miles Pty Ltd | Reserves; undisturbed land  | 24.50         |
| ML5901                   | WOLEEBBEE NO. 2 | Terrequip Miles Pty Ltd | Reserves; undisturbed land  | 25.11         |
| <b>Total</b>             |                 |                         |                             | <b>270.46</b> |

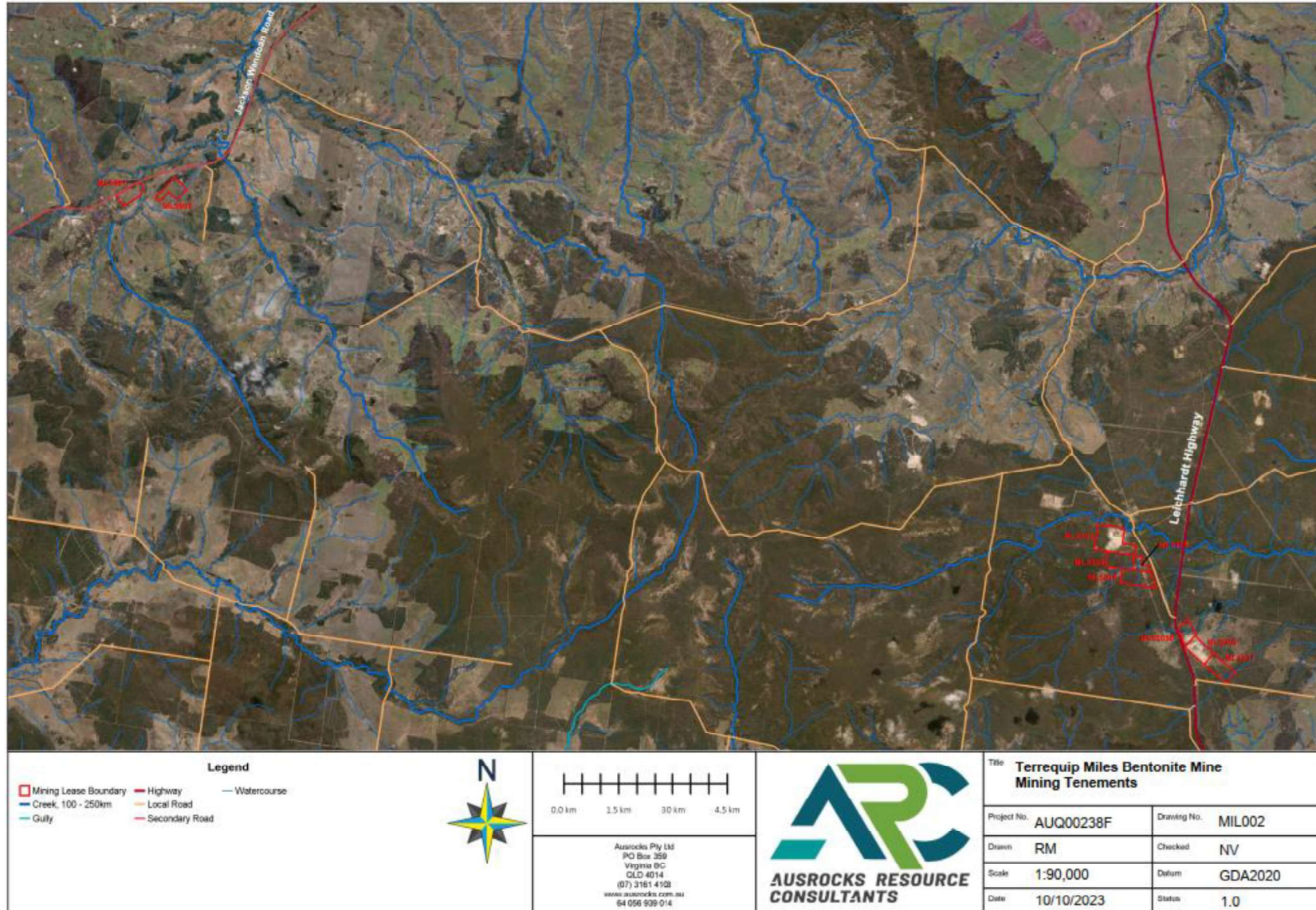


Figure 1: Terrequip Miles mining tenements



## 4 LAND MANAGEMENT VALUES

### 4.1 Climate

The Miles area typically experiences a dry humid sub-tropical climate. Data from the Bureau of Meteorology Miles Post Office Weather Station (Station no. 042023) reports mean maximum temperatures between 30-33°C in the warmer months (November to March) and 19-25°C in the cooler months (June to September).

### 4.2 Geology

The leases are positioned on relatively flat plains and are surrounded by undulating hills with elevation ranging from 360m to 390m AHD in the Gurulmundi and Ausben leases and 310m to 330m AHD in the Woleebee leases.

The site is underlain regionally by a sequence of Jurassic and Cretaceous sedimentary rocks, forming part of the Surat Basin northeastern margin. The Ausben and Gurulmundi leases surface geology consist of sedimentary rock Kumbarilla Beds and the Woleebee leases of sedimentary rock Orallo Formation (adjacent to an area of Mooga Sandstone).

### 4.3 Soils

A soil survey was conducted in July 2023 on mining leases ML5092, ML5907, ML5909 and ML50058 (note, ML5898, ML5905, ML5906 were not accessible during the day of survey and ML5900 and ML5901 were not included in the survey scope).<sup>2</sup> Due to a lack of available historical records, the purpose of the assessment was to conduct a land assessment survey in non-disturbed areas of the site to provide background data of the existing landscape as a baseline for rehabilitation purposes.

The primary and only soil type described for the surveyed leases is Brown and Grey Sodosols (classified using the Australian Soil Classification (ASC) system).<sup>3</sup> Sodosol are texture contrast soils, typically characterised by sandy loam or clay loam surfaces over light to medium clay sub-soils that are sodic in the upper portion of the B-horizon.

### 4.4 Hydrology

Due to soil characteristics, natural drainage off-site is primarily via overland flow over a gentle slope to Little Tree Creek; this creek provides intermittent flows to Dogwood Creek which supplies water to the Miles township via the Gil Weir.

Water captured onsite shall be redirected for re-use in site personal hygiene, dust suppression and/or rehabilitation activities. Water is not a requirement for the mining and/or processing of bentonite. Water shall be

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<sup>2</sup> Horizon Soil Science and Engineering (August 2023): Report on the Soil Survey of Leases of the Terrequip Miles Bentonite Mine. Revision 1.1

<sup>3</sup> Isbell, R.F. (2021). The Australian Soil Classification, Third Edition. CSIRO Publishing, Collingwood Victoria.



management via a Site Water Management and Monitoring Plan (SWMMP) as required under Schedule C of the EA.

#### **4.5 Flora and fauna**

Fauna and flora (native vascular) species observed are provided in **Appendix 1**.



## 5 LAND SUITABILITY ASSESSMENT

Agricultural land in classification in Queensland follows a simple hierarchical scheme that is applicable across the state.<sup>4</sup> It allows the presentation of interpreted land evaluation data to indicate the location and extent of agricultural land that can be used sustainably for a wide range of land uses with minimal land degradation. Three broad classes of agricultural land and one non-agricultural land class are identified:

- Class A – crop land
- Class B – limited crop land
- Class C – pasture land
- Class D – non-agricultural land

The table below summarises the relationship between agricultural land classes and land capability and land suitability for grazing.

**Table 3: Agricultural Land Classification and correlations with land capability and suitability**

| Agricultural Land Class | Land capability | Land suitability | Description   |
|-------------------------|-----------------|------------------|---|
| <b>A</b>                | I – III         | 1 – 3            | <b>CROP LAND</b> – Land that is suitable for a wide range <sup>1</sup> of current and potential crops with nil to moderate limitations.   |
| A1                      | II              | 1 – 3            | Suitable for a wide range of current and potential broadacre and horticulture crops. <sup>2</sup>   |
| A2                      | III             | 1 – 3            | Suitable for a wide range of current and potential horticulture crops only.   |
| <b>B</b>                | III – IV        | 1 – 3            | <b>LIMITED CROP LAND</b> – Land that is suitable for a narrow range <sup>3</sup> of crops. The land is suitable for sown pastures and may be suitable for a wider ranges of crops with changes to knowledge, economics or technology.                 |
| <b>C</b>                | V – VII         | 1 – 2            | <b>PASTURE LAND</b> – Land that is suitable only for improved or native pastures due to limitations that preclude continuous cultivation for crop production. Some areas may tolerate a short period of ground disturbance for pasture establishment. |
| C1                      | V               | 1 – 2            | Suitable for grazing sown pastures requiring ground disturbance for establishment; or native pastures on higher fertility soils.  |
| C2                      | VII             | 3                | Suitable for grazing native pastures, with or without the introduction of pasture, and with lower fertility soils than C1.  |
| C3                      | VII             | 4                | Suitable for light grazing of native pastures in accessible areas and includes steep land more suited to forestry or catchment protection.  |
| <b>D</b>                | VIII            | <b>5</b>         | <b>NON-AGRICULTURAL LAND</b> <sup>4</sup> – Land not suitable for agricultural use, including land alienated from agricultural use.   |

<sup>1</sup> A wide range of crops is four or more existing crops of local commercial significance.

<sup>2</sup> Horticulture includes intensively grown small crops (e.g. vegetables) as well as tree crops (e.g. grown or nuts, seeds or fruit). Silviculture (plantation forestry) is not included.

<sup>3</sup> A narrow range of crops is three or fewer types (broadacre or horticulture) of local commercial significance. Silviculture (plantation forestry) may be included. Crops with similar agronomic requirements e.g. maize and grain sorghum, peaches and nectarines are not generally regarded as different crop types. Different management regimes (including irrigation strategies) for the same crop do not increase the number of crops.

<sup>4</sup> Non-agricultural land includes land that cannot be placed in any of the other land classes and includes land such as urban areas and stream channels.

<sup>5</sup> In cases where two or more land classes are equally dominant and none are greater than 50%, judgement is used to identify the most appropriate agricultural land class/es for the unit.

<sup>4</sup> DSITI & DNRM (December 2015): Guidelines for Agricultural Land Evaluation in Queensland, Second Edition.



Land suitability classification assesses the potential of land for a specific land use. Five (5) land suitability classes are defined for use in Queensland (classes 1 to 3 are suitable for agricultural production):

- Class 1 – suitable land with negligible limitations
- Class 2 – suitable land with minor limitations
- Class 3 – suitable land with moderate limitations
- Class 4 – unsuitable land with severe limitations
- Class 5 – unsuitable land with extreme limitations

Land capability classification evaluates the potential of land for broadly defined land uses (e.g. cropping, pastoral, non-agricultural) and is generally only used for broad scale assessment of land. There are eight (8) classes:

- Class I – land suitable for all agricultural and pastoral uses
- Class II – land suitable for all agricultural uses but with slight restrictions for cultivation
- Class III – land primarily suited to pastoral uses but with moderate restrictions for cultivation
- Class IV – land primarily suited to pastoral uses but which may be safely used for occasional cultivation with careful management
- Class V – land that in all other characteristics would be arable but has limitations that make cultivation impractical and/or uneconomic
- Class VI – land that is not suitable for cultivation but is well suited to pastoral use
- Class VII – land that is not suitable for cultivation but on which pastoral use is possible only with careful management
- Class VIII – land that has such severe limitations that it is unsuited for either cultivation or grazing

## **5.1 Pre-mining land suitability**

Due to a lack of historical records there is little information available on pre-mining land use and assessments. Based on existing surrounding land use it is highly likely that the land on which the mine operates has previously been used for grazing purposes.



## 5.2 Erosion hazard and control

### 5.2.1 Erosion hazard

Open cut mining activities involve land disturbance that can pre-dispose areas to erosion risks. Mining activities that require the use of erosion mitigation strategies include, but are not limited to:

- topsoil stripping prior to mining development;
- drainage line crossings (pipes and roads);
- waste dump placement; and
- topsoil stockpiles.

### 5.2.2 Erosion control

Erosion can have an adverse effect on soil productivity and the associated agricultural land value. Additional downstream effects may include sedimentation, reduced fertility and productivity via soil structure losses, increased dust generation, and poor rehabilitation outcomes. Dispersive subsoils with high ESPs and low Ca:Mg ratios are susceptible to tunnel and gull erosion which is particularly difficult to manage once established. Site subsoils are sodic to strongly sodic and therefore will erode due to clay dispersion where soil is exposed to rainfall or runoff.

In accordance with the site EA, progressive rehabilitation will commence when disturbed areas within the operation land become available. Fast action to commence rehabilitation in disturbed areas will help minimise the risk of erosion.

Erosion control practices will be guided by site specific erosion and sediment control plans however, where appropriate, the following methods shall be followed:

- Implementation of contour banks, or Monto Vetiver<sup>5</sup> along crests and contours to control surface flow speed, at intervals appropriate to the slope and soil type to control the flow of surface water;
- Diversion and erosion and sediment control devices should be fully implemented to provide effective erosion control prior to land disturbance activities, and kept in place and maintained until the area has been effectively rehabilitated; and
- Where diversion of runoff water around a construction/rehabilitation site is required, design will need to consider possible erosion effects due to concentration of flow.

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<sup>5</sup> Monto Vetiver a sterile perennial clumping grass

## 6 POST MINING LAND USE AND REHABILITATION

### 6.1 Rehabilitation principles and hierarchy

The primary rehabilitation goal is to return the land to a PMLU of marginal grazing, and for active pit (final void) areas, marginal grazing or water storage by:

- creating stable rehabilitated landforms that are non-polluting and safe to humans and wildlife;
- ensuring rehabilitated landforms can support sustainable grazing activities;
- implementing and monitoring measurable standards to assess the success of rehabilitated landforms to the agreed grazing and/or water storage PMLU;
- ensuring progressive rehabilitation of disturbed land over the life-of-mine to minimise the amount of land disturbed by mining activities at any one time and reduce the rehabilitation burden prior to mine closure; and
- achieving regulatory approval for surrender of mining leases to allow complete mine closure.

### 6.2 Post-mining land use

Grazing pastures will be achieved using desirable native (3P) and pasture (exotic) grass species, as well as species required by the landholder. Where appropriate, smaller areas of local native trees and/or shrub species may also be planted to support a PMLU of grazing. This nominated land use will ensure the land remains agriculturally productive, is consistent with surrounding land uses, and land use agreed upon with the landholder. Where agreed with the landholder, final pit voids and existing water storage structures will be rehabilitated for use as stock dams to support grazing land use.

The proposed PMLU for areas undisturbed by mining activities will be grazing and native ecosystem.

### 6.3 Rehabilitation strategies

The rehabilitation strategy relies on the progressive rehabilitation of areas disturbed by mining activities including, but not limited to:

- appropriate pre-disturbance preparation (e.g. topsoil management plan, integrated mine planning to efficiently coordinate mining activities);
- implementation of practical landform designs to prevent erosion and establish long-term geotechnical stability;
- identification of an appropriate PMLU that is consistent with local environmental conditions;
- avoiding the placement of sodic/dispersive material near the surface of dumps or within plant root zones;
- progressive rehabilitation of disturbed areas using appropriate rehabilitation procedures;
- implementing an appropriate rehabilitation monitoring program to assess rehabilitation success against accepted performance indicators; and
- a corrective action program to address areas of substandard rehabilitation.



### 6.3.1 Progressive rehabilitation

A progressive rehabilitation program will continue to be implemented and commence as soon as possible and when areas become available within the operational land. Progressive rehabilitation will include, but are not limited to:

- development of a stable slope design that incorporates appropriate water management structures (e.g. contour banks);
- use of suitable topsoil which will be stockpiled until rehabilitation areas are available and/or will be respread immediately across available recontoured areas;
- contour ripping to promote infiltration and minimise runoff;
- seeding with an appropriate seed mix (grass, shrub and/or tree species) prior to the commencement of the wet season to maximise the benefits of subsequent rainfall;
- application of appropriate fertiliser and/or ameliorants for plant establishment (if required); and
- battering down of final void slopes to create depressed landforms that can safely support the proposed PMLUs.

### 6.3.2 Topsoil

Suitable topsoil will be stripped from each new mining area for subsequent use in the rehabilitation program. Topsoil will be stripped as defined by soil surveys and will either be stockpiled until required for rehabilitation or will be immediately respread in available rehabilitation areas. Topsoil resources present are determined adequate for the rehabilitation of disturbed areas.

### 6.3.3 Revegetation

Revegetation methods for areas disturbed by mining activities will consist of, but not limited to:

- resspreading stockpiled and/or freshly stripped topsoil;
- contour ripping;
- application of an appropriate fertiliser and/or ameliorant for plant establishment (and after soil chemical analysis, if required); and
- seeding with an appropriate seed mix.

### 6.3.4 Rehabilitation maintenance

Rehabilitation areas shall be monitored to ensure early detection of any areas requiring maintenance and/or repair. Rehabilitation areas that have not achieved the designated acceptance criteria shall be repaired.

Supplementary planting and/or seeding may be used to increase species diversity and/or groundcover. Maintenance work shall be performed to repair any areas of exhibiting excessive or concerning soil erosion. In the event problem areas occur, these shall be investigated to determine the cause/reason and to identify the most appropriate method for repair.



### 6.3.5 Decommissioning

Upon completion of mining activities, infrastructure shall be treated as follows and as agreed upon with the landholder:

- roads and tracks agreed to remain for use as farm roads, or otherwise will be rehabilitated;
- existing water structures (e.g. sediment dams, raw water storage) to remain for use as stock dams;
- infrastructure to remain for potential future use by the landholder, or otherwise will be decommissioned and rehabilitated;
- where suspected or known, contaminated land management will be completed as required under the EP Act; and
- final voids remaining at the end of the mine life will remain for use as stock dams by the landholder, or otherwise will be battered down to form depressed landforms to support a grazing PMLU.

A Post-Surrender Management Report and Compliance Statement shall be produced as a statutory requirements of the surrender process for environmental authorities and their associated mining tenements<sup>6</sup>.

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<sup>6</sup> Application for surrender or partial surrender of an environmental authority for a resource activity (ESR/201/1751) Version 5.03

## 7 SELECTION AND DESCRIPTION OF ANALOGUE SITES

### 7.1 Methodology for selection of analogue sites

Analogue sites are selected to represent grazing Land Class C2 and Land Capability VII. Analogue sites are used as a means of providing a baseline to which future land use rehabilitation may be measured to prove achievement of acceptance criteria. The sites are intended to be representative of a surrounding land use typical of grazing land class C2 and land capability VII.

### 7.2 Proposed rehabilitation acceptance criteria

Acceptance criteria for land disturbed by mining activities is summarised in following tables:

Table 4: Grazing PLMU acceptance criteria

| Goal                        | Objective   | Indicator                                       | Acceptance criteria   |
|-----------------------------|---|---|---|
| Safe to humans and wildlife | Safety hazards in rehabilitation are not significantly different to surrounding unmined landscapes subject to the same land use | Hazard assessment                               | No significant difference   |
|                             | Rehabilitation is geotechnically stable   | Factor of safety (FoS)                          | FoS $\geq 1.5^1$  |
| Stable                      | Rehabilitation is erosionally stable  | Extent, slope gradient and groundcover          | Groundcover $\geq 50\%$<br>70% slopes $\leq 20\%$ gradient  |
|                             | Rainfall runoff from rehabilitation achieves relevant water quality objectives for receiving waters                             | ANZECC 95% aquatic ecosystem threshold          | No significant difference   |
| Non-polluting               | Deep drainage from rehabilitation achieves relevant water quality objectives for groundwater                                    | ANZECC 95% aquatic ecosystem threshold          | Not significantly different to local water quality objectives in accordance with the Queensland Water Quality Guidelines <sup>7</sup> |
|                             | Rehabilitation is suitable for sustainable grazing pasture  | Land suitability assessment for grazing pasture | Land suitability class $\geq 3$ or not different from pre-mining class if $\geq 4$  |

<sup>1</sup> ANCOLD (2017): Factor of Safety

<sup>7</sup> Queensland Department of Environment and Heritage Protection (re-published July 2013): Queensland Water Quality Guidelines 2009

**Table 5: Water Storage PLMU acceptance criteria**

| Goal  | Objective  | Indicator                              | Acceptance criteria   |
|---|--|--|---|
| <b>Safe to humans and wildlife</b>                    | Safety hazards in rehabilitation areas are not significantly different to existing safety hazards in surrounding unmined environment (subject to similar land use) | Hazard assessment                      | No significant difference   |
| <b>Stable</b>   | Rehabilitation is geotechnically stable  | Factor of safety (FoS)                 | Steep slopes adequately fenced  |
|   | Rehabilitation is geotechnically stable  | Factor of safety                       | FoS $\geq 1.5^1$  |
| <b>Non-polluting</b>                                  | Rehabilitation is erosionally stable   | Extent, slope gradient and groundcover | Groundcover $\geq 50\%$<br>70% slopes $\leq 20\%$ gradient  |
|   | Rainfall runoff from rehabilitation achieves relevant water quality objectives   | ANZECC 95% aquatic ecosystem threshold | No significant difference   |
| <b>Able to sustain an agreed post-mining land use</b> | Deep drainage from rehabilitation achieves relevant water quality objectives for groundwater   | ANZECC 95% aquatic ecosystem threshold | Not significantly different to local water quality objectives developed in accordance with the Queensland Water Quality Guidelines <sup>2</sup> |

<sup>1</sup> ANCOLD (2017): Factor of Safety

<sup>2</sup> DEHP (2013): Queensland Water Quality Guidelines





## 8 REPORTING FRAMEWORK

### 8.1 Monitoring of rehabilitation works

At the commencement of rehabilitation works in a new area, permanent photograph points shall be established and delineated with a star picket or other suitable visible marker post. The geographic location and bearing of the photograph shall be recorded using GPS coordinates. This point will form the start of a permanent monitoring site for rehabilitation until certification can be achieved.

### 8.2 Annual rehabilitation reports

In accordance with the site EA, an Annual Rehabilitation Report (ARR) shall be completed documenting qualitative rehabilitation progress achieved including remediation works required and/or applied for the relevant reporting period. The ARR shall include, but will not be limited to:

- a summary description of visual monitoring for active rill/gully erosion within the first 12 months after seeding and after heavy rainfall events;
- photographs of the new rehabilitation areas from permanent photographic points;
- a summary record of treatments used, including seeding rates, soil treatment, topsoil source; and
- a summary description of any failure of rehabilitation works and maintenance conducted or proposed to be conducted for rehabilitation areas.

### 8.3 Revegetation monitoring program

It is proposed that rehabilitation will be monitored every two (2) years until success has been achieved (i.e. certification). During the monitoring program, revegetation will be compared against success criteria proposed in **Table 4** for marginal grazing. During the monitoring program the following details will be collected:

- photographic evidence of existing and new rehabilitation areas from permanent photographic points;
- record of treatments used for each new rehabilitation (including seeding rates, soil treatment, topsoil source);
- botanical description of the rehabilitation area (including percentage cover and species diversity);
- presence and abundance of weed species;
- landform monitoring (including slope angle, contour bank spacing, waterways, presence/absence of rill/gully erosion); and
- any failure of rehabilitation works, and maintenance/remediation conducted or proposed for the area.



## 8.4 Identification of remedial works

Remedial works may be required at a number of stages during the rehabilitation process, including the following actions:

- soil remediation may be required prior to the seeding/planting of rehabilitation areas (requirement based on soil type, stripping depths applied, and where applicable, storage residence times);
- failure to achieve the desired levels of vegetation cover and species diversity will require supplementary seeding and/or planting;
- weed infestation will require treatment to an appropriate standard or as defined by governing legislation; and
- erosion damage may require repair depending on the level of severity – the potential for erosion will be controlled by the establishment of a good ground cover ( $\geq 50\%$ ) and through the correct design of water management structures.



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## APPENDICES

### Appendix 1 Observed Flora and Fauna Species



# Appendix 1

## Observed Flora and Fauna Species<sup>8</sup>

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<sup>8</sup> AGC Woodward – Clyde (1991): Secure Landfill – Gurulmundi Final Impact Assessment Study Report (prepared for CEM Unit Bureau of emergency Services)



Table 6: Summary of observed flora and fauna species

| Scientific name                    | Common name               |
|------------------------------------|---------------------------|
| <b>Mammals</b>                     |                           |
| <i>Tachyglossus aculeatus</i>      | Short Beaked Echidna      |
| <i>Macropus doralis</i>            | Black-striped Wallaby     |
| <i>M. giganteus</i>                | Eastern Grey Kangaroo     |
| <i>Eptesicus pumilus</i>           | Little Cave Eptesicus     |
| <b>Birds</b>                       |                           |
| <i>Dromaius novaehollandiae</i>    | Emu                       |
| <i>Anas superciliosa</i>           | Pacific Black Duck        |
| <i>Aquila audax</i>                | Wedge-tailed Eagle        |
| <i>Falco berigora</i>              | Brown Falcon              |
| <i>Geopilia placida</i>            | Peaceful Dove             |
| <i>Phaps chalcoptera</i>           | Common Bronzewing         |
| <i>Geophaps lophotes</i>           | Crested Pigeon            |
| <i>Cacatua roseicapilla</i>        | Galah                     |
| <i>C. glauca</i>                   | Sulphur-crested Cockatoo  |
| <i>Leptolophus novaehollandiae</i> | Cockatiel                 |
| <i>Trichoglossus haematodus</i>    | Rainbow Lorikeet          |
| <i>Alisterus scapularis</i>        | Australian King Parrot    |
| <i>Aprosmictus erythropterus</i>   | Red Winged Parrot         |
| <i>Platycercus eximius</i>         | White-cheeked Rosella     |
| <i>Aegotheles cristatus</i>        | Australian Owlet-nightjar |
| <i>Dacelo novaguineae</i>          | Laughing Kookaburra       |
| <i>Coracina novaehollandiae</i>    | Black-faced Cuckoo-shrike |
| <i>Microeca leucophaea</i>         | Jack-winter               |
| <i>Eopsaltria australis</i>        | Eastern Yellow Robin      |
| <i>Petroica goenovii</i>           | Red-capped Robin          |
| <i>P. rosea</i>                    | Rose Robin                |
| <i>Pachycephala pectoralis</i>     | Golden Whistler           |
| <i>P. rufiventris</i>              | Rufous Whistler           |
| <i>Colluricincla harmonica</i>     | Grey Shrike-thrush        |
| <i>Rhipidura fuliginosa</i>        | Grey Fantail              |
| <i>Pomatostomus temporalis</i>     | Grey-crowned Babbler      |



| Scientific name                  | Common name             |
|----------------------------------|-------------------------|
| <i>Sericornis sagittatus</i>     | Speckled Warbler        |
| <i>Smicronis brevirostris</i>    | Weebil                  |
| <i>Acanthiza pusilla</i>         | Brown Thornbill         |
| <i>A. nana</i>                   | Yellow Thornbill        |
| <i>A. reguloides</i>             | Buff-rumped Thornbill   |
| <i>A. crysorrhoa</i>             | Yellow-rumped Thornbill |
| <i>Gerygone fusca</i>            | Western Gerygone        |
| <i>Plectorhyncha lanceolata</i>  | Stripped Honeyeater     |
| <i>Philemon corniculatus</i>     | Noisy Friarbird         |
| <i>Entomyzon cyanotis</i>        | Blue-faced Honeyeater   |
| <i>Manorina melanocephala</i>    | Noisy Miner             |
| <i>Lichenostomus chrysops</i>    | Yellow-faced Honeyeater |
| <i>L. leucotis</i>               | White-eared Honeyeater  |
| <i>Melithreptus brevirostris</i> | Brown-headed Honeyeater |
| <i>Dicaeum hirundinaceum</i>     | Mistletoebird           |
| <i>Pardalotus punctatus</i>      | Spotted Pardalote       |
| <i>p. sttatus</i>                | Striated Pardalote      |
| <i>Taeniopygia bichenovii</i>    | Double-barred Finch     |
| <i>Struthidea cinerea</i>        | Apostlebird             |
| <i>Grallina cyanoleuca</i>       | Australian Magpie-lark  |
| <i>Artamus cyanopterus</i>       | Dusky Woodswallow       |
| <i>Cracticus torquatus</i>       | Grey Butherbird         |
| <i>Gymnorhina tibicen</i>        | Australian Magpie       |
| <i>Strepera graculina</i>        | Pied Currawong          |
| <i>Corvus coronoides</i>         | Australian Raven        |
| <i>c. orru</i>                   | Torresian Crow          |
| <b>Reptiles</b>                  |                         |
| <i>Diplodactylus taenicauda</i>  | Golden-tailed Gecko     |
| <i>Menetia greyii</i>            | Skink                   |
| <i>Varnus gouldi</i>             | Sand Monitor            |
| <b>Flora (vascular plants)</b>   |                         |
| <i>Callitris columellaris</i>    | White Cypress           |
| <i>Cheilanthes sieberi</i>       | Cloak Fern              |



| Scientific name                | Common name            |
|--------------------------------|------------------------|
| <i>Craspedia chrysantha</i>    | Yellow Buttons         |
| <i>Eucalyptus crebra</i>       | Narrow-leaved Ironbark |
| <i>Eucalyptus fibrosa</i>      | Broad-leaved Ironbark  |
| <i>Eucalyptus maculata</i>     | Spotted Gum            |
| <i>Cyperus victoriensis</i>    | Yelka Sedge            |
| <i>Fimbristylis dichotoma</i>  | Fringe Rush            |
| <i>Juncus usitatus</i>         | Common Rush            |
| <i>Cymbidium canaliculatum</i> | Black Orchid           |
| <i>Eleocharis blakeana</i>     | Spike Rush             |
| <i>Aristida spp.</i>           | Wire Grass             |
| <i>Cymbopogon refractus</i>    | Barwire Grass          |
| <i>Cynodont dactyon</i>        | Green Couch Grass      |
| <i>Enneapogon sp.</i>          | Nineawn Grass          |
| <i>Heteropogon contortus</i>   | Spear Grass            |
| <i>Setaria pumila</i>          | Pale Pidgeon Grass     |
| <i>Sporobolus creber</i>       | Rat's Tail Grass       |
| <i>Themeda triabdra</i>        | Kangaroo Grass         |
| <i>Lomandra leucocephala</i>   | Woody Matrush          |
| <i>Xanthorrhoea johnsonii</i>  | Grasstree              |
| <i>Cotula australis</i>        | Carrot Weed            |
| <i>Chenopodium carinatum</i>   | Green Crumbweed        |
| <i>Maireana microphylla</i>    | Eastern Cottonbush     |
| <i>Wahlenbergia gracilis</i>   | Native Bell            |
| <i>Casuarina leuhmanii</i>     | Buloke                 |
| <i>Maytenus cunninghamii</i>   | Small Maytenus         |
| <i>Melichrus urceolauts</i>    | Urn Heath              |
| <i>Hardenbergia violacea</i>   | Sarsaparilla           |
| <i>Indigofera australis</i>    | Native Indigo          |
| <i>Goodenia rotounifolia</i>   | Roundleaf Goodenia     |
| <i>Amyema sp.</i>              | Mistletoe              |
| <i>Sida corrugata</i>          | Corrugated Sida        |
| <i>Acacia crassa</i>           | Curracabah             |
| <i>Acacia neriifolia</i>       | Oleander Wattle        |





| Scientific name               | Common name       |
|-------------------------------|-------------------|
| <i>Acacia spectabilis</i>     | Glory Wattle      |
| <i>Angophora costata</i>      | Rusty Gum         |
| <i>Hakea purpurea</i>         | Crimson Hakea     |
| <i>Boronia bipinnata</i>      | Rock Boronia      |
| <i>Solanum densevestiitum</i> | Woolly Nightshade |

# **Attachment 9**

Soil Survey Report



# **Report on the Soil Survey of Leases of the Terrequip Miles Bentonite Mine**



Prepared for: Ausrocks Resource Consultants (Ausrocks)

Revision 1.1 (Release)

Revision date: 22/08/2023

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## 1. Scope and Deliverables

The Terrequip Miles Bentonite mine is an open-pit mining development operated by Terrequip Miles Pty Ltd, hereafter referred to as the “project area”. Bentonite mined at site is used in various industrial and commercial applications. The locality of the lease areas (ML50058, ML5898, ML5902, ML5905, ML5906, ML5907 and ML5909) are shown in Appendix 1 Maps: Mine Lease Boundaries. Note that the leases ML5898, ML5905 and ML5906 were not accessible for survey. The project area surveyed included ML50058, ML5902, ML5907 and ML5909.

Horizon Soil Science and Engineering (Horizon) were engaged by Ausrocks Resource Consultants (Ausrocks) to conduct a land assessment survey in non-disturbed areas of the project area to provide background data of the existing landscape as a baseline for rehabilitation purposes.

### 1.1 Scope

The scope of work was to conduct a land assessment of the project area to:

- Assist Ausrocks devise and execute a land assessment survey (including chemistry sampling) in non-disturbed areas to provide background data of the existing landscape as a baseline for rehabilitation purposes;
- Investigate the soil condition of previously rehabilitated areas;
- Investigate the condition of stockpiled topsoil material;
- Provide a report summarising the land assessment and previously rehabilitated areas characteristics across the project areas; and
- Assist Ausrocks to develop a soil rehabilitation methodology and topsoil amelioration procedure.

### 1.2 Deliverables

The key deliverables for the project included:

1. A soil survey report for the project area that:
  - Maps the boundaries of soil types across the non-disturbed areas;
  - Provides key physical and chemical characteristics of the mapped soils; and
  - Classifies the project area agricultural land capability using an appropriate method.
2. Assist Ausrocks to develop:
  - Soil rehabilitation methodology;
  - Topsoil amelioration procedure;
  - A soil testing program/procedure; and
  - Metrics to measure future rehabilitation performance based on soil testing program results.

## 2. Desktop Review and Survey Design

### 2.1 Desktop Review

A desktop review was completed to assist with defining landscape characteristics and soil boundaries. The desktop review included geology, land resource and land management data.

#### 2.1.1 Geology

The surface geology of the project area was reviewed in Queensland Globe (no map provided in this report). The project area is all mapped as Late Jurassic to Early Cretaceous derived sedimentary rock units with a mix of sandstone, siltstone, mudstone and conglomerate. The major geological unit being Kumbarilla beds- JKK(w).

#### 2.1.2 Land Resources and Soils

Soils mapping available for the site includes The National scale (1:2,000,000) ASRIS mapping (<https://www.asris.csiro.au/>) (no map provided in this report) and Land Resource land suitability survey for Murilla Tara and Chinchilla Shires (Maher, 1996).

The ASRIS mapping describes the entire project area as classified under a single unit, Va24. The primary soil associated with this unit are texture contrast (Sodosol) soils.

In their evaluation of Land Resource land suitability survey for Murilla Tara and Chinchilla Shires (Maher, 1996) the majority of the areas are “light forest” with a minor area of “Poplar box flat plains”. A general description of these LRU are:

- Light forest - undulating plains and rises; shrubby woodland and layered open forest of ironbarks, bull oak, wattles and cypress pine. Common soils include:
  - Bogandill – Hardsetting thin (<15 cm) bleached sandy surface over brown or black clay subsoils; and
  - Arubial - Hardsetting thin (<15 cm) bleached clay loam surface over black or grey clay subsoils.
- Poplar box flat plains -gently undulating to flat plains; woodland of poplar box and bull oak or of poplar box; associated species include narrow-leaved ironbark, false sandalwood, cypress pine and molly box. Common soils include:
  - Minnabilla – Very shallow gravelly red soils and rock outcrops;
  - Braemar – Moderately thick (20-40 cm) bleached sandy surface over mottled yellowish brown and greyish brown clay subsoils; and
  - Flinton – Shallow to deep sandy to loamy surface with massive subsoils overlying laterised sandstones.

The desktop assessment suggests that the soils across the project area are likely to be shallow texture contrast soils, with shallow bleached sandy to clay surface over brown to black clay subsoils.

#### 2.1.3 Grazing Land Management

The project area is mapped as a mix of grazing land management (GLM) units (Source: Future Beef, 2018);

- IB19 – Spotted gum ridges. Soils of this GLM unit are described as very shallow to shallow (<50 cm) sandy, loamy lithosols.
- MB02 – Bloodwood ironbark woodlands on steep rocky hills; and



- FT07 – Bulloak country

The MB02 unit appears misclassified as there are not steep rocky hills within the survey areas, with the landscape a mix of low rises and plains. The FT07 bulloak unit coincides with the Poplar box flat plains unit.

These GLM is described as suitable for light grazing on native pastures. Minimal ground disturbance of the landscape is recommended as the dispersive soils erode easily, and grazing pressures should be managed to maximise ground cover and minimise soil loss.

The units are considered to have land use limitations that include:

- Shallow effective rooting depth;
- Low fertility and very low to low water holding capacity; and
- Very high erosion hazard.

## 2.2 Survey Design

The field survey was designed in accordance with sampling intensities recommended in the Australian Guidelines for Surveying Soil and Land Resources (McKenzie *et al*, 2008). The footprint area of the project areas is approximately 213 ha, however due to access constraints the final detailed survey areas was 134 ha. With a sample density of 6.25-25 ha /site for soil mapping at 1:25,000 scale giving a range of 5 - 21 observation sites.

The number of sites sampled for detailed analysis and chemistry are shown and exceed the percentage of sites criteria required by McKenzie *et al*. (2008).

**Table 1: Sample numbers**

|             | Mapping Observations | Detailed Description | Soil profile Chemistry sites |
|-------------|----------------------|----------------------|------------------------------|
| Recommended | 5-21                 | 10-20%<br>(1-4)      | 5-10%<br>(1-2)               |
| Proposed    | 21                   | 6                    | 6                            |
| Actual      | 29                   | 6                    | 6                            |

In addition to the survey sites, samples were collected for chemistry in three (3) rehabilitation areas and from two (2) topsoil stockpiles.

### 2.2.1 Field Descriptions

Field descriptions were undertaken in accordance with the Australian Soil Survey and Land Survey Field Handbook 3rd edition (The National Committee on Soil and Terrain, 2009) and classified using The Australian Soil Classification (Isbell, 2016). Field descriptions included a combination of mapping observations and detailed observations with a subset of detailed observations analysed for chemistry as described below:

1. Mapping observations are primarily used to identify land type boundaries. They include a description of:
  - Landform;
  - Vegetation;

- Other distinguishing surface characteristics (e.g., gilgai and rockiness); and
  - Where active erosion is evident.
2. Detailed observations make up >25 % of the required survey locations. The sample locations are provided in Appendix 1 Map 4: Observations and Sample Locations, profile logs and photographs are provided in Appendix 2. These sites were sampled using a hand auger include soil profile descriptions and observations of:
- Horizon depths, designation and boundary distinctness;
  - Field texture;
  - Munsell Colour;
  - Mottles colour and abundance;
  - Coarse fragments size and abundance;
  - Structure;
  - Segregations and abundance.

## 2.2.2 Chemistry

Chemistry sites make up >25 % of the required survey locations. Typically, 4 sample depths were analysed per site based on soil horizons; generally, this included the A1, upper and lower B2 horizons. Standard sampling depth targets were (0-100, 200-300, 500-600, 800-900mm). The key parameters analysed are provided in Table 2. Analysis was conducted by the NATA accredited ALS Laboratory. The Certificate of Analysis is provided in Appendix 3.

**Table 2: Soil chemistry analysis parameters**

| Parameter   | ALS Method/ Package Code            | Technique/ Method Reference         | Limit of Reporting |
|---|-------------------------------------|-------------------------------------|--------------------|
| Electrical Conductivity (1:5)                                     | IN-4S                               | APHA 2510 B 1:5                     | 1 $\mu$ S/cm       |
| pH (1:5)  |                                     | APHA 4500 H B 1:5                   | 0.1 pH Unit        |
| CEC - Exchangeable Cations with pre-treatment (Ca, Mg, Na, K, Al) | ALS to determine based on pH and EC | calc                                | 0.1 meq/100g       |
| Exchangeable Sodium Percent (ESP) – base saturation calc          |                                     | ALS to determine based on pH and EC | 0.1 meq/100g       |
| Ca:Mg ratio   |                                     |                                     | 0.10%              |
| Chloride  | ED045G                              | APHA 4500 Cl 1:5                    | 10 mg/kg           |
| Emerson Aggregate Test  | EA058                               | AS1289.3.8.1                        | n/a                |
| Total Organic Carbon (OC) in Soil                                 | EP003                               | ALS In house                        | 0.02 %             |

Saturated extract soil salinity ( $EC_{se}$ ) was estimated from  $EC_{1:5}$  data using Shaw (1994) soil chloride and cation exchange method.

For reference the following acronyms are used for soil chemistry in this report:

- $EC_{se}$  - Saturated extract soil salinity.
- CEC – Cation Exchange Capacity.
- ESP -Exchangeable sodium Percentage.
- Ca:Mg – Calcium: Magnesium ratio.
- EAT – Emerson Aggregate Test.
- OC - Organic Carbon.

### 3. Soil Survey Results

A soil survey of the project area was conducted on the 19<sup>th</sup> and 20<sup>th</sup> July 2023. Sampling was conducted using a hand auger.

#### 3.1 Soil Physical Characteristics Descriptions

Only one soil type was described within the project area using the Australian Soil Classification (ASC) system (Isbell, 2021), Brown and Grey Sodosols. Sodosols are texture contrast soils, typically characterised by sandy loam or clay loam surfaces over light to medium clay sub-soils that are sodic in the upper portion of the B-horizon. Example soil profiles for are given in Table 4. All full site descriptions are given in Appendix 2. This soil type is consistent with what was expected from the desktop assessment.

A summary of the number of sites described and sampled for chemistry are given in Table 3.

**Table 3: Summary of soil type areal extent, number of sites described and sampled for chemistry**

| Australian Soil Classification | Mapped area (ha) | Number of Observations | Number of Detailed and Chemistry sites |
|--------------------------------|------------------|------------------------|--|
| Brown and Grey Sodosol         | 134              | 29                     | 6                                      |

**Table 4: Typical Physical Characteristics of Soil Types**

| Soil Description  |
|---|
| <p><b>Australian Soil Classification : Brown Sodosol</b></p> <p><b>A1</b> Brown (7.5YR 4/2) massive sandy loam, to 0.15 m, clear change to;</p> <p><b>A2</b> Bleached, Brown (7.5YR 4/2) massive sandy loam, common small gravel and a few medium gravel throughout, to 0.5 m, clear change to;</p> <p><b>B2</b> Dark brown (7.5YR 3/1) fine sandy medium clay with weak polyhedral structure, to 0.9 m.</p>  |
| <p><b>Australian Soil Classification : Grey Sodosol</b></p> <p><b>A1</b> Brown (7.5YR 4/2) massive sandy loam, to 0.1 m, clear change to;</p> <p><b>A2</b> Bleached, Brown (7.5YR 4/2) massive sandy loam, to 0.15 m, abrupt change to;</p> <p><b>B21</b> Dark grey (7.5YR 4/1) fine sandy medium heavy clay with weak polyhedral structure, to 0.5 m, clear change to;</p> <p><b>B22</b> Dark brown (7.5YR 3/2) massive sandy clay loam, a few medium gravel throughout, to 0.9 m.</p> |

### 3.2 Summary of Soil Chemistry

Six reference sites and three rehabilitation locations were selected for soil chemistry sampling. Site numbers, soil classification and sample depth are given in Table 5. The survey reference number can be cross referenced with the Appendix 1 Map 4: Observation and Sample Locations, and the soil chemistry sample number with the Certificate of analysis in Appendix 3.

**Table 5: Soil chemistry sample location reference**

| Survey reference | Australian Soil Classification | Lower Sample Depth (mm) |
|------------------|--------------------------------|-------------------------|
| TQM01            | Brown Sodosol                  | 400                     |
| TQM02            | Brown Sodosol                  | 400                     |
| TQM03            | Brown Sodosol                  | 900                     |
| TQM04            | Grey Sodosol                   | 400                     |
| TQM05            | Grey Sodosol                   | 900                     |
| TQM06            | Brown Sodosol                  | 900                     |
| Rehab 1          | Rehabilitation                 | 300                     |
| Rehab 2          | Rehabilitation                 | 300                     |
| Rehab 3          | Rehabilitation                 | 100                     |
| Stockpile 1      | Stockpile                      | 100                     |
| Stockpile 2      | Stockpile                      | 100                     |

Soil chemistry profiles of the key characteristics are show in Figure 1 . Table 6 shows the classification of the profiles based on Hazelton and Murphy (2016). Emerson Aggregate Test (EAT) scores are given in Table 7.

Summarising soil chemistry by soil type the soils were found to be:

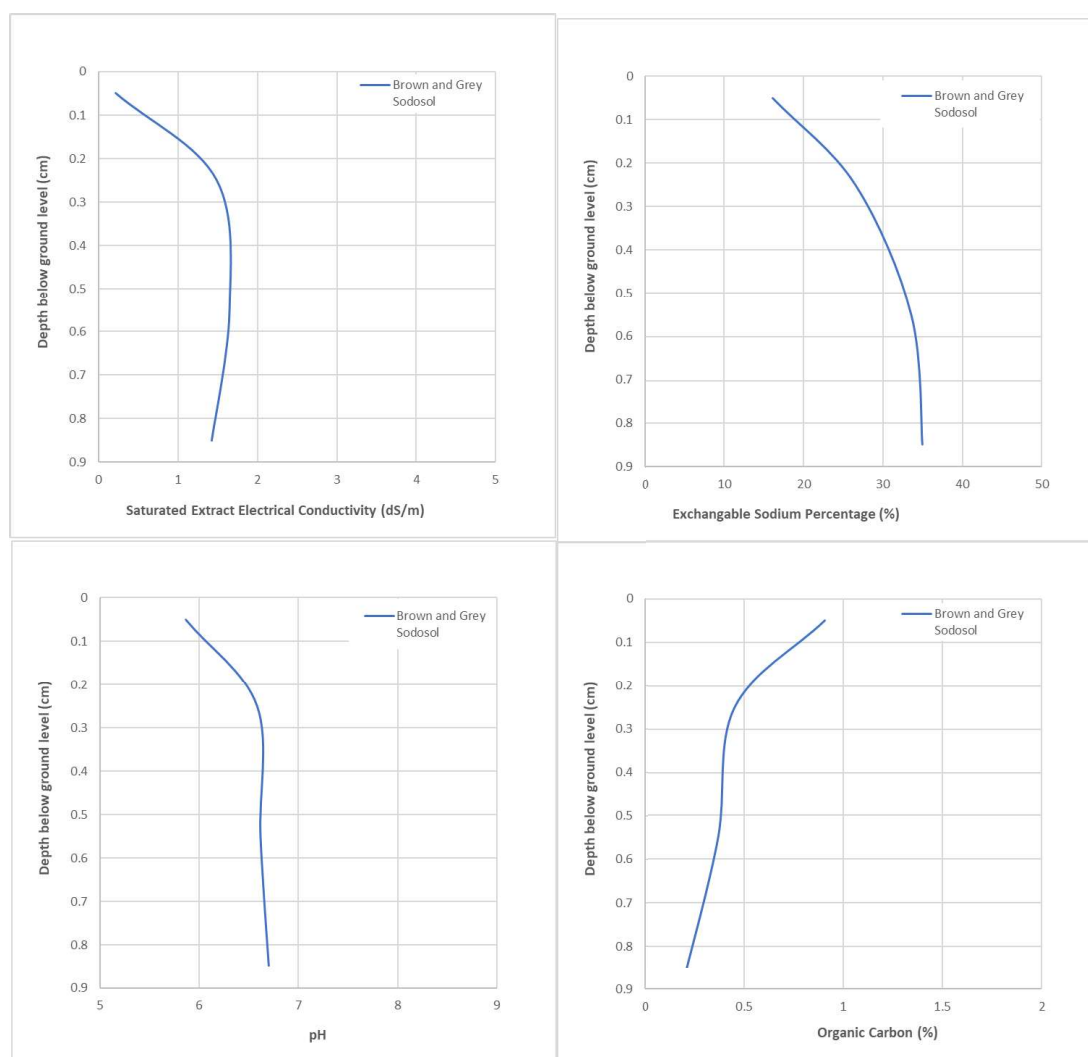
- Brown and Grey Sodosol;
  - pH profiles slightly acid at the surface to neutral at depth;
  - Non-saline throughout;
  - Low organic carbon throughout, with
  - Low to moderate CEC;
  - Strongly sodic and Ca:Mg ratio suggest calcium deficient;
  - EAT scores suggest dispersive topsoils and subsoils.
  -

**Table 6: Chemical Characteristics of Soil Types**

| Australian Soil Classifications | Profile  | pH            | EC <sub>se</sub> | CEC      | ESP (%)        | OC (%) |
|---------------------------------|----------|---------------|------------------|----------|----------------|--------|
| Brown and Grey Sodosol          | Topsoil  | Slightly acid | Non-saline       | Low      | Strongly sodic | Low    |
|                                 | Sub-soil | Neutral       | Non-saline       | Moderate | Strongly sodic | Low    |

**Table 7: Emerson Aggregate Scores by soil type and depth**

| Australian Soil Classifications | Emerson Score | Dispersion Class    |
|---------------------------------|---------------|---------------------|
| Brown and Grey Sodosol          | 3             | Some Dispersion     |
|                                 | 1-2           | Complete dispersion |



**Figure 1: Chemistry by soil type and depth (Salinity  $EC_{se}$ , pH, ESP and OC)**

### 3.3 Rehabilitation Areas

An assessment of the rehabilitation areas (refer – Map 4 : Observation and Sample Locations) was made. Photos the rehabilitation areas are shown in Figure 2, and descriptions in Appendix 2.



**Figure 2: Photo of Rehabilitation areas (sites labelled)**

Samples of the topsoil (0-100 mm) and “subsoil” (200-300 mm) were sampled (note that due to refusal on gravel no 200-300 mm sample was collected at rehabilitation site 3). The chemical characteristics (refer Table 8 ) of the material can be described as:

- Rehabilitation Areas 1;
  - Moderately acid surface to neutral subsoil
  - Non-saline throughout;
  - Low organic carbon;
  - Low to moderate CEC
  - Strongly sodic, Calcium deficient;
  - EAT scores suggest dispersive soils.
- Rehabilitation Areas 2
  - Moderately alkaline surface pH, with strongly acid subsoil;
  - Non-saline surface to highly saline subsoil;
  - Moderate organic carbon at surface, low in subsoil;
  - Very low CEC surface, moderate in subsoil.
  - Sodic to strongly sodic, Calcium deficient;
  - EAT scores suggest dispersive soils.
- Rehabilitation Areas 3 (surface only)
  - Moderately alkaline pH;
  - Non-saline ;

- High organic carbon;
- Low CEC
- Non-sodic, with low Calcium;
- EAT scores suggest dispersive soils.

**Table 8: Rehabilitation Area Soil Chemistry Summary**

| Site    | Sample depth (mm) | ECse | pH  | ESP (%) | CEC  | Ca:Mg ratio | OC (%) | EAT |
|---------|-------------------|------|-----|---------|------|-------------|--------|-----|
| Rehab 1 | 0-100             | 1.3  | 5.7 | 33.9    | 8.6  | 0.4         | 0.3    | 3   |
|         | 200-300           | 0.9  | 7.2 | 40.2    | 15.1 | 0.2         | 0.3    | 3   |
| Rehab 2 | 0-100             | 1.6  | 8.2 | 6.9     | 4.2  | 2.5         | 1.4    | 3   |
|         | 200-300           | 11.0 | 4.8 | 20.3    | 14.2 | 0.9         | 0.6    | 2   |
| Rehab 3 | 0-100             | 0.5  | 8.0 | <0.2    | 10.9 | 2.7         | 2.7    | 3   |

An assessment of the topsoil stockpile areas (refer – Map 4 : Observation and Sample Locations) was made. The chemical characteristics (refer Table 9) of the material can be described as:

- Topsoil Stockpile 1
  - Mildly alkaline pH;
  - Non-saline ;
  - Low organic carbon;
  - Low CEC,
  - Strongly sodic with low Calcium;
  - EAT scores suggest dispersive soils.
- Topsoil Stockpile 2
  - Moderately alkaline pH;
  - Non-saline;
  - Low organic carbon;
  - Very low CEC
  - Non-sodic with low Calcium;
  - EAT scores suggest non-dispersive soils.

**Table 9: Topsoil Stockpile Soil Chemistry Summary**

| Site        | ECse | pH  | ESP (%) | CEC | Ca:Mg ratio | OC (%) | EAT |
|-------------|------|-----|---------|-----|-------------|--------|-----|
| Stockpile 1 | 1.3  | 7.6 | 23.3    | 7.1 | 1.0         | 0.7    | 4   |
| Stockpile 2 | 0.2  | 5.6 | 1.1     | 2.6 | 0.7         | 0.7    | 3   |

## 4. Agricultural Land Evaluation

A number of frameworks and references are referred to establish the agricultural land evaluation for the project area.

### 4.1 Strategic Cropping Land

None of the area was defined as strategic cropping land (SCL) on the trigger maps. Queensland Globe (2022) (last access 7/08/2023). Therefore, no further assessment is required under this framework.

### 4.2 Agricultural Land Classification

Agricultural land classification in Queensland follows a simple hierarchical scheme that is applicable across the state (DSITI & DNRM, 2015). It allows the presentation of interpreted land evaluation data to indicate the location and extent of agricultural land that can be used sustainably for a wide range of land uses with minimal land degradation. Three broad classes of agricultural land and one non-agricultural land class are identified:

- **Class A** – Crop land
- **Class B** – Limited crop land
- **Class C** – Pasture land
- **Class D** – Non-agricultural land

A review of Queensland Globe (access 7/8/2023) define the majority of the project area as C2 class. C2 land is typically suited to livestock fattening with low stocking rates (DSITI & DNRM, 2015). The site is considered suitable for livestock fattening where stock can be removed as required to maintain vegetative cover, protecting the soils from erosion risk.

The northern portion of ML50058, mapped as “Poplar box flat plain” in the land resource mapping (refer Map 3), is classified as Class B. Class B land is “Limited crop land that is suitable for a narrow range of current and potential crops due to severe limitations, but is highly suitable for pastures”. Land may be suitable for cropping with engineering or agronomic improvements. This classification not supported by the observations made by Horizon, nor by the GLM classification. We suggest this area is considered class C2 as per the rest of the project area. The soils are not suitable for cropping due to their shallow rooting depth potential, low water holding capacity and very low fertility (Future Beef, 2018).



## 5. Land Management and Amelioration

### 5.1 Soil Erosion

Erosion can have an adverse effect on soil productivity and the associated agricultural value. Additional effects can include downstream sedimentation, and decline in fertility through loss of soil structure, and increased dust generation and poor rehabilitation.

Dispersive subsoils with high ESPs, low Ca:Mg ratios are susceptible to tunnel and gully erosion which is particularly difficult to manage once initiated. The subsoils of the project area have subsoils that have a low erosion rating when undisturbed. However, as the subsoils can be sodic to strongly sodic, these soils will erode due to clay dispersion where soil is exposed to rainfall or runoff. Management options involve minimising exposure, careful management of overland flow, maintaining vegetation cover, and where appropriate, the use of soil ameliorants such as gypsum (to reduce the degree of dispersion).

While site practices will be guided by site specific Erosion and Sediment Control plans. Where applicable, the following general erosion and sediment control measures are recommended:

- Methods such as contour banks, or Vetiver Manto along crests and contours to control surface flow speed, should be used at intervals appropriate to the slope and soil type to control the flow of surface water.
- Diversion and erosion and sediment control devices should be fully implemented to provide effective erosion control prior to land disturbance activities, and kept in place and maintained until the area has been effectively rehabilitated.
- Where diversion of runoff water around a construction/rehabilitation site is required, design will need to be mindful of possible erosion effects due to concentration of flow.

### 5.2 Soil Amelioration

Soil amelioration will vary for different soils depending on soil chemistry. Lower cation exchange capacity soils (i.e., sandy soils) generally have a lower amendment requirement due less exchange sites for cation transfer. The guiding principles for choosing chemical amendments, i.e., to use lime, gypsum, or sulphur ameliorants, depends on both pH, ESP and Ca:Mg ratio.

The following recommendations are proposed:

- Topsoil stripping of not greater than 150 mm is recommended due to sodic subsoils material.
- The surface 150mm of material has no pH, salinity limitations, but tends to be sodic and should be amended for use in rehabilitation.
- Once topsoil is reinstated, an application of Aglime at 5 t/ha is proposed.
- This topsoil material will still be subject to erosion due to the concentrated runoff and therefore needs to be spread such that any runoff flows are not concentrated.
- A broad-based fertiliser should be applied with suitable rates are around 40-50 kg/ha N, 20-30 kg/ha P and 20-30 kg/ha K to assist vegetation growth.

### 5.3 Existing Rehabilitation Area

#### Rehabilitation Area 1:

- Soils have no salinity or pH limitations.
- It is recommended that the area 1 should be treated with AgLime at a rate not less than 5 t/ha (sufficient to treat 100 mm across 1 ha to an ESP <6%).
- A broad-based fertiliser should be applied with suitable rates are around 40-50 kg/ha N, 20-30 kg/ha P and 20-30 kg/ha K to assist vegetation growth.

#### Rehabilitation Area 2:

- Soils have no salinity, pH or sodicity limitations.
- A broad-based fertiliser should be applied with suitable rates are around 40-50 kg/ha N, 20-30 kg/ha P and 20-30 kg/ha K to assist vegetation growth.

#### Rehabilitation Area 3:

- Soils have no salinity, pH or sodicity limitations.
- A broad-based fertiliser should be applied with suitable rates are around 40-50 kg/ha N, 20-30 kg/ha P and 20-30 kg/ha K to assist vegetation growth.

### 5.4 Stockpile material

#### Topsoil Stockpile 1:

- Soils have no salinity or pH limitations.
- Stockpile 1 material should be treated with amendment once reinstated.
  - AgLime at a rate not less than 2.5 kg/m<sup>3</sup> (sufficient to treat to an ESP <6%).
  - A broad-based fertiliser should be applied with suitable rates are around 40-50 kg/ha N, 20-30 kg/ha P and 20-30 kg/ha K to assist vegetation growth.

#### Topsoil Stockpile 2:

- Soils have no salinity, pH or sodicity limitations.
- Stockpile 2 material should be treated with amendment once reinstated.
  - A broad-based fertiliser should be applied with suitable rates are around 40-50 kg/ha N, 20-30 kg/ha P and 20-30 kg/ha K to assist vegetation growth.

## 7. Rehabilitation Soil Testing and Monitoring Metrics

Horizon were requested to provide:

- A soil testing program/procedure; and
- Metrics to measure future rehabilitation performance based on soil testing program results.

Our proposed methodology is provided below:

### 7.1 Soil testing program/procedure

The following steps detail the proposed sampling program:

1. The testing program plan for each uniform rehabilitation area should be at a density of:
  - Minimum of 1 sample site per 6 hectares of rehabilitation: and
  - Have a minimum of 3 sample sites per rehabilitation area.
2. At each site, samples should be taken at a maximum of 100 mm increments to a depth not less than the topsoil capping depth. Sampling should ensure that soil from different depths does not mix.
3. Minimum sample size should 250 g. Samples to be labelled with sampler name, site, sample number, sample depth and date of sample.
4. Photograph to be taken of the samples, and surrounding area, with a hole identifier label and date visible.
5. Samples to be submitted to a NATA accredited laboratory for analysis of:
  - a. Moisture Content @ 40°C.
  - b. Electrical Conductivity (1:5).
  - c. pH (1:5).
  - d. Exchangeable Cations (Ca, Mg, Na, K, Al). With Ca:Mg ratio, and Exchangeable Sodium Percent (ESP) derived.
  - e. Chloride.
  - f. Total Organic Carbon (TOC) in Soil.

Soil salinity to be estimated as Saturated Extract Electrical Conductivity ( $EC_{se}$ ) using the methods outlined in Shaw (1994).

### 7.2 Metrics for Soil Rehabilitation Performance.

The metrics for soil rehabilitation performance should be estimated using a minimum of three (3) samples for each uniform rehabilitation area. The measurement being expressed as a mean measurement with standard error of measurement presented.

The metric for success of the soil rehabilitation should be assessed against the following criteria:

1. The pH is between 5 and 8.5 pH units; and
2. The Exchangeable Sodium Percentage is less than six percent (< 6%); and
3. The soil salinity, expressed as  $EC_{se}$  is less than 5.5 dS/m; and
4. The organic carbon percentage (OC %) is greater than 1.0 %.
5. The site should be stable and not exhibiting evidence of rilling classified as severe.

## 8. References

DSITI & DNRM (2015). Guidelines for agricultural land evaluation in Queensland (2nd edn). Queensland Government (Department of Science, Information Technology and Innovation and Department of Natural Resources and Mines), Brisbane, Queensland.

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Rayment, G. and Lyons, D. (2011) *Soil Chemical Methods*. CSIRO Publishing, Collingwood, Victoria.

Shaw, R.J. (1994) *Estimation of the electrical conductivity of saturation extracts from the electrical conductivity of 1:5 soil:water suspensions and various soil properties*, Project report Q094025,

## Appendix 1: Maps


# Map 1 Lease Areas

Project:  
Terrequip Miles

Version Number: 1.1  
Date: 18/08/2023



## Legend

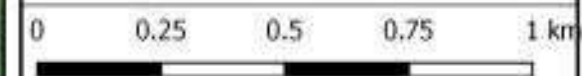
-  Lease areas
- Google Satellite



# Map 2 Grazing Land Management

Project:  
Terrequip Miles

Version Number: 1.1  
Date: 18/08/2023



## Legend

Lease areas

GLM Land Type

Bloodwood-ironbark woodland  
on steep rocky hills

Bulloak country

Eucalypts and bloodwood on  
loamy red tableland

Spotted gum ridges

Google Satellite



**Horizon**  
Soil Science and Engineering

# Map 3 Land Resources

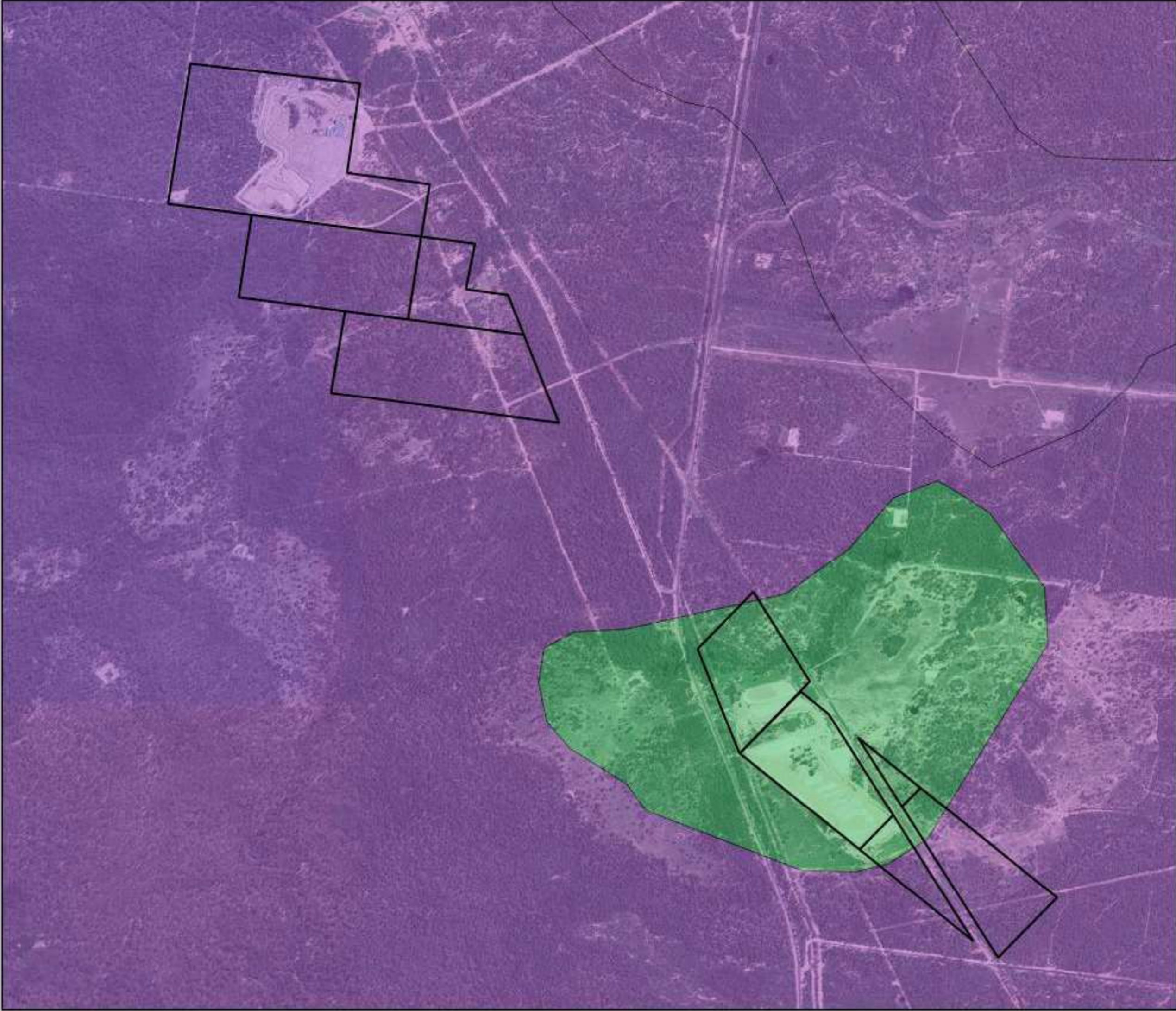
Project:  
Terrequip Miles

Version Number: 1.1  
Date: 18/08/2023



## Legend

-  Lease areas
- Land Resource Areas
  -  Light forests
  -  Poplar box flat plains
- Google Satellite





# Map 4 Observations and Sample Locations

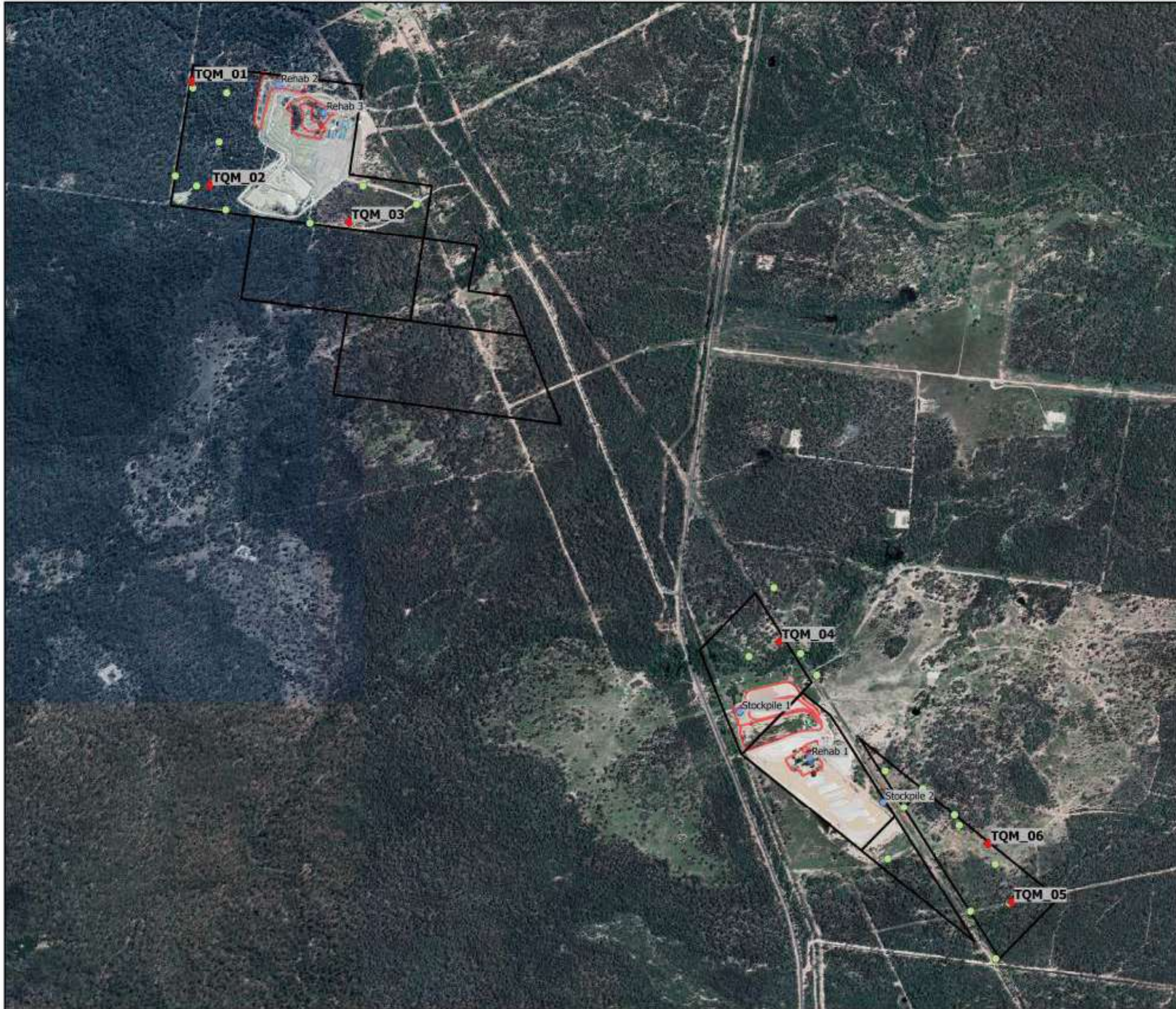
Project:  
Terrequip Miles

Version Number: 1.1  
Date: 18/08/2023



## Legend

- ◆ Detailed descriptions
  - Rehab and stockpiles
  - Observations
  - Lease areas
- Google Satellite



# Map 5 Australian Soils Classification

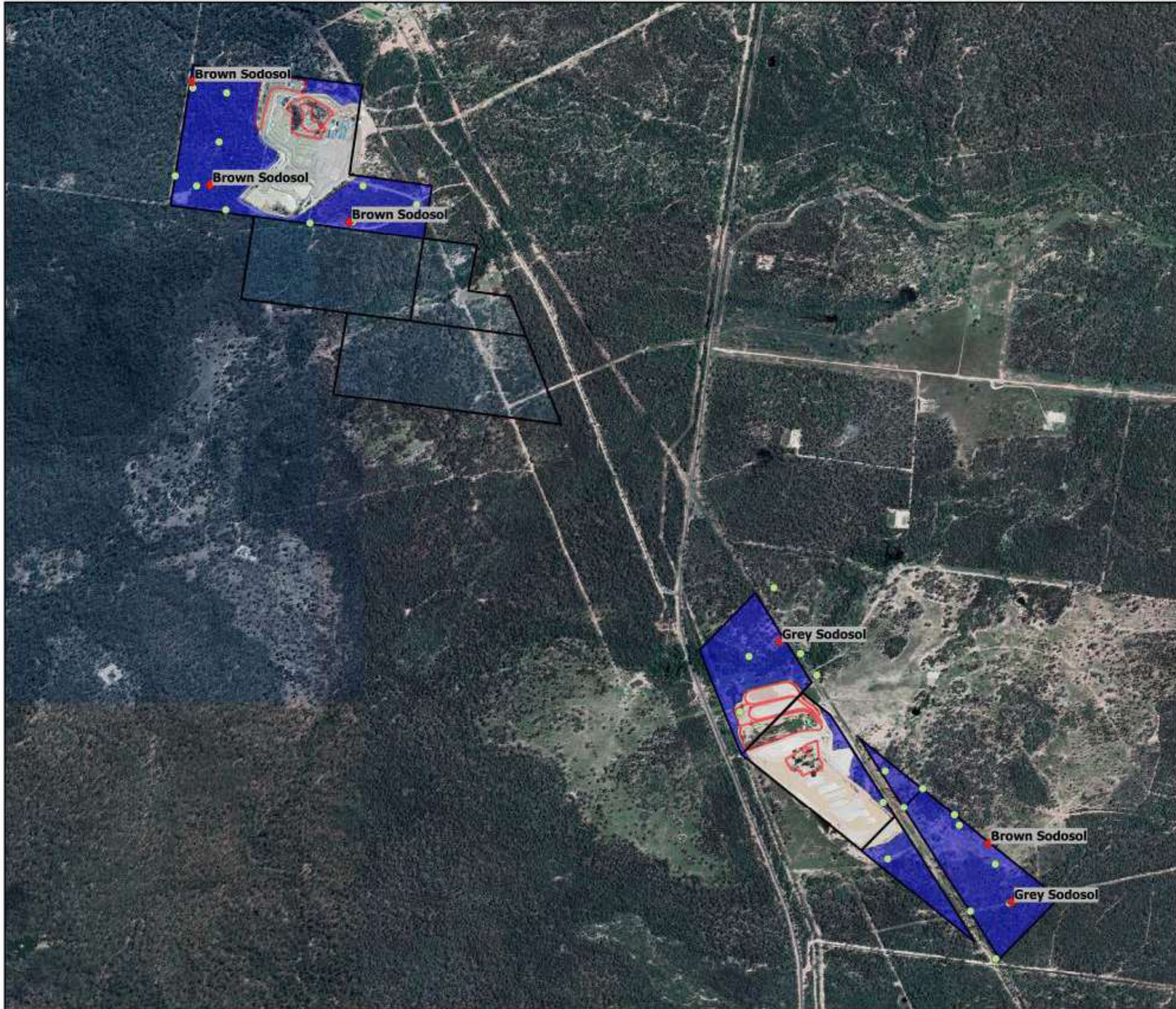
Project:  
Terrequip Miles

Version Number: 1.1  
Date: 18/08/2023







## Legend



- ◆ Detailed descriptions
- Observations
  - Sodosol
- ASC
  - Sodosol
  - (Unsurveyed)
- Lease areas
- Google Satellite







## Appendix 2: Detailed Descriptions



| Site number  | Description  | Photos   |
|--|--|--|
| <p> <b>Site ID:</b> TQM01<br/> <b>Location:</b><br/>           S26.42102° E150.04386°<br/> <b>Described by:</b> Dan Rattray<br/> <b>Date:</b> 20/07/2023<br/> <b>Geology:</b> Sedimentary<br/> <b>Landform pattern:</b> Rises<br/> <b>Element:</b> Middle of landform<br/> <b>Permeability:</b> Moderately permeable<br/> <b>Microrelief:</b> None<br/> <b>Drainage:</b> Imperfectly drained<br/> <b>Rock outcrop:</b> Nil<br/> <b>Surface coarse fragments:</b> Nil<br/> <b>Surface condition:</b> Firm<br/> <b>Disturbance:</b> Limited clearing<br/> <b>Sample site:</b> Yes         </p> | <p> <b>Australian Soil Classification : Brown Sodosol</b><br/><br/> <b>A1</b> Brown (7.5YR 4/2) massive sandy loam, to 0.2 m, clear change to;<br/><br/> <b>A21</b> Bleached, Brown (7.5YR 4/2) massive sandy loam, to 0.3 m, clear change to;<br/><br/> <b>A22</b> Brown (10YR 5/3) massive sandy loam, common medium gravel, to 0.45 m.<br/><br/>           Refusal on gravel/rock and did not sample B2 horizon.         </p> |  |
|  |    |  |

| Site number  | Description  | Photos   |
|--|--|--|
| <p> <b>Site ID:</b> TQM02<br/> <b>Location:</b><br/>           S26.42554° E150.04464°<br/> <b>Described by:</b> Dan Rattray<br/> <b>Date:</b> 20/07/2023<br/> <b>Geology:</b> Sedimentary<br/> <b>Landform pattern:</b> Rises<br/> <b>Element:</b> Middle of landform<br/> <b>Permeability:</b> Moderately permeable<br/> <b>Microrelief:</b> None<br/> <b>Drainage:</b> Imperfectly drained<br/> <b>Rock outcrop:</b> Nil<br/> <b>Surface coarse fragments:</b> Nil<br/> <b>Surface condition:</b> Firm<br/> <b>Disturbance:</b> Limited clearing<br/> <b>Sample site:</b> Yes         </p> | <p> <b>Australian Soil Classification : Brown Sodosol</b><br/><br/> <b>A1</b> Brown (7.5YR 4/2) massive sandy loam, to 0.2 m, clear change to;<br/><br/> <b>A21</b> Bleached, Brown (7.5YR 4/2) massive sandy loam, to 0.3 m, clear change to;<br/><br/> <b>A22</b> Brown (10YR 5/3) massive sandy loam, common medium gravel, to 0.45 m.<br/><br/>           Refusal on gravel/rock and did not sample B2 horizon.         </p> |  |
|  |    |  |



| Site number  | Description  | Photos   |
|--|--|--|
| <p> <b>Site ID:</b> TQM03<br/> <b>Location:</b><br/>           S26.42714° E150.05074°<br/> <b>Described by:</b> Dan Rattray<br/> <b>Date:</b> 20/07/2023<br/> <b>Geology:</b> Sedimentary<br/> <b>Landform pattern:</b> Rises<br/> <b>Element:</b> Middle of landform<br/> <b>Permeability:</b> Moderately permeable<br/> <b>Microrelief:</b> None<br/> <b>Drainage:</b> Imperfectly drained<br/> <b>Rock outcrop:</b> Nil<br/> <b>Surface coarse fragments:</b> Nil<br/> <b>Surface condition:</b> Firm<br/> <b>Disturbance:</b> Limited clearing<br/> <b>Sample site:</b> Yes         </p> | <p> <b>Australian Soil Classification : Brown Sodosol</b><br/><br/> <b>A1</b> Brown (7.5YR 4/2) massive sandy loam, to 0.15 m, clear change to;<br/><br/> <b>A2</b> Bleached, Brown (7.5YR 4/2) massive sandy loam, common small gavel and a few medium gravel throughout, to 0.5 m, clear change to;<br/><br/> <b>B2</b> Dark brown (7.5YR 3/1) fine sandy medium clay with weak polyhedral structure, to 0.9 m.         </p> |  |
|    |  |  |



| Site number  | Description  | Photos   |
|--|--|--|
| <p> <b>Site ID:</b> TQM04<br/> <b>Location:</b><br/>           S26.44551° E150.06955°<br/> <b>Described by:</b> Dan Rattray<br/> <b>Date:</b> 20/07/2023<br/> <b>Geology:</b> Sedimentary<br/> <b>Landform pattern:</b> Rises<br/> <b>Element:</b> Middle of landform<br/> <b>Permeability:</b> Moderately permeable<br/> <b>Microrelief:</b> None<br/> <b>Drainage:</b> Imperfectly drained<br/> <b>Rock outcrop:</b> Nil<br/> <b>Surface coarse fragments:</b> Nil<br/> <b>Surface condition:</b> Firm<br/> <b>Disturbance:</b> Extensive clearing<br/> <b>Sample site:</b> Yes         </p> | <p> <b>Australian Soil Classification : Grey Sodosol</b><br/><br/> <b>A1</b> Brown (7.5YR 4/2) massive sandy loam, to 0.1 m, clear change to;<br/><br/> <b>A2</b> Bleached, Brown (7.5YR 4/2) massive sandy loam, to 0.15 m, clear change to;<br/><br/> <b>B2</b> Dark grey (7.5YR 4/1) fine sandy medium clay with weak polyhedral structure, to 0.4 m.<br/><br/>           Refusal at 0.4 m, soil cemented.         </p> |  |
|  |    |  |


| Site number  | Description   | Photos   |
|--|---|--|
| <p> <b>Site ID:</b> TQM05<br/> <b>Location:</b><br/>           S26.45689° E150.07973°<br/> <b>Described by:</b> Dan Rattray<br/> <b>Date:</b> 20/07/2023<br/> <b>Geology:</b> Sedimentary<br/> <b>Landform pattern:</b> Rises<br/> <b>Element:</b> Middle of landform<br/> <b>Permeability:</b> Moderately permeable<br/> <b>Microrelief:</b> None<br/> <b>Drainage:</b> Imperfectly drained<br/> <b>Rock outcrop:</b> Nil<br/> <b>Surface coarse fragments:</b> Nil<br/> <b>Surface condition:</b> Firm<br/> <b>Disturbance:</b> Limited clearing<br/> <b>Sample site:</b> Yes         </p> | <p> <b>Australian Soil Classification : Grey Sodosol</b><br/><br/> <b>A1</b> Brown (7.5YR 4/2) massive sandy loam, to 0.1 m, clear change to;<br/><br/> <b>A2</b> Bleached, Brown (7.5YR 4/2) massive sandy loam, to 0.15 m, abrupt change to;<br/><br/> <b>B21</b> Dark grey (7.5YR 4/1) fine sandy medium heavy clay with weak polyhedral structure, to 0.5 m, clear change to;<br/><br/> <b>B22</b> Dark brown (7.5YR 3/2) massive sandy clay loam, a few medium gravel throughout, to 0.9 m.         </p> |  |
|    |   |  |

| Site number  | Description   | Photos   |
|--|---|--|
| <p> <b>Site ID:</b> TQM06<br/> <b>Location:</b><br/>           S26.45433° E150.07871°<br/> <b>Described by:</b> Dan Rattray<br/> <b>Date:</b> 20/07/2023<br/> <b>Geology:</b> Sedimentary<br/> <b>Landform pattern:</b> Rises<br/> <b>Element:</b> Middle of landform<br/> <b>Permeability:</b> Moderately permeable<br/> <b>Microrelief:</b> None<br/> <b>Drainage:</b> Imperfectly drained<br/> <b>Rock outcrop:</b> Nil<br/> <b>Surface coarse fragments:</b> Nil<br/> <b>Surface condition:</b> Firm<br/> <b>Disturbance:</b> Extensive clearing<br/> <b>Sample site:</b> Yes         </p> | <p> <b>Australian Soil Classification : Brown Sodosol</b><br/><br/> <b>A1</b> Brown (7.5YR 4/2) massive sandy loam, to 0.15 m, clear change to;<br/><br/> <b>B2</b> Dark brown (7.5YR 3/2) fine sandy medium clay with weak polyhedral structure, a few fine carbonates, to 0.9 m.         </p> |  |
|    |   |  |



| Site number   | Description  | Photos   |
|---|--|--|
| <p> <b>Site ID:</b> Rehab 1<br/> <b>Location:</b><br/>           S26.45058° E150.07088°<br/> <b>Described by:</b> Dan Rattray<br/> <b>Date:</b> 20/07/2023<br/> <b>Surface coarse fragments:</b> Common small and large gravel<br/> <b>Surface condition:</b> Hardset<br/> <b>Sample site:</b> Yes         </p> | <p> <b>0-10 cm</b> Dark brown (7.5YR 3/2) sandy clay loam, clear change<br/><br/> <b>20-30 cm</b> Brown (7.5YR 4/2) fine sandy medium clay.<br/><br/>           Refusal on rock at 30 cm.         </p> |  |
|   |  |  |

| Site number   | Description   | Photos   |
|---|---|--|
| <p> <b>Site ID:</b> Rehab 2<br/> <b>Location:</b><br/>           S26.42118° E150.04766°<br/> <b>Described by:</b> Dan Rattray<br/> <b>Date:</b> 20/07/2023<br/> <b>Surface coarse fragments:</b> Nil<br/> <b>Surface condition:</b> Hardset<br/> <b>Sample site:</b> Yes         </p> | <p> <b>0-10 cm</b> Dark brown (7.5YR 3/2) sandy loam, clear change<br/><br/> <b>20-30 cm</b> Mix of decomposing sandstone and saprolitic clays, reddish to grey<br/><br/>           Refusal on sandstone at 0.4 m.         </p> |  |
|   |   |  |

| Site number   | Description   | Photos   |
|---|---|--|
| <p> <b>Site ID:</b> Rehab 3<br/> <b>Location:</b><br/>           S26.42233° E150.04969°<br/> <b>Described by:</b> Dan Rattray<br/> <b>Date:</b> 20/07/2023<br/> <b>Surface coarse fragments:</b> Common small and large gravel<br/> <b>Surface condition:</b> Hardset<br/> <b>Sample site:</b> Yes         </p> | <p> <b>0-10 cm</b> Very dark grey (7.5YR 3/1) clay loam with common medium gravel throughout<br/><br/>           Refusal on gravel at 15 cm.         </p> |  |

## **Appendix 3: Certificate of Analysis**



## CERTIFICATE OF ANALYSIS

**Work Order** : **EB2322454**  
**Client** : **HORIZON SOIL SCIENCE AND ENGINEERING**  
**Contact** : MR DAN RATTRAY  
**Address** : CONDAMINE ALLIANCE ECOHUB 266 MARGARET STREET  
 TOOWOOMBA Toowoomba 4350  
**Telephone** : ----  
**Project** : Terraquip Warwick  
**Order number** : ----  
**C-O-C number** : ----  
**Sampler** : DAN RATTRAY  
**Site** : ----  
**Quote number** : BN/158/21 V4  
**No. of samples received** : 32  
**No. of samples analysed** : 32

**Page** : 1 of 14  
**Laboratory** : Environmental Division Brisbane  
**Contact** : Customer Services EB  
**Address** : 2 Byth Street Stafford QLD Australia 4053  
**Telephone** : +61-7-3243 7222  
**Date Samples Received** : 24-Jul-2023 09:00  
**Date Analysis Commenced** : 25-Jul-2023  
**Issue Date** : 01-Aug-2023 15:17



Accreditation No. 825  
 Accredited for compliance with  
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

**Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.**

### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories        | Position                         | Accreditation Category                      |
|--------------------|----------------------------------|---|
| Ben Felgendrejeris | Senior Acid Sulfate Soil Chemist | Brisbane Acid Sulphate Soils, Stafford, QLD |
| Ben Felgendrejeris | Senior Acid Sulfate Soil Chemist | Brisbane Inorganics, Stafford, QLD          |
| Kim McCabe         | Senior Inorganic Chemist         | Brisbane Acid Sulphate Soils, Stafford, QLD |
| Kim McCabe         | Senior Inorganic Chemist         | Brisbane Inorganics, Stafford, QLD          |
| Layla Hafner       | Acid Sulphate Soils - Chemist    | Brisbane Acid Sulphate Soils, Stafford, QLD |
| Layla Hafner       | Acid Sulphate Soils - Chemist    | Brisbane Inorganics, Stafford, QLD          |



## General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.  
LOR = Limit of reporting  
^ = This result is computed from individual analyte detections at or above the level of reporting  
∅ = ALS is not NATA accredited for these tests.  
~ = Indicates an estimated value.

- ALS is not NATA accredited for the analysis of Exchangeable Aluminium and Exchange Acidity in soils when performed under ALS Method ED005.
- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- ED006 (Exchangeable Cations on Alkaline Soils): Unable to calculate Magnesium/Potassium Ratio results for some samples as required Exchangeable Potassium results are less than the limit of reporting.
- ED007 (Exchangeable Cations): Unable to calculate Magnesium/Potassium Ratio result as required Exchangeable Potassium results are less than the limit of reporting.
- EA058 Emerson: V. = Very, D. = Dark, L. = Light, VD. = Very Dark
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H<sup>+</sup> + Al<sup>3+</sup>).



## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)                   |            |     |          | Sample ID                        | TQM_SP1-1                        | TQM_SP1-2                    | TQM_SP1-3                        | TQM-SP2-1                        | TQM-SP2-2 |
|--|------------|-----|----------|----------------------------------|----------------------------------|------------------------------|----------------------------------|----------------------------------|-----------|
| Sampling date / time                                 |            |     |          | 19-Jul-2023 00:00                | 19-Jul-2023 00:00                | 19-Jul-2023 00:00            | 19-Jul-2023 00:00                | 19-Jul-2023 00:00                |           |
| Compound   | CAS Number | LOR | Unit     | EB2322454-001                    | EB2322454-002                    | EB2322454-003                | EB2322454-004                    | EB2322454-005                    |           |
|  |            |     |          | Result                           | Result                           | Result                       | Result                           | Result                           |           |
| <b>EA002: pH 1:5 (Soils)</b>                         |            |     |          |                                  |                                  |                              |                                  |                                  |           |
| pH Value   | ----       | 0.1 | pH Unit  | 6.8                              | 7.8                              | 8.3                          | 5.6                              | 5.5                              |           |
| <b>EA010: Conductivity (1:5)</b>                     |            |     |          |                                  |                                  |                              |                                  |                                  |           |
| Electrical Conductivity @ 25°C                       | ----       | 1   | µS/cm    | 116                              | 192                              | 281                          | 12                               | 22                               |           |
| <b>EA055: Moisture Content (Dried @ 105-110°C)</b>   |            |     |          |                                  |                                  |                              |                                  |                                  |           |
| Moisture Content                                     | ----       | 0.1 | %        | 3.6                              | 3.0                              | 5.2                          | 7.9                              | 8.8                              |           |
| <b>EA058: Emerson Aggregate Test</b>                 |            |     |          |                                  |                                  |                              |                                  |                                  |           |
| Color (Munsell)                                      | ----       | -   | -        | Dark Grayish Brown<br>(10YR 4/2) | Dark Grayish Brown<br>(10YR 4/2) | Very Dark Gray (2.5Y<br>3/1) | Dark Grayish Brown<br>(2.5Y 4/2) | Dark Grayish Brown<br>(2.5Y 4/2) |           |
| Texture  | ----       | -   | -        | Silty Loam                       | Silty Loam                       | Silty Loam                   | Silty Loam                       | Silty Loam                       |           |
| Emerson Class Number                                 | EC/TC      | -   | -        | 5                                | 3                                | 3                            | 3                                | 3                                |           |
| <b>ED005: Exchange Acidity</b>                       |            |     |          |                                  |                                  |                              |                                  |                                  |           |
| ∅ Exchange Acidity                                   | ----       | 0.1 | meq/100g | ----                             | ----                             | ----                         | 0.5                              | 0.1                              |           |
| ∅ Exchangeable Aluminium                             | ----       | 0.1 | meq/100g | ----                             | ----                             | ----                         | <0.1                             | <0.1                             |           |
| <b>ED006: Exchangeable Cations on Alkaline Soils</b> |            |     |          |                                  |                                  |                              |                                  |                                  |           |
| ∅ Exchangeable Calcium                               | ----       | 0.2 | meq/100g | ----                             | 2.5                              | 2.8                          | ----                             | ----                             |           |
| ∅ Exchangeable Magnesium                             | ----       | 0.2 | meq/100g | ----                             | 2.5                              | 1.9                          | ----                             | ----                             |           |
| ∅ Exchangeable Potassium                             | ----       | 0.2 | meq/100g | ----                             | 0.2                              | 0.2                          | ----                             | ----                             |           |
| ∅ Exchangeable Sodium                                | ----       | 0.2 | meq/100g | ----                             | 1.8                              | 1.4                          | ----                             | ----                             |           |
| ∅ Cation Exchange Capacity                           | ----       | 0.2 | meq/100g | ----                             | 7.0                              | 6.3                          | ----                             | ----                             |           |
| ∅ Exchangeable Sodium Percent                        | ----       | 0.2 | %        | ----                             | 25.6                             | 22.2                         | ----                             | ----                             |           |
| ∅ Calcium/Magnesium Ratio                            | ----       | 0.2 | -        | ----                             | 1.0                              | 1.5                          | ----                             | ----                             |           |
| ∅ Magnesium/Potassium Ratio                          | ----       | 0.2 | -        | ----                             | 12.0                             | 8.6                          | ----                             | ----                             |           |
| <b>ED007: Exchangeable Cations</b>                   |            |     |          |                                  |                                  |                              |                                  |                                  |           |
| Exchangeable Calcium                                 | ----       | 0.1 | meq/100g | 2.0                              | ----                             | ----                         | 0.5                              | 0.7                              |           |
| Exchangeable Magnesium                               | ----       | 0.1 | meq/100g | 3.8                              | ----                             | ----                         | 0.6                              | 1.2                              |           |
| Exchangeable Potassium                               | ----       | 0.1 | meq/100g | 0.5                              | ----                             | ----                         | 0.7                              | 0.8                              |           |
| Exchangeable Sodium                                  | ----       | 0.1 | meq/100g | 1.8                              | ----                             | ----                         | <0.1                             | <0.1                             |           |
| Cation Exchange Capacity                             | ----       | 0.1 | meq/100g | ----                             | ----                             | ----                         | 2.3                              | 2.8                              |           |
| Cation Exchange Capacity                             | ----       | 0.1 | meq/100g | 8.1                              | ----                             | ----                         | ----                             | ----                             |           |
| Exchangeable Sodium Percent                          | ----       | 0.1 | %        | 22.1                             | ----                             | ----                         | 0.6                              | 2.2                              |           |
| Calcium/Magnesium Ratio                              | ----       | 0.1 | -        | 0.5                              | ----                             | ----                         | 0.8                              | 0.6                              |           |
| Magnesium/Potassium Ratio                            | ----       | 0.1 | -        | 8.1                              | ----                             | ----                         | 0.8                              | 1.4                              |           |
| <b>ED045G: Chloride by Discrete Analyser</b>         |            |     |          |                                  |                                  |                              |                                  |                                  |           |
| Chloride   | 16887-00-6 | 10  | mg/kg    | 80                               | 80                               | 100                          | <10                              | <10                              |           |



### Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)               |            |      |      | Sample ID         | TQM_SP1-1         | TQM_SP1-2         | TQM_SP1-3         | TQM-SP2-1         | TQM-SP2-2 |
|--|------------|------|------|-------------------|-------------------|-------------------|-------------------|-------------------|-----------|
| Sampling date / time                             |            |      |      | 19-Jul-2023 00:00 | 19-Jul-2023 00:00 | 19-Jul-2023 00:00 | 19-Jul-2023 00:00 | 19-Jul-2023 00:00 |           |
| Compound   | CAS Number | LOR  | Unit | EB2322454-001     | EB2322454-002     | EB2322454-003     | EB2322454-004     | EB2322454-005     |           |
|  |            |      |      | Result            | Result            | Result            | Result            | Result            |           |
| <b>EP003: Total Organic Carbon (TOC) in Soil</b> |            |      |      |                   |                   |                   |                   |                   |           |
| Total Organic Carbon                             | ----       | 0.02 | %    | <b>0.58</b>       | <b>0.60</b>       | <b>0.95</b>       | <b>0.53</b>       | <b>0.70</b>       |           |





## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)                   |            |     |          | Sample ID                        | TQM-SP2-3                        | Rehab1_0-10                 | Rehab1_20-30                          | Rehab2_0-10                      | Rehab2_20-30      |
|--|------------|-----|----------|----------------------------------|----------------------------------|-----------------------------|---------------------------------------|----------------------------------|-------------------|
| Sampling date / time                                 |            |     |          | 19-Jul-2023 00:00                | 20-Jul-2023 00:00                | 20-Jul-2023 00:00           | 20-Jul-2023 00:00                     | 20-Jul-2023 00:00                | 20-Jul-2023 00:00 |
| Compound   | CAS Number | LOR | Unit     | EB2322454-006                    | EB2322454-007                    | EB2322454-008               | EB2322454-009                         | EB2322454-010                    |                   |
|  |            |     |          | Result                           | Result                           | Result                      | Result                                | Result                           |                   |
| <b>EA002: pH 1:5 (Soils)</b>                         |            |     |          |                                  |                                  |                             |                                       |                                  |                   |
| pH Value   | ----       | 0.1 | pH Unit  | 5.8                              | 5.7                              | 7.2                         | 8.2                                   | 4.8                              |                   |
| <b>EA010: Conductivity (1:5)</b>                     |            |     |          |                                  |                                  |                             |                                       |                                  |                   |
| Electrical Conductivity @ 25°C                       | ----       | 1   | µS/cm    | 19                               | 210                              | 146                         | 189                                   | 1510                             |                   |
| <b>EA055: Moisture Content (Dried @ 105-110°C)</b>   |            |     |          |                                  |                                  |                             |                                       |                                  |                   |
| Moisture Content                                     | ----       | 0.1 | %        | 8.4                              | 3.8                              | 8.7                         | 9.2                                   | 18.3                             |                   |
| <b>EA058: Emerson Aggregate Test</b>                 |            |     |          |                                  |                                  |                             |                                       |                                  |                   |
| Color (Munsell)                                      | ----       | -   | -        | Dark Grayish Brown<br>(2.5Y 4/2) | Dark Grayish Brown<br>(2.5Y 4/2) | Grayish Brown<br>(10YR 5/2) | Very Dark Grayish<br>Brown (2.5Y 3/2) | Light Reddish<br>Brown (5YR 6/4) |                   |
| Texture  | ----       | -   | -        | Silty Loam                       | Sandy Loam                       | Light Medium Clay           | Sandy Loam                            | Clay Loam Sandy                  |                   |
| Emerson Class Number                                 | EC/TC      | -   | -        | 3                                | 3                                | 3                           | 3                                     | 2                                |                   |
| <b>ED005: Exchange Acidity</b>                       |            |     |          |                                  |                                  |                             |                                       |                                  |                   |
| ∅ Exchange Acidity                                   | ----       | 0.1 | meq/100g | 0.2                              | <0.1                             | ----                        | ----                                  | 1.4                              |                   |
| ∅ Exchangeable Aluminium                             | ----       | 0.1 | meq/100g | <0.1                             | <0.1                             | ----                        | ----                                  | 1.2                              |                   |
| <b>ED006: Exchangeable Cations on Alkaline Soils</b> |            |     |          |                                  |                                  |                             |                                       |                                  |                   |
| ∅ Exchangeable Calcium                               | ----       | 0.2 | meq/100g | ----                             | ----                             | ----                        | 2.4                                   | ----                             |                   |
| ∅ Exchangeable Magnesium                             | ----       | 0.2 | meq/100g | ----                             | ----                             | ----                        | 1.0                                   | ----                             |                   |
| ∅ Exchangeable Potassium                             | ----       | 0.2 | meq/100g | ----                             | ----                             | ----                        | 0.5                                   | ----                             |                   |
| ∅ Exchangeable Sodium                                | ----       | 0.2 | meq/100g | ----                             | ----                             | ----                        | 0.3                                   | ----                             |                   |
| ∅ Cation Exchange Capacity                           | ----       | 0.2 | meq/100g | ----                             | ----                             | ----                        | 4.2                                   | ----                             |                   |
| ∅ Exchangeable Sodium Percent                        | ----       | 0.2 | %        | ----                             | ----                             | ----                        | 6.9                                   | ----                             |                   |
| ∅ Calcium/Magnesium Ratio                            | ----       | 0.2 | -        | ----                             | ----                             | ----                        | 2.5                                   | ----                             |                   |
| ∅ Magnesium/Potassium Ratio                          | ----       | 0.2 | -        | ----                             | ----                             | ----                        | 1.9                                   | ----                             |                   |
| <b>ED007: Exchangeable Cations</b>                   |            |     |          |                                  |                                  |                             |                                       |                                  |                   |
| Exchangeable Calcium                                 | ----       | 0.1 | meq/100g | 0.7                              | 1.6                              | 1.7                         | ----                                  | ----                             |                   |
| Exchangeable Magnesium                               | ----       | 0.1 | meq/100g | 0.9                              | 3.8                              | 6.9                         | ----                                  | ----                             |                   |
| Exchangeable Potassium                               | ----       | 0.1 | meq/100g | 0.8                              | 0.3                              | 0.4                         | ----                                  | ----                             |                   |
| Exchangeable Sodium                                  | ----       | 0.1 | meq/100g | <0.1                             | 2.9                              | 6.0                         | ----                                  | ----                             |                   |
| Cation Exchange Capacity                             | ----       | 0.1 | meq/100g | 2.6                              | 8.6                              | ----                        | ----                                  | ----                             |                   |
| Cation Exchange Capacity                             | ----       | 0.1 | meq/100g | ----                             | ----                             | 15.1                        | ----                                  | ----                             |                   |
| Exchangeable Sodium Percent                          | ----       | 0.1 | %        | 0.6                              | 33.9                             | 40.2                        | ----                                  | ----                             |                   |
| Calcium/Magnesium Ratio                              | ----       | 0.1 | -        | 0.8                              | 0.4                              | 0.2                         | ----                                  | ----                             |                   |
| Magnesium/Potassium Ratio                            | ----       | 0.1 | -        | 1.1                              | 14.5                             | 16.6                        | ----                                  | ----                             |                   |
| <b>ED008: Exchangeable Cations</b>                   |            |     |          |                                  |                                  |                             |                                       |                                  |                   |
| Exchangeable Calcium                                 | ----       | 0.1 | meq/100g | ----                             | ----                             | ----                        | ----                                  | 4.3                              |                   |



## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)               |            |      |          | Sample ID | TQM-SP2-3         | Rehab1 _0-10      | Rehab1 _20-30     | Rehab2 _0-10      | Rehab2 _20-30     |
|--|------------|------|----------|-----------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Sampling date / time                             |            |      |          |           | 19-Jul-2023 00:00 | 20-Jul-2023 00:00 | 20-Jul-2023 00:00 | 20-Jul-2023 00:00 | 20-Jul-2023 00:00 |
| Compound   | CAS Number | LOR  | Unit     |           | EB2322454-006     | EB2322454-007     | EB2322454-008     | EB2322454-009     | EB2322454-010     |
|  |            |      |          |           | Result            | Result            | Result            | Result            | Result            |
| <b>ED008: Exchangeable Cations - Continued</b>   |            |      |          |           |                   |                   |                   |                   |                   |
| Exchangeable Magnesium                           | ----       | 0.1  | meq/100g | ----      | ----              | ----              | ----              | ----              | 4.7               |
| Exchangeable Potassium                           | ----       | 0.1  | meq/100g | ----      | ----              | ----              | ----              | ----              | 1.2               |
| Exchangeable Sodium                              | ----       | 0.1  | meq/100g | ----      | ----              | ----              | ----              | ----              | 2.6               |
| Cation Exchange Capacity                         | ----       | 0.1  | meq/100g | ----      | ----              | ----              | ----              | ----              | 14.2              |
| Exchangeable Sodium Percent                      | ----       | 0.1  | %        | ----      | ----              | ----              | ----              | ----              | 20.3              |
| Calcium/Magnesium Ratio                          | ----       | 0.1  | -        | ----      | ----              | ----              | ----              | ----              | 0.9               |
| Magnesium/Potassium Ratio                        | ----       | 0.1  | -        | ----      | ----              | ----              | ----              | ----              | 3.9               |
| <b>ED045G: Chloride by Discrete Analyser</b>     |            |      |          |           |                   |                   |                   |                   |                   |
| Chloride   | 16887-00-6 | 10   | mg/kg    | <10       | 80                | 60                | 140               | 1330              |                   |
| <b>EP003: Total Organic Carbon (TOC) in Soil</b> |            |      |          |           |                   |                   |                   |                   |                   |
| Total Organic Carbon                             | ----       | 0.02 | %        | 0.82      | 0.25              | 0.28              | 1.40              | 0.60              |                   |



## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)                   |            |     |          | Sample ID                          | TQM_Rehab3_0-10      | TQM1_0-10         | TQM1_20-30               | TQM1_30-40                    | TQM2_0-10 |
|--|------------|-----|----------|------------------------------------|----------------------|-------------------|--------------------------|-------------------------------|-----------|
| Sampling date / time                                 |            |     |          | 20-Jul-2023 00:00                  | 20-Jul-2023 00:00    | 20-Jul-2023 00:00 | 20-Jul-2023 00:00        | 20-Jul-2023 00:00             |           |
| Compound   | CAS Number | LOR | Unit     | EB2322454-011                      | EB2322454-012        | EB2322454-013     | EB2322454-014            | EB2322454-015                 |           |
|  |            |     |          | Result                             | Result               | Result            | Result                   | Result                        |           |
| <b>EA002: pH 1:5 (Soils)</b>                         |            |     |          |                                    |                      |                   |                          |                               |           |
| pH Value   | ----       | 0.1 | pH Unit  | 8.0                                | 5.5                  | 6.1               | 6.0                      | 5.6                           |           |
| <b>EA010: Conductivity (1:5)</b>                     |            |     |          |                                    |                      |                   |                          |                               |           |
| Electrical Conductivity @ 25°C                       | ----       | 1   | µS/cm    | 104                                | 3                    | 4                 | 23                       | 13                            |           |
| <b>EA055: Moisture Content (Dried @ 105-110°C)</b>   |            |     |          |                                    |                      |                   |                          |                               |           |
| Moisture Content                                     | ----       | 0.1 | %        | 11.5                               | 3.6                  | 3.8               | 6.2                      | 2.7                           |           |
| <b>EA058: Emerson Aggregate Test</b>                 |            |     |          |                                    |                      |                   |                          |                               |           |
| Color (Munsell)                                      | ----       | -   | -        | Very Dark Grayish Brown (2.5Y 3/2) | Dark Gray (10YR 4/1) | Gray (7.5YR 5/1)  | Grayish Brown (10YR 5/2) | Dark Grayish Brown (10YR 4/2) |           |
| Texture  | ----       | -   | -        | Sandy Loam                         | Silty Clay Loam      | Silty Loam        | Sandy Loam               | Silty Clay Loam               |           |
| Emerson Class Number                                 | EC/TC      | -   | -        | 3                                  | 7                    | 2                 | 2                        | 3                             |           |
| <b>ED005: Exchange Acidity</b>                       |            |     |          |                                    |                      |                   |                          |                               |           |
| ∅ Exchange Acidity                                   | ----       | 0.1 | meq/100g | ----                               | 1.1                  | ----              | 0.7                      | 1.1                           |           |
| ∅ Exchangeable Aluminium                             | ----       | 0.1 | meq/100g | ----                               | <0.1                 | ----              | <0.1                     | <0.1                          |           |
| <b>ED006: Exchangeable Cations on Alkaline Soils</b> |            |     |          |                                    |                      |                   |                          |                               |           |
| ∅ Exchangeable Calcium                               | ----       | 0.2 | meq/100g | 7.5                                | ----                 | ----              | ----                     | ----                          |           |
| ∅ Exchangeable Magnesium                             | ----       | 0.2 | meq/100g | 2.8                                | ----                 | ----              | ----                     | ----                          |           |
| ∅ Exchangeable Potassium                             | ----       | 0.2 | meq/100g | 0.6                                | ----                 | ----              | ----                     | ----                          |           |
| ∅ Exchangeable Sodium                                | ----       | 0.2 | meq/100g | <0.2                               | ----                 | ----              | ----                     | ----                          |           |
| ∅ Cation Exchange Capacity                           | ----       | 0.2 | meq/100g | 10.9                               | ----                 | ----              | ----                     | ----                          |           |
| ∅ Exchangeable Sodium Percent                        | ----       | 0.2 | %        | <0.2                               | ----                 | ----              | ----                     | ----                          |           |
| ∅ Calcium/Magnesium Ratio                            | ----       | 0.2 | -        | 2.7                                | ----                 | ----              | ----                     | ----                          |           |
| ∅ Magnesium/Potassium Ratio                          | ----       | 0.2 | -        | 4.6                                | ----                 | ----              | ----                     | ----                          |           |
| <b>ED007: Exchangeable Cations</b>                   |            |     |          |                                    |                      |                   |                          |                               |           |
| Exchangeable Calcium                                 | ----       | 0.1 | meq/100g | ----                               | 0.2                  | <0.1              | 0.2                      | 0.4                           |           |
| Exchangeable Magnesium                               | ----       | 0.1 | meq/100g | ----                               | 0.4                  | 0.6               | 1.3                      | 1.2                           |           |
| Exchangeable Potassium                               | ----       | 0.1 | meq/100g | ----                               | 0.2                  | <0.1              | 0.1                      | 0.6                           |           |
| Exchangeable Sodium                                  | ----       | 0.1 | meq/100g | ----                               | <0.1                 | 0.1               | 0.4                      | 0.2                           |           |
| Cation Exchange Capacity                             | ----       | 0.1 | meq/100g | ----                               | 1.9                  | ----              | 2.7                      | 3.5                           |           |
| Cation Exchange Capacity                             | ----       | 0.1 | meq/100g | ----                               | ----                 | 1.0               | ----                     | ----                          |           |
| Exchangeable Sodium Percent                          | ----       | 0.1 | %        | ----                               | 4.0                  | 13.8              | 20.3                     | 8.4                           |           |
| Calcium/Magnesium Ratio                              | ----       | 0.1 | -        | ----                               | 0.5                  | <0.1              | 0.2                      | 0.3                           |           |
| Magnesium/Potassium Ratio                            | ----       | 0.1 | -        | ----                               | 1.9                  | ----              | 9.5                      | 1.9                           |           |
| <b>ED045G: Chloride by Discrete Analyser</b>         |            |     |          |                                    |                      |                   |                          |                               |           |
| Chloride   | 16887-00-6 | 10  | mg/kg    | <10                                | <10                  | <10               | <10                      | <10                           |           |



### Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)               |            |      |      | Sample ID         | TQM_Rehab3_0-10   | TQM1_0-10         | TQM1_20-30        | TQM1_30-40        | TQM2_0-10 |
|--|------------|------|------|-------------------|-------------------|-------------------|-------------------|-------------------|-----------|
| Sampling date / time                             |            |      |      | 20-Jul-2023 00:00 | 20-Jul-2023 00:00 | 20-Jul-2023 00:00 | 20-Jul-2023 00:00 | 20-Jul-2023 00:00 |           |
| Compound   | CAS Number | LOR  | Unit | EB2322454-011     | EB2322454-012     | EB2322454-013     | EB2322454-014     | EB2322454-015     |           |
|  |            |      |      | Result            | Result            | Result            | Result            | Result            |           |
| <b>EP003: Total Organic Carbon (TOC) in Soil</b> |            |      |      |                   |                   |                   |                   |                   |           |
| Total Organic Carbon                             | ----       | 0.02 | %    | <b>2.66</b>       | <b>0.56</b>       | <b>0.66</b>       | <b>0.43</b>       | <b>1.18</b>       |           |



## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)                 |            |      |          | Sample ID                | TQM2_20-30               | TQM2_30-40                         | TQM3_0-10                | TQM3_20-30           | TQM3_50-60 |
|--|------------|------|----------|--------------------------|--------------------------|------------------------------------|--------------------------|----------------------|------------|
| Sampling date / time                               |            |      |          | 20-Jul-2023 00:00        | 20-Jul-2023 00:00        | 20-Jul-2023 00:00                  | 20-Jul-2023 00:00        | 20-Jul-2023 00:00    |            |
| Compound   | CAS Number | LOR  | Unit     | EB2322454-016            | EB2322454-017            | EB2322454-018                      | EB2322454-019            | EB2322454-020        |            |
|  |            |      |          | Result                   | Result                   | Result                             | Result                   | Result               |            |
| <b>EA002: pH 1:5 (Soils)</b>                       |            |      |          |                          |                          |                                    |                          |                      |            |
| pH Value   | ----       | 0.1  | pH Unit  | 5.6                      | 5.6                      | 6.1                                | 6.8                      | 6.9                  |            |
| <b>EA010: Conductivity (1:5)</b>                   |            |      |          |                          |                          |                                    |                          |                      |            |
| Electrical Conductivity @ 25°C                     | ----       | 1    | µS/cm    | 28                       | 55                       | 11                                 | 49                       | 121                  |            |
| <b>EA055: Moisture Content (Dried @ 105-110°C)</b> |            |      |          |                          |                          |                                    |                          |                      |            |
| Moisture Content                                   | ----       | 0.1  | %        | 3.0                      | 3.3                      | 4.1                                | 3.8                      | 8.4                  |            |
| <b>EA058: Emerson Aggregate Test</b>               |            |      |          |                          |                          |                                    |                          |                      |            |
| Color (Munsell)                                    | ----       | -    | -        | Grayish Brown (10YR 5/2) | Grayish Brown (10YR 5/2) | Very Dark Grayish Brown (10YR 3/2) | Grayish Brown (10YR 5/2) | Dark Gray (10YR 4/1) |            |
| Texture  | ----       | -    | -        | Silty Clay Loam          | Silty Clay Loam          | Sandy Loam                         | Silty Loam               | Silty Clay Loam      |            |
| Emerson Class Number                               | EC/TC      | -    | -        | 2                        | 2                        | 3                                  | 1                        | 1                    |            |
| <b>ED005: Exchange Acidity</b>                     |            |      |          |                          |                          |                                    |                          |                      |            |
| ∅ Exchange Acidity                                 | ----       | 0.1  | meq/100g | 0.8                      | 0.6                      | ----                               | ----                     | ----                 |            |
| ∅ Exchangeable Aluminium                           | ----       | 0.1  | meq/100g | <0.1                     | <0.1                     | ----                               | ----                     | ----                 |            |
| <b>ED007: Exchangeable Cations</b>                 |            |      |          |                          |                          |                                    |                          |                      |            |
| Exchangeable Calcium                               | ----       | 0.1  | meq/100g | <0.1                     | 0.1                      | 0.5                                | 0.2                      | 0.2                  |            |
| Exchangeable Magnesium                             | ----       | 0.1  | meq/100g | 1.0                      | 1.1                      | 1.4                                | 3.5                      | 7.5                  |            |
| Exchangeable Potassium                             | ----       | 0.1  | meq/100g | 0.4                      | 0.4                      | 0.1                                | 0.1                      | 0.3                  |            |
| Exchangeable Sodium                                | ----       | 0.1  | meq/100g | 0.3                      | 0.6                      | 0.6                                | 1.8                      | 3.3                  |            |
| Cation Exchange Capacity                           | ----       | 0.1  | meq/100g | 2.5                      | 2.8                      | ----                               | ----                     | ----                 |            |
| Cation Exchange Capacity                           | ----       | 0.1  | meq/100g | ----                     | ----                     | 2.6                                | 5.6                      | 11.4                 |            |
| Exchangeable Sodium Percent                        | ----       | 0.1  | %        | 18.0                     | 26.8                     | 22.0                               | 31.4                     | 29.4                 |            |
| Calcium/Magnesium Ratio                            | ----       | 0.1  | -        | <0.1                     | <0.1                     | 0.4                                | <0.1                     | <0.1                 |            |
| Magnesium/Potassium Ratio                          | ----       | 0.1  | -        | 2.2                      | 2.5                      | 10.8                               | 29.8                     | 27.5                 |            |
| <b>ED045G: Chloride by Discrete Analyser</b>       |            |      |          |                          |                          |                                    |                          |                      |            |
| Chloride   | 16887-00-6 | 10   | mg/kg    | 30                       | 60                       | 10                                 | 30                       | 60                   |            |
| <b>EP003: Total Organic Carbon (TOC) in Soil</b>   |            |      |          |                          |                          |                                    |                          |                      |            |
| Total Organic Carbon                               | ----       | 0.02 | %        | 0.41                     | 0.47                     | 0.98                               | 0.26                     | 0.35                 |            |



## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)                   |            |     |          | Sample ID                | TQM3_80-90               | TQM4_0-10            | TQM4_20-30           | TQM4_30-40                    | TQM5_0-10 |
|--|------------|-----|----------|--------------------------|--------------------------|----------------------|----------------------|-------------------------------|-----------|
| Sampling date / time                                 |            |     |          | 20-Jul-2023 00:00        | 20-Jul-2023 00:00        | 20-Jul-2023 00:00    | 20-Jul-2023 00:00    | 20-Jul-2023 00:00             |           |
| Compound   | CAS Number | LOR | Unit     | EB2322454-021            | EB2322454-022            | EB2322454-023        | EB2322454-024        | EB2322454-025                 |           |
|  |            |     |          | Result                   | Result                   | Result               | Result               | Result                        |           |
| <b>EA002: pH 1:5 (Soils)</b>                         |            |     |          |                          |                          |                      |                      |                               |           |
| pH Value   | ----       | 0.1 | pH Unit  | 6.6                      | 6.0                      | 6.9                  | 7.5                  | 6.0                           |           |
| <b>EA010: Conductivity (1:5)</b>                     |            |     |          |                          |                          |                      |                      |                               |           |
| Electrical Conductivity @ 25°C                       | ----       | 1   | µS/cm    | 131                      | 56                       | 346                  | 469                  | 11                            |           |
| <b>EA055: Moisture Content (Dried @ 105-110°C)</b>   |            |     |          |                          |                          |                      |                      |                               |           |
| Moisture Content                                     | ----       | 0.1 | %        | 9.2                      | 4.0                      | 9.9                  | 11.1                 | 1.6                           |           |
| <b>EA058: Emerson Aggregate Test</b>                 |            |     |          |                          |                          |                      |                      |                               |           |
| Color (Munsell)                                      | ----       | -   | -        | Grayish Brown (10YR 5/2) | Grayish Brown (10YR 5/2) | Dark Gray (10YR 4/1) | Dark Gray (10YR 4/1) | Dark Grayish Brown (10YR 4/2) |           |
| Texture  | ----       | -   | -        | Silty Clay Loam          | Silty Loam               | Light Clay           | Clay Loam Sandy      | Sandy Loam                    |           |
| Emerson Class Number                                 | EC/TC      | -   | -        | 1                        | 2                        | 1                    | 2                    | 2                             |           |
| <b>ED005: Exchange Acidity</b>                       |            |     |          |                          |                          |                      |                      |                               |           |
| ∅ Exchange Acidity                                   | ----       | 0.1 | meq/100g | ----                     | 0.4                      | ----                 | ----                 | 0.1                           |           |
| ∅ Exchangeable Aluminium                             | ----       | 0.1 | meq/100g | ----                     | <0.1                     | ----                 | ----                 | <0.1                          |           |
| <b>ED006: Exchangeable Cations on Alkaline Soils</b> |            |     |          |                          |                          |                      |                      |                               |           |
| ∅ Exchangeable Calcium                               | ----       | 0.2 | meq/100g | ----                     | ----                     | ----                 | 0.8                  | ----                          |           |
| ∅ Exchangeable Magnesium                             | ----       | 0.2 | meq/100g | ----                     | ----                     | ----                 | 3.7                  | ----                          |           |
| ∅ Exchangeable Potassium                             | ----       | 0.2 | meq/100g | ----                     | ----                     | ----                 | <0.2                 | ----                          |           |
| ∅ Exchangeable Sodium                                | ----       | 0.2 | meq/100g | ----                     | ----                     | ----                 | 4.9                  | ----                          |           |
| ∅ Cation Exchange Capacity                           | ----       | 0.2 | meq/100g | ----                     | ----                     | ----                 | 9.6                  | ----                          |           |
| ∅ Exchangeable Sodium Percent                        | ----       | 0.2 | %        | ----                     | ----                     | ----                 | 51.4                 | ----                          |           |
| ∅ Calcium/Magnesium Ratio                            | ----       | 0.2 | -        | ----                     | ----                     | ----                 | 0.2                  | ----                          |           |
| <b>ED007: Exchangeable Cations</b>                   |            |     |          |                          |                          |                      |                      |                               |           |
| Exchangeable Calcium                                 | ----       | 0.1 | meq/100g | 0.2                      | 0.5                      | ----                 | ----                 | 0.6                           |           |
| Exchangeable Magnesium                               | ----       | 0.1 | meq/100g | 8.0                      | 0.8                      | ----                 | ----                 | 0.7                           |           |
| Exchangeable Potassium                               | ----       | 0.1 | meq/100g | 0.3                      | 0.6                      | ----                 | ----                 | 0.2                           |           |
| Exchangeable Sodium                                  | ----       | 0.1 | meq/100g | 3.5                      | 0.9                      | ----                 | ----                 | 0.2                           |           |
| Cation Exchange Capacity                             | ----       | 0.1 | meq/100g | ----                     | 3.2                      | ----                 | ----                 | 1.8                           |           |
| Cation Exchange Capacity                             | ----       | 0.1 | meq/100g | 12.0                     | ----                     | ----                 | ----                 | ----                          |           |
| Exchangeable Sodium Percent                          | ----       | 0.1 | %        | 29.6                     | 32.9                     | ----                 | ----                 | 9.1                           |           |
| Calcium/Magnesium Ratio                              | ----       | 0.1 | -        | <0.1                     | 0.6                      | ----                 | ----                 | 0.8                           |           |
| Magnesium/Potassium Ratio                            | ----       | 0.1 | -        | 27.3                     | 1.2                      | ----                 | ----                 | 2.7                           |           |
| <b>ED008: Exchangeable Cations</b>                   |            |     |          |                          |                          |                      |                      |                               |           |
| Exchangeable Calcium                                 | ----       | 0.1 | meq/100g | ----                     | ----                     | 0.9                  | ----                 | ----                          |           |
| Exchangeable Magnesium                               | ----       | 0.1 | meq/100g | ----                     | ----                     | 3.9                  | ----                 | ----                          |           |



## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)               |            |      |          | Sample ID         | TQM3_80-90        | TQM4_0-10         | TQM4_20-30        | TQM4_30-40        | TQM5_0-10         |
|--|------------|------|----------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Sampling date / time                             |            |      |          | 20-Jul-2023 00:00 | 20-Jul-2023 00:00 | 20-Jul-2023 00:00 | 20-Jul-2023 00:00 | 20-Jul-2023 00:00 | 20-Jul-2023 00:00 |
| Compound   | CAS Number | LOR  | Unit     | EB2322454-021     | EB2322454-022     | EB2322454-023     | EB2322454-024     | EB2322454-025     |                   |
|  |            |      |          | Result            | Result            | Result            | Result            | Result            |                   |
| <b>ED008: Exchangeable Cations - Continued</b>   |            |      |          |                   |                   |                   |                   |                   |                   |
| Exchangeable Potassium                           | ----       | 0.1  | meq/100g | ----              | ----              | <b>0.2</b>        | ----              | ----              |                   |
| Exchangeable Sodium                              | ----       | 0.1  | meq/100g | ----              | ----              | <b>2.9</b>        | ----              | ----              |                   |
| Cation Exchange Capacity                         | ----       | 0.1  | meq/100g | ----              | ----              | <b>8.0</b>        | ----              | ----              |                   |
| Exchangeable Sodium Percent                      | ----       | 0.1  | %        | ----              | ----              | <b>36.4</b>       | ----              | ----              |                   |
| Calcium/Magnesium Ratio                          | ----       | 0.1  | -        | ----              | ----              | <b>0.2</b>        | ----              | ----              |                   |
| Magnesium/Potassium Ratio                        | ----       | 0.1  | -        | ----              | ----              | <b>23.4</b>       | ----              | ----              |                   |
| <b>ED045G: Chloride by Discrete Analyser</b>     |            |      |          |                   |                   |                   |                   |                   |                   |
| Chloride   | 16887-00-6 | 10   | mg/kg    | <b>70</b>         | <b>70</b>         | <b>430</b>        | <b>670</b>        | <10               |                   |
| <b>EP003: Total Organic Carbon (TOC) in Soil</b> |            |      |          |                   |                   |                   |                   |                   |                   |
| Total Organic Carbon                             | ----       | 0.02 | %        | <b>0.26</b>       | <b>0.78</b>       | <b>0.45</b>       | <b>0.37</b>       | <b>0.98</b>       |                   |



## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)                   |            |     |          | Sample ID                   | TQM5_20-30              | TQM5_50-60                           | TQM5_80-90                           | TQM6_0-10                            | TQM6_20-30 |
|--|------------|-----|----------|-----------------------------|-------------------------|--------------------------------------|--------------------------------------|--------------------------------------|------------|
| Sampling date / time                                 |            |     |          | 20-Jul-2023 00:00           | 20-Jul-2023 00:00       | 20-Jul-2023 00:00                    | 20-Jul-2023 00:00                    | 20-Jul-2023 00:00                    |            |
| Compound   | CAS Number | LOR | Unit     | EB2322454-026               | EB2322454-027           | EB2322454-028                        | EB2322454-029                        | EB2322454-030                        |            |
|  |            |     |          | Result                      | Result                  | Result                               | Result                               | Result                               |            |
| <b>EA002: pH 1:5 (Soils)</b>                         |            |     |          |                             |                         |                                      |                                      |                                      |            |
| pH Value   | ----       | 0.1 | pH Unit  | <b>6.9</b>                  | <b>7.5</b>              | <b>7.8</b>                           | <b>6.0</b>                           | <b>7.2</b>                           |            |
| <b>EA010: Conductivity (1:5)</b>                     |            |     |          |                             |                         |                                      |                                      |                                      |            |
| Electrical Conductivity @ 25°C                       | ----       | 1   | µS/cm    | <b>364</b>                  | <b>254</b>              | <b>223</b>                           | <b>26</b>                            | <b>165</b>                           |            |
| <b>EA055: Moisture Content (Dried @ 105-110°C)</b>   |            |     |          |                             |                         |                                      |                                      |                                      |            |
| Moisture Content                                     | ----       | 0.1 | %        | <b>9.1</b>                  | <b>6.8</b>              | <b>5.3</b>                           | <b>2.2</b>                           | <b>6.3</b>                           |            |
| <b>EA058: Emerson Aggregate Test</b>                 |            |     |          |                             |                         |                                      |                                      |                                      |            |
| Color (Munsell)                                      | ----       | -   | -        | <b>Dark Gray (10YR 4/1)</b> | <b>Gray (7.5YR 5/1)</b> | <b>Dark Grayish Brown (10YR 4/2)</b> | <b>Dark Grayish Brown (10YR 4/2)</b> | <b>Dark Grayish Brown (10YR 4/2)</b> |            |
| Texture  | ----       | -   | -        | <b>Light Medium Clay</b>    | <b>Silty Clay Loam</b>  | <b>Light Clay</b>                    | <b>Silty Loam</b>                    | <b>Silty Clay Loam</b>               |            |
| Emerson Class Number                                 | EC/TC      | -   | -        | <b>1</b>                    | <b>2</b>                | <b>2</b>                             | <b>2</b>                             | <b>1</b>                             |            |
| <b>ED005: Exchange Acidity</b>                       |            |     |          |                             |                         |                                      |                                      |                                      |            |
| ∅ Exchange Acidity                                   | ----       | 0.1 | meq/100g | ----                        | ----                    | ----                                 | <b>0.4</b>                           | ----                                 |            |
| ∅ Exchangeable Aluminium                             | ----       | 0.1 | meq/100g | ----                        | ----                    | ----                                 | <b>&lt;0.1</b>                       | ----                                 |            |
| <b>ED006: Exchangeable Cations on Alkaline Soils</b> |            |     |          |                             |                         |                                      |                                      |                                      |            |
| ∅ Exchangeable Calcium                               | ----       | 0.2 | meq/100g | ----                        | <b>&lt;0.2</b>          | <b>&lt;0.2</b>                       | ----                                 | ----                                 |            |
| ∅ Exchangeable Magnesium                             | ----       | 0.2 | meq/100g | ----                        | <b>3.2</b>              | <b>3.2</b>                           | ----                                 | ----                                 |            |
| ∅ Exchangeable Potassium                             | ----       | 0.2 | meq/100g | ----                        | <b>0.4</b>              | <b>0.3</b>                           | ----                                 | ----                                 |            |
| ∅ Exchangeable Sodium                                | ----       | 0.2 | meq/100g | ----                        | <b>2.7</b>              | <b>2.6</b>                           | ----                                 | ----                                 |            |
| ∅ Cation Exchange Capacity                           | ----       | 0.2 | meq/100g | ----                        | <b>6.3</b>              | <b>6.1</b>                           | ----                                 | ----                                 |            |
| ∅ Exchangeable Sodium Percent                        | ----       | 0.2 | %        | ----                        | <b>43.1</b>             | <b>43.2</b>                          | ----                                 | ----                                 |            |
| ∅ Calcium/Magnesium Ratio                            | ----       | 0.2 | -        | ----                        | <b>&lt;0.2</b>          | <b>&lt;0.2</b>                       | ----                                 | ----                                 |            |
| ∅ Magnesium/Potassium Ratio                          | ----       | 0.2 | -        | ----                        | <b>9.2</b>              | <b>10.9</b>                          | ----                                 | ----                                 |            |
| <b>ED007: Exchangeable Cations</b>                   |            |     |          |                             |                         |                                      |                                      |                                      |            |
| Exchangeable Calcium                                 | ----       | 0.1 | meq/100g | ----                        | ----                    | ----                                 | <b>0.8</b>                           | <b>0.9</b>                           |            |
| Exchangeable Magnesium                               | ----       | 0.1 | meq/100g | ----                        | ----                    | ----                                 | <b>1.3</b>                           | <b>6.0</b>                           |            |
| Exchangeable Potassium                               | ----       | 0.1 | meq/100g | ----                        | ----                    | ----                                 | <b>0.3</b>                           | <b>0.1</b>                           |            |
| Exchangeable Sodium                                  | ----       | 0.1 | meq/100g | ----                        | ----                    | ----                                 | <b>0.6</b>                           | <b>3.0</b>                           |            |
| Cation Exchange Capacity                             | ----       | 0.1 | meq/100g | ----                        | ----                    | ----                                 | <b>3.4</b>                           | ----                                 |            |
| Cation Exchange Capacity                             | ----       | 0.1 | meq/100g | ----                        | ----                    | ----                                 | ----                                 | <b>10.2</b>                          |            |
| Exchangeable Sodium Percent                          | ----       | 0.1 | %        | ----                        | ----                    | ----                                 | <b>20.6</b>                          | <b>29.5</b>                          |            |
| Calcium/Magnesium Ratio                              | ----       | 0.1 | -        | ----                        | ----                    | ----                                 | <b>0.6</b>                           | <b>0.2</b>                           |            |
| Magnesium/Potassium Ratio                            | ----       | 0.1 | -        | ----                        | ----                    | ----                                 | <b>4.6</b>                           | <b>48.8</b>                          |            |
| <b>ED008: Exchangeable Cations</b>                   |            |     |          |                             |                         |                                      |                                      |                                      |            |
| Exchangeable Calcium                                 | ----       | 0.1 | meq/100g | <b>&lt;0.1</b>              | ----                    | ----                                 | ----                                 | ----                                 |            |





## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)               |            |      |          | Sample ID         | TQM5_20-30        | TQM5_50-60        | TQM5_80-90        | TQM6_0-10         | TQM6_20-30 |
|--|------------|------|----------|-------------------|-------------------|-------------------|-------------------|-------------------|------------|
| Sampling date / time                             |            |      |          | 20-Jul-2023 00:00 | 20-Jul-2023 00:00 | 20-Jul-2023 00:00 | 20-Jul-2023 00:00 | 20-Jul-2023 00:00 |            |
| Compound   | CAS Number | LOR  | Unit     | EB2322454-026     | EB2322454-027     | EB2322454-028     | EB2322454-029     | EB2322454-030     |            |
|  |            |      |          | Result            | Result            | Result            | Result            | Result            |            |
| <b>ED008: Exchangeable Cations - Continued</b>   |            |      |          |                   |                   |                   |                   |                   |            |
| Exchangeable Magnesium                           | ----       | 0.1  | meq/100g | 1.7               | ----              | ----              | ----              | ----              |            |
| Exchangeable Potassium                           | ----       | 0.1  | meq/100g | 0.2               | ----              | ----              | ----              | ----              |            |
| Exchangeable Sodium                              | ----       | 0.1  | meq/100g | 0.9               | ----              | ----              | ----              | ----              |            |
| Cation Exchange Capacity                         | ----       | 0.1  | meq/100g | 3.0               | ----              | ----              | ----              | ----              |            |
| Exchangeable Sodium Percent                      | ----       | 0.1  | %        | 30.4              | ----              | ----              | ----              | ----              |            |
| Calcium/Magnesium Ratio                          | ----       | 0.1  | -        | <0.1              | ----              | ----              | ----              | ----              |            |
| Magnesium/Potassium Ratio                        | ----       | 0.1  | -        | 8.8               | ----              | ----              | ----              | ----              |            |
| <b>ED045G: Chloride by Discrete Analyser</b>     |            |      |          |                   |                   |                   |                   |                   |            |
| Chloride   | 16887-00-6 | 10   | mg/kg    | 420               | 320               | 280               | 10                | 50                |            |
| <b>EP003: Total Organic Carbon (TOC) in Soil</b> |            |      |          |                   |                   |                   |                   |                   |            |
| Total Organic Carbon                             | ----       | 0.02 | %        | 0.54              | 0.29              | 0.20              | 0.96              | 0.40              |            |



## Analytical Results

| Sub-Matrix: SOIL<br>(Matrix: SOIL)                 |            |      |          | Sample ID               | TQM6_50-60              | TQM6_80-90 | ----  | ----  | ---- |
|--|------------|------|----------|-------------------------|-------------------------|------------|-------|-------|------|
| Sampling date / time                               |            |      |          | 20-Jul-2023 00:00       | 20-Jul-2023 00:00       | ----       | ----  | ----  |      |
| Compound   | CAS Number | LOR  | Unit     | EB2322454-031           | EB2322454-032           | -----      | ----- | ----- |      |
|  |            |      |          | Result                  | Result                  | ----       | ----  | ----  |      |
| <b>EA002: pH 1:5 (Soils)</b>                       |            |      |          |                         |                         |            |       |       |      |
| pH Value   | ----       | 0.1  | pH Unit  | <b>6.2</b>              | <b>5.7</b>              | ----       | ----  | ----  |      |
| <b>EA010: Conductivity (1:5)</b>                   |            |      |          |                         |                         |            |       |       |      |
| Electrical Conductivity @ 25°C                     | ----       | 1    | µS/cm    | <b>151</b>              | <b>159</b>              | ----       | ----  | ----  |      |
| <b>EA055: Moisture Content (Dried @ 105-110°C)</b> |            |      |          |                         |                         |            |       |       |      |
| Moisture Content                                   | ----       | 0.1  | %        | <b>8.2</b>              | <b>8.6</b>              | ----       | ----  | ----  |      |
| <b>EA058: Emerson Aggregate Test</b>               |            |      |          |                         |                         |            |       |       |      |
| Color (Munsell)                                    | ----       | -    | -        | <b>Gray (7.5YR 5/1)</b> | <b>Gray (7.5YR 5/1)</b> | ----       | ----  | ----  |      |
| Texture  | ----       | -    | -        | <b>Silty Clay Loam</b>  | <b>Medium Clay</b>      | ----       | ----  | ----  |      |
| Emerson Class Number                               | EC/TC      | -    | -        | <b>1</b>                | <b>1</b>                | ----       | ----  | ----  |      |
| <b>ED005: Exchange Acidity</b>                     |            |      |          |                         |                         |            |       |       |      |
| ∅ Exchange Acidity                                 | ----       | 0.1  | meq/100g | ----                    | <b>0.2</b>              | ----       | ----  | ----  |      |
| ∅ Exchangeable Aluminium                           | ----       | 0.1  | meq/100g | ----                    | <b>&lt;0.1</b>          | ----       | ----  | ----  |      |
| <b>ED007: Exchangeable Cations</b>                 |            |      |          |                         |                         |            |       |       |      |
| Exchangeable Calcium                               | ----       | 0.1  | meq/100g | <b>0.6</b>              | <b>0.6</b>              | ----       | ----  | ----  |      |
| Exchangeable Magnesium                             | ----       | 0.1  | meq/100g | <b>6.4</b>              | <b>6.3</b>              | ----       | ----  | ----  |      |
| Exchangeable Potassium                             | ----       | 0.1  | meq/100g | <b>0.2</b>              | <b>0.2</b>              | ----       | ----  | ----  |      |
| Exchangeable Sodium                                | ----       | 0.1  | meq/100g | <b>3.2</b>              | <b>3.4</b>              | ----       | ----  | ----  |      |
| Cation Exchange Capacity                           | ----       | 0.1  | meq/100g | ----                    | <b>10.7</b>             | ----       | ----  | ----  |      |
| Cation Exchange Capacity                           | ----       | 0.1  | meq/100g | <b>10.6</b>             | ----                    | ----       | ----  | ----  |      |
| Exchangeable Sodium Percent                        | ----       | 0.1  | %        | <b>30.7</b>             | <b>32.2</b>             | ----       | ----  | ----  |      |
| Calcium/Magnesium Ratio                            | ----       | 0.1  | -        | <b>&lt;0.1</b>          | <b>&lt;0.1</b>          | ----       | ----  | ----  |      |
| Magnesium/Potassium Ratio                          | ----       | 0.1  | -        | <b>33.8</b>             | <b>27.2</b>             | ----       | ----  | ----  |      |
| <b>ED045G: Chloride by Discrete Analyser</b>       |            |      |          |                         |                         |            |       |       |      |
| Chloride   | 16887-00-6 | 10   | mg/kg    | <b>70</b>               | <b>80</b>               | ----       | ----  | ----  |      |
| <b>EP003: Total Organic Carbon (TOC) in Soil</b>   |            |      |          |                         |                         |            |       |       |      |
| Total Organic Carbon                               | ----       | 0.02 | %        | <b>0.32</b>             | <b>0.18</b>             | ----       | ----  | ----  |      |

# **Attachment 10**

Landowner Agreement



Landowner Information

Landowner Information

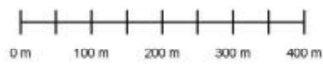
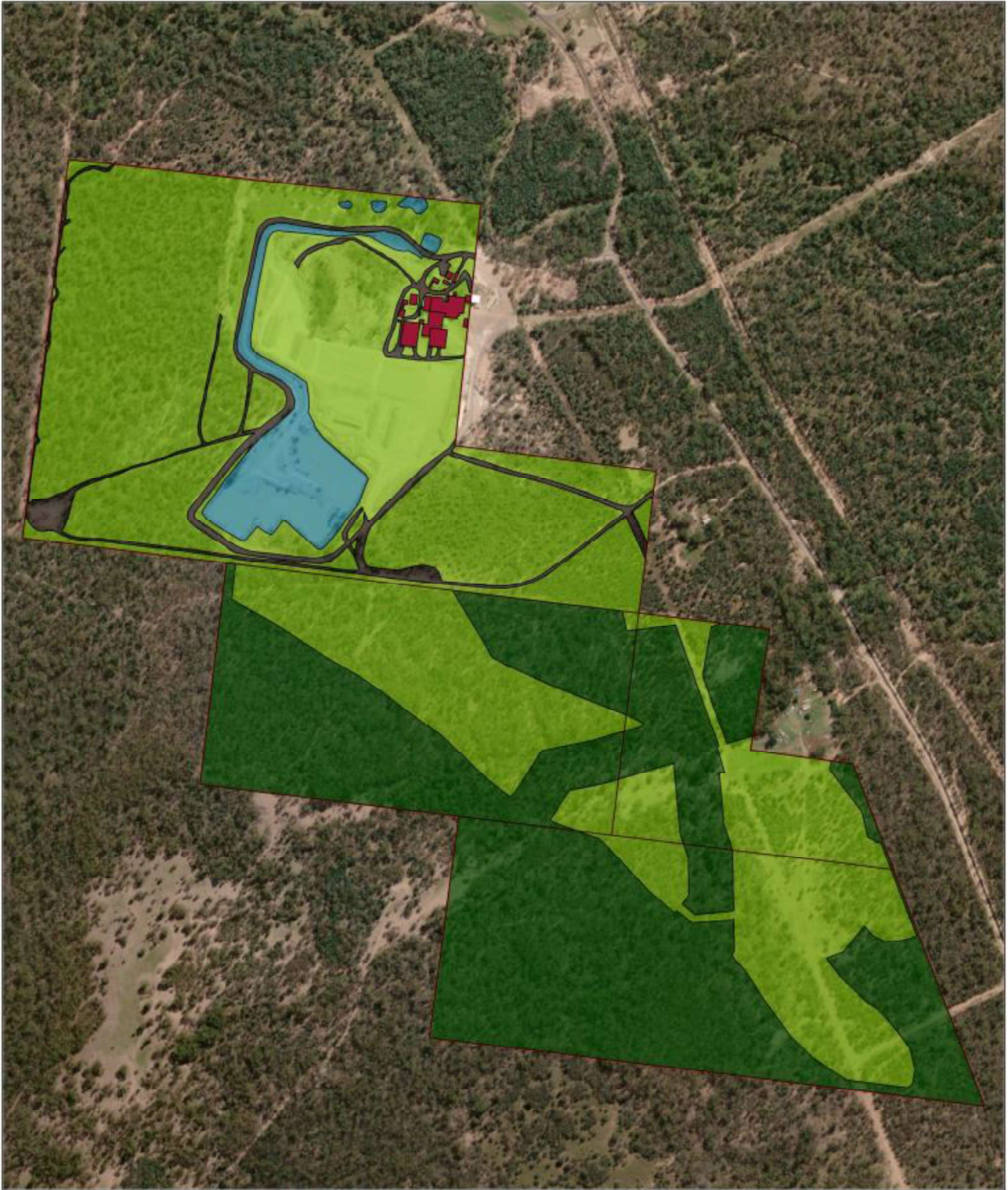
Landowner Information

**Landowner Information**

**Landowner Information**



Landowner Information

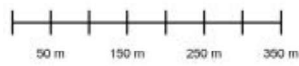


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**Legend**

- ML Boundaries
- PMLU - Grazing
- PMLU - Infrastructure
- PMLU - Native Ecosystem
- PMLU - Road
- PMLU - Water Storage

|   |                         |                                 |
|---|-------------------------|---------------------------------|
| <b>Title</b><br>Terrequip Miles Bentonite Mine<br>Final Site Design - Gurulmundi Leases |                         | <b>Project No.</b><br>AUQ00238F |
|   |                         | <b>Drawing No.</b><br>MIL008    |
| <b>Scale</b><br>1:6,500   | <b>Datum</b><br>GDA2020 | <b>Date</b><br>19/01/2024       |
| <b>Drawn</b><br>RM  | <b>Checked</b><br>CM    | <b>Status</b><br>v1.0           |



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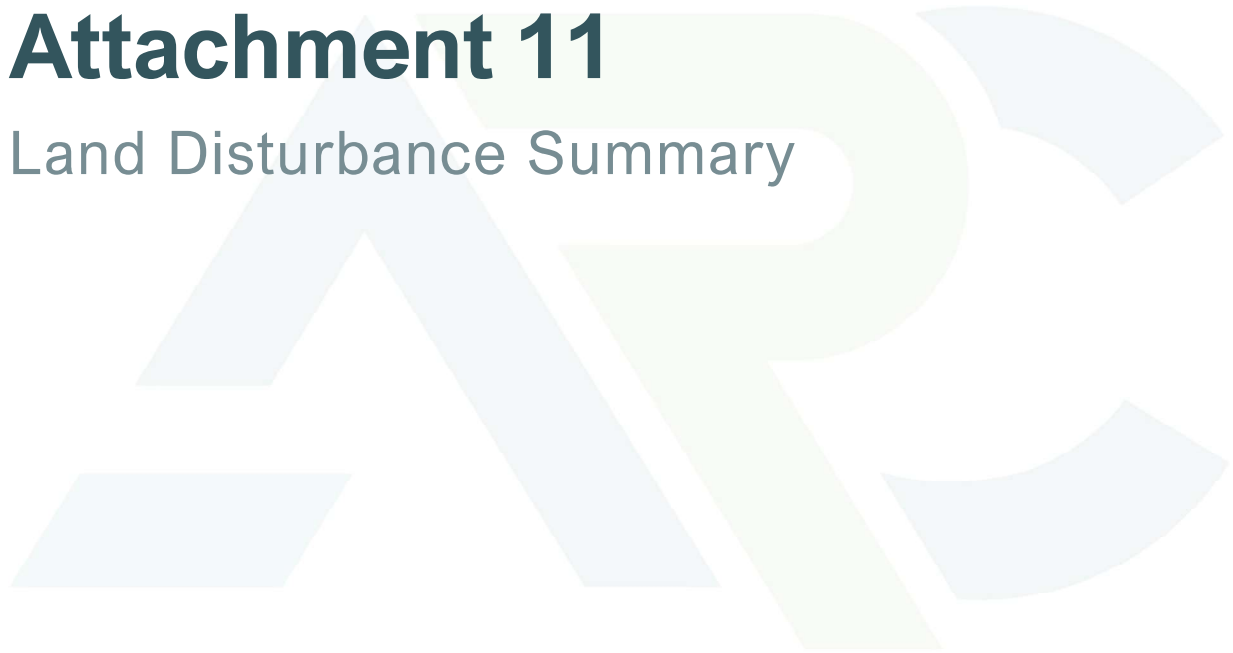
**Legend**

- ML Boundaries
- PMLU - Abandoned Rail Line
- PMLU - Grazing
- PMLU - Infrastructure
- PMLU - Native Ecosystem
- PMLU - Road
- PMLU - Water Storage

|   |               |                       |
|---|---------------|-----------------------|
| <b>Title</b><br>Terrequip Miles Bentonite Mine<br>Final Site Design - Ausben Leases |               | Project No. AUQ00238F |
|   |               | Drawing No. MIL009    |
| Scale 1:6,000   | Datum GDA2020 | Date 19/01/2024       |
| Drawn RM  | Checked CM    | Status v1.0           |

# **Attachment 11**

Land Disturbance Summary



| Lease              | Lease Area (ha) | Existing Mining Disturbance | Area (ha) | Proposed Type        | Area (ha)         | Rehabilitation Outcome | Landowner Agreement (Y/N) |
|--------------------|-----------------|-----------------------------|-----------|----------------------|-------------------|------------------------|---------------------------|
| ML5898             | 30.18642        |                             |           | Pits                 | 12.147            | Grazing                | N                         |
| <b>TOTAL</b>       |                 |                             |           |                      | 12.147            |                        |                           |
| ML5900             | 24.468          |                             |           | Road                 | 0.1818            | Grazing                | N                         |
|                    |                 |                             |           | Pit                  | 18.1466           | Grazing                |                           |
|                    |                 |                             |           | Water Storage        | 0.1187            | Water Storage          |                           |
|                    |                 |                             |           | Topsoil Stockpile    | 1.3046            | Grazing                |                           |
| <b>TOTAL</b>       |                 |                             |           |                      | 19.7517           |                        |                           |
| ML5901             | 25.14           |                             |           | Road                 | 0.1617            | Grazing                | N                         |
|                    |                 |                             |           | Pit                  | 17.782            | Grazing                |                           |
|                    |                 |                             |           | Water Storage        | 0.061             | Water Storage          |                           |
|                    |                 |                             |           | Topsoil Stockpile    | 0.3566            | Grazing                |                           |
| <b>TOTAL</b>       |                 |                             |           |                      | 18.3613           |                        |                           |
| ML5902             | 61.146          | Road                        | 4.5904    | Road                 | 4.5904            | Road                   | Y                         |
|                    |                 | Water Storage               | 5.7921    | Water Storage        | 5.7921            | Water Storage          |                           |
|                    |                 | Built Infrastructure        | 0.6632    | Built Infrastructure | 0.6632            | Built Infrastructure   |                           |
|                    |                 | Laydown Yard                | 10.7038   | Laydown Yard         | 10.7038           | Laydown Yard           |                           |
|                    |                 | Rehabilitation Area         | 3.9191    | Rehabilitation Area  | 3.9191            | Grazing                |                           |
|                    |                 |                             |           | Pit                  | 0.35313           | Grazing                |                           |
| <b>TOTAL</b>       |                 |                             |           |                      | 26.02173          |                        |                           |
| ML5905             | 13.587          | Road                        | 0.483     | Road                 | 0.483             | Road                   | N                         |
|                    |                 |                             |           | Road                 | 0.4185            | Grazing                |                           |
|                    |                 |                             |           | Pit                  | 3.2398            | Grazing                |                           |
| <b>TOTAL</b>       |                 |                             |           |                      | 4.1413            |                        |                           |
| ML5906             | 35.945          |                             |           | Road                 | 0.1572            | Grazing                | N                         |
|                    |                 |                             |           | Pit                  | 8.9869            | Grazing                |                           |
| <b>TOTAL</b>       |                 |                             |           |                      | 9.1441            |                        |                           |
| ML5907             | 31.896          | Pit                         | 0.5106    | Road                 | 1.0559            |                        | Y                         |
|                    |                 |                             |           | Water Storage        | 0.5106            | Water Storage          |                           |
|                    |                 |                             |           | Pit                  | 18.933            | Grazing                |                           |
| <b>TOTAL</b>       |                 |                             |           |                      | 20.4995           |                        |                           |
| ML5909             | 27.957          | Road                        | 2.7309    | Road                 | 2.8765            | Road                   | Y                         |
|                    |                 | Water Storage               | 4.8037    | Water Storage        | 11.7267           | Water Storage          |                           |
|                    |                 | Built Infrastructure        | 0.0049    | Built Infrastructure | 0.0049            | Built Infrastructure   |                           |
|                    |                 | Laydown Yard                | 5.0722    | Laydown Yard         | 5.0722            | Laydown Yard           |                           |
|                    |                 | Stockpiling Area            | 9.0617    | Rehabilitation Area  | 1.4936            | Grazing                |                           |
|                    |                 | Rehabilitation Area         | 1.4936    | Pit                  | 1.264             | Grazing                |                           |
|                    |                 | Pit                         | 0.6693    | Pit                  | 0.3304            | Water Storage          |                           |
|                    |                 | Topsoil Stockpile           | 0.3475    | Topsoil Stockpile    | 0.3475            | Grazing                |                           |
| <b>TOTAL</b>       |                 |                             |           |                      | 23.1158           |                        |                           |
| ML50058            | 19.839          | Road                        | 0.2587    | Road                 | 0.2815            | Road                   | Y                         |
|                    |                 | Water Storage               | 0.1687    | Water Storage        | 0.1687            | Water Storage          |                           |
|                    |                 | Laydown Yard                | 1.202     | Laydown Yard         | 1.202             | Laydown Yard           |                           |
|                    |                 | Pit                         | 1.2706    | Pit                  | 7.2432            | Grazing                |                           |
|                    |                 | Pit                         | 1.5715    | Pit                  | 3.7351            | Water Storage          |                           |
|                    |                 | Topsoil Stockpile           | 0.8236    | Topsoil Stockpile    | 1.6841            | Grazing                |                           |
| <b>TOTAL</b>       |                 |                             |           |                      | 14.3146           |                        |                           |
| <b>GRAND TOTAL</b> |                 |                             |           |                      | <b>147.497 ha</b> |                        |                           |