TAHMOOR SOUTH PROJECT

Rehabilitation & Mine Closure Strategy Amendment

Prepared for:

Tahmoor Coal Pty Ltd



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PREPARED BY

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
10 Kings Road
New Lambton NSW 2305 Australia
(PO Box 447 New Lambton NSW 2305)
T: +61 2 4037 3200
E: newcastleau@slrconsulting.com www.slrconsulting.com

BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Tahmoor Coal Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
630.12315-R01-v0.1	July 2020	Emily Curtis	Murray Fraser	Rod Masters

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1 Introduction

1.1 Background

Tahmoor Coal Pty Ltd (Tahmoor Coal) owns and operates the Tahmoor Mine, an existing underground coal mine approximately 80 kilometres (km) south-west of Sydney in the Southern Coalfields of New South Wales (NSW) (refer to **Figure 1**). The mine has been operating since 1979 when product coal was first produced.

Currently, up to three million tonnes (Mt) of run-of-mine (ROM) coal is extracted annually from the mine. Product coal is primarily transported via rail to Port Kembla Coal Terminal, or to Newcastle Port Waratah from time to time, for shipment to both Australian and international markets.

Tahmoor Mine employs close to 400 people.

Mining within the existing Tahmoor North mining area is scheduled for completion by approximately 2022, depending on geological and mining conditions. Without access to a new extraction area by this time, Tahmoor Mine would commence closure of the mine resulting in cessation of the extraction of the coking coal resource. Accordingly, Tahmoor Coal is seeking approval for the Tahmoor South Project, being an extension of underground coal mining at Tahmoor Mine, to the south of Tahmoor Coal's existing mining area (the Project).

Given its significance to the State, the Project is deemed to be State significant development (SSD) under the provisions of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). Under these provisions, the NSW Minister for Planning and Public Spaces, or delegate, is the consent authority for the Project. Approval for the Project is also required from the Commonwealth Minister for the Environment under the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Following the receipt of updated Secretary's Environmental Assessment Requirements (SEARs) in June 2018, a comprehensive environmental impact statement (EIS) was prepared by AECOM Australia Pty Limited (AECOM 2018) for the Project. The EIS was publicly exhibited between 23 January and 5 March 2019 by the NSW Department of Planning, Industry and Environment (DPIE). In response, 91 submissions were received from the community and community organisations, and 15 responses were received from government agencies and councils.

On 20 February 2020, a submissions report (AECOM 2020a) was lodged with DPIE which responded to all submissions made during exhibition of the EIS. At the same time (i.e. 20 February 2020) a project amendment report (AECOM 2020b) was lodged with DPIE to document amendments made to the Project in response to the submissions and to reduce potential environmental impacts of the Project.

The amendments documented in the project amendment report included, among other things, changes to the mine plan and the REA. The changes to the mine plan included the removal of a longwall in the northern part of the mine (LW109), reconfiguration of the longwall layouts to comprise two series of shorter longwall panels, the reduction of the width of the longwalls, and a reduction in the height of extraction within the longwalls. The changes to the REA included a reduction in the proposed extension area by increasing the height of the REA.

1.2 Amendments to Project

Tahmoor Coal has now made the decision to make further changes to the Project to further reduce potential environmental impacts, particularly potential subsidence and biodiversity impacts. These amendments include the removal of two longwalls, LW107B and LW108B, further changes to the REA design and small amendments to the layout of the ventilation shafts and associated transmission line easements.

With the removal of LW107B and LW108B the life of mining will be reduced from about 2035 as described in the project amendment report (AECOM 2020b) to about 2032 (i.e. a reduction of about three years).

All other aspects of the Project remain the same as those documented in the project amendment report (AECOM 2020b).

Further details on the proposed amendments to the Project are described in Section 2.

1.3 Purpose of this report

This report has been prepared by SLR Consulting to consider the current changes to the Project in relation to the Rehabilitation and Mine Closure Strategy. This report will be used to support a second project amendment report being prepared by EMM Consulting Pty Ltd on behalf of Tahmoor Coal.

2 Amendments to Project

As previously stated, changes are proposed to the Project to further reduce potential environmental impacts, particularly potential subsidence and biodiversity impacts. These amendments include:

- the removal of two longwalls in the southern part of the mine (LW107B and LW108B);
- the containment of the REA within the bounds of the currently approved disturbance footprint; and
- changes to the layout of the ventilation shafts and associated transmission line easements.

The removal of LW107B and LW108B will reduce the estimated production volume of the Project from about:

- 43 million tonnes (Mt) of ROM coal considered in the project amendment report (AECOM 2020b) to 33 Mt;
- 30 Mt of coking coal considered in AECOM 2020b to 23 Mt; and
- 2 Mt of thermal coal considered in AECOM 2020b to 1.4 Mt.

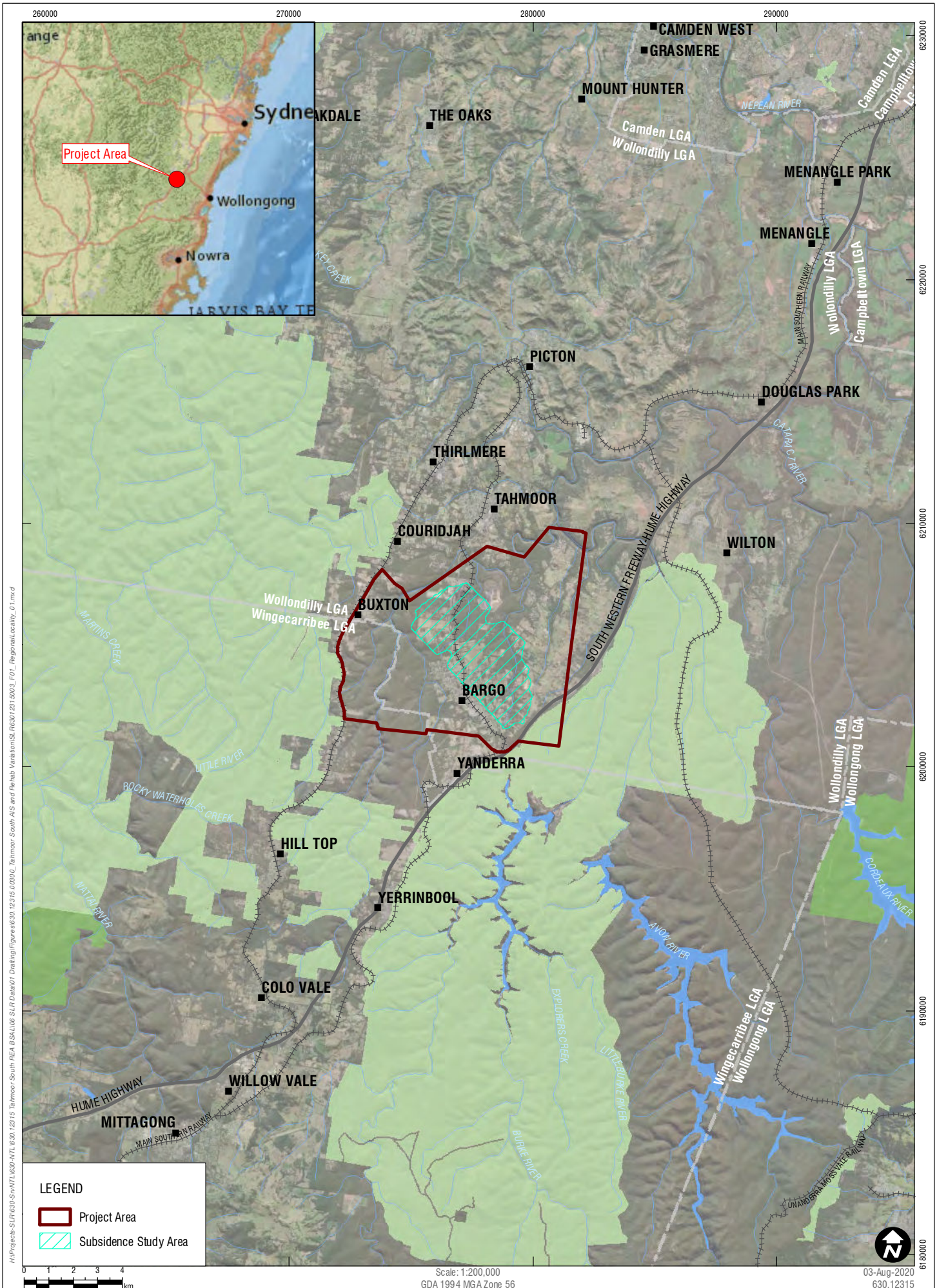
The removal of LW107B and LW108B will also lead to a reduction in the volume of rejects from about 11.6 Mt to 9.7 Mt.

With the removal of LW107B and LW108B the life of the mining will be reduced from about 2035 as described in the project amendment report (AECOM 2020b) to about 2032 (i.e. a reduction of about three years). Some surface works, rehabilitation and mine closure would be undertaken after the completion of mining activities.

The containment of the REA within the currently approved disturbance footprint will ensure that no native vegetation, particularly the Shale Sandstone Transition Forest (SSTF) endangered ecological community, will be required to be cleared for the REA. However, to accommodate the reduced footprint, the height of the REA will be increased by 10 metres from a top of reduced level (RL) 310 metres that was proposed in the project amendment report (AECOM 2020b) to a top of RL 320 metres.

The changes to the layout of the ventilation shafts and associated transmission line easements are aimed at reducing clearing of the SSTF during their construction.

All other aspects of the Project remain the same as those documented in the project amendment report (AECOM 2020b).



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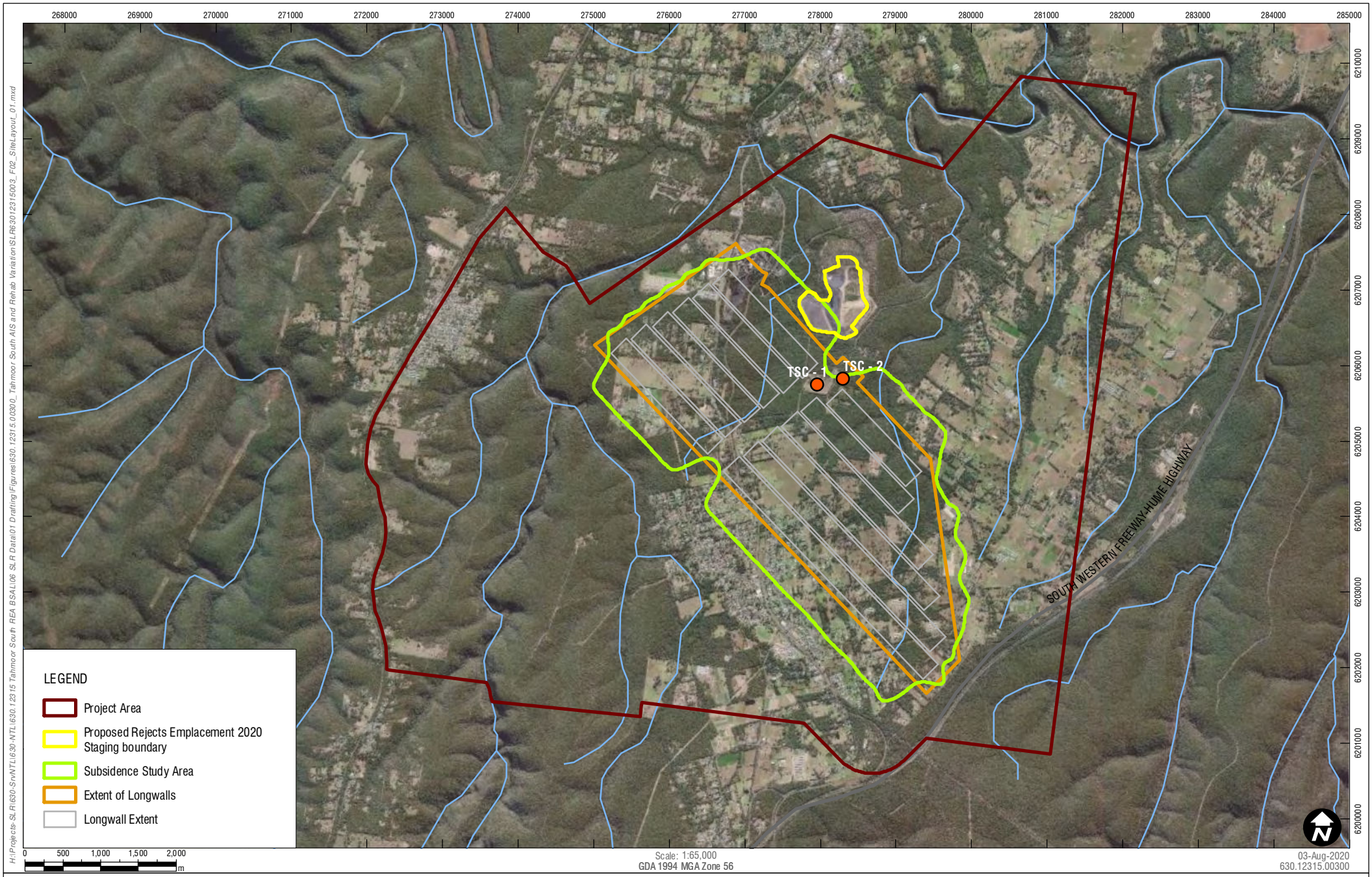
Regional Locality

FIGURE 1



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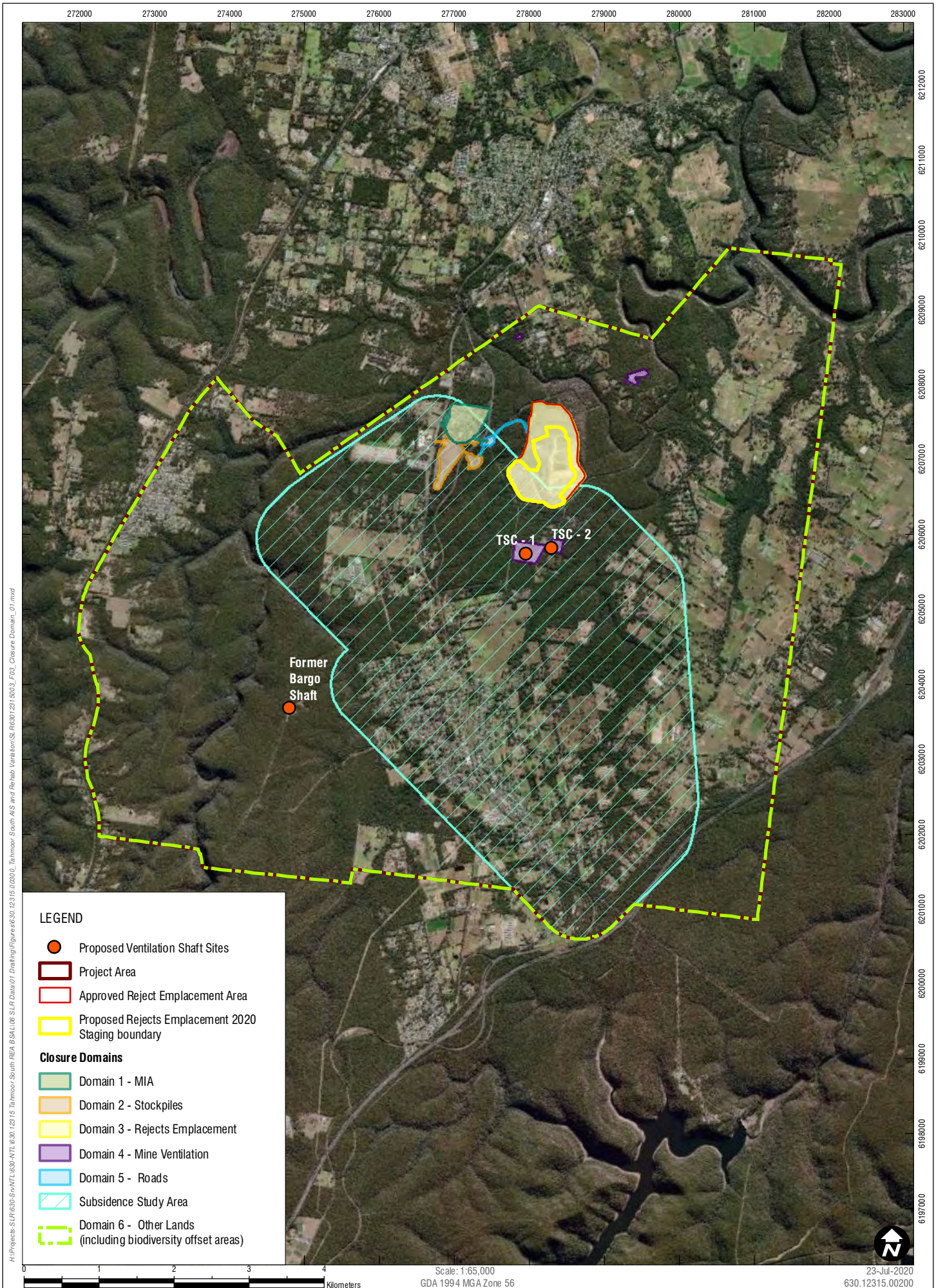
Site Layout

FIGURE 2



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Closure Domains

FIGURE 3

3 Assessment of Amendments to Project

This section addresses the project amendments listed in the previous section and considers changes to potential impacts with reference to those previously considered in the project amendment report (AECOM 2020b).

A summary of the amendments to the strategy and resulting impacts, are outlined in **Table 1**.

Table 1 Summary of the Changes to the Strategy as a Result of the Amended Project

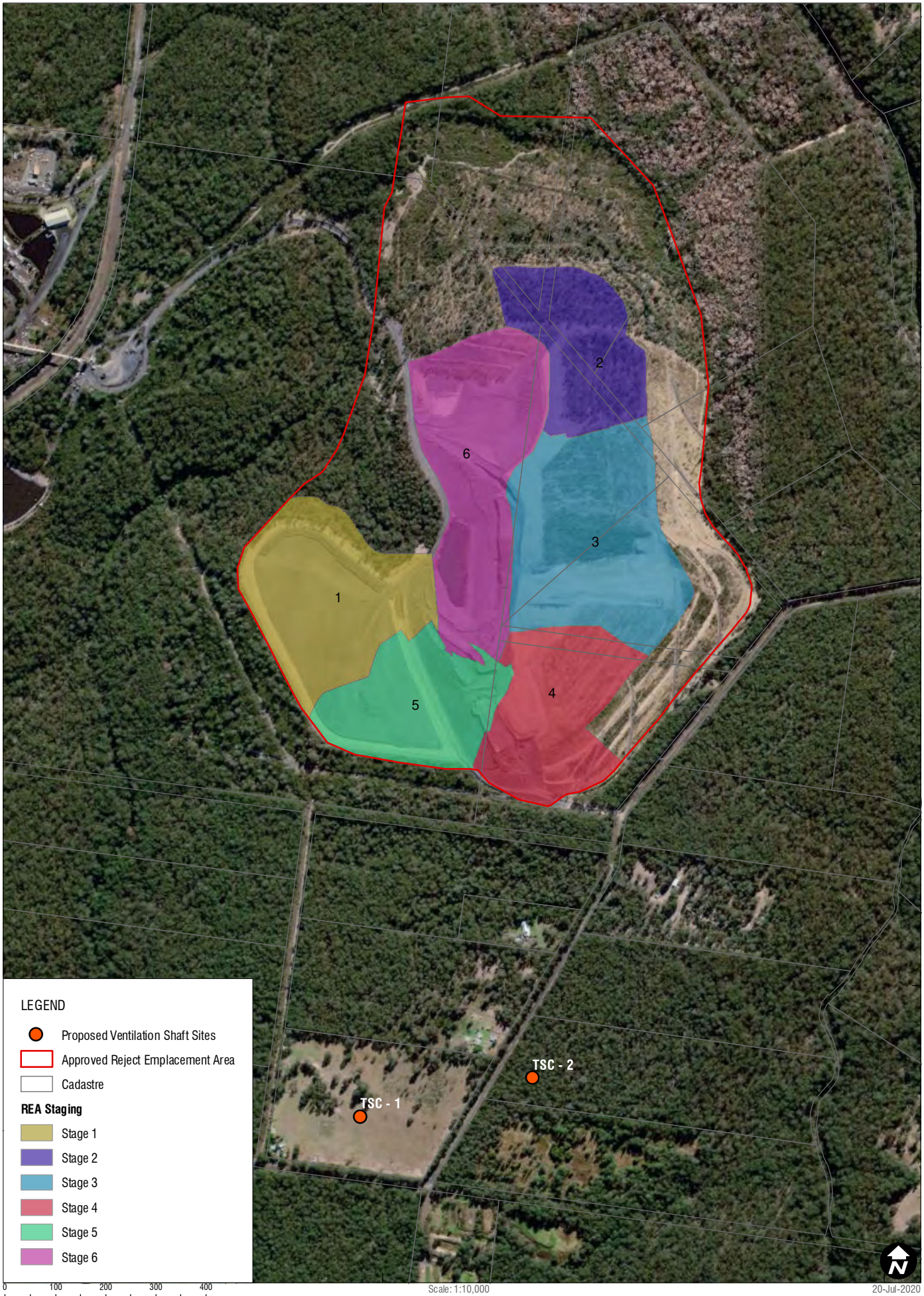
Additional Information	Response
Revised Rejects Emplacement Area (REA) changes to sections of the rehabilitation strategy	
Section 10.3.1 Reject Emplacement Area	Amendment of REA disturbance area and stages of progression, all contained within the existing approved REA. Additional disturbance of native vegetation no longer required.
Section 11.2 Landform Design and Planning	Amended with inclusion of reference to revised REA design.
Section 11.5 Topsoil Mass Balance	REA to be contained within the existing approved boundary, topsoil stripping will take place only within the existing REA.
Section 11.5.3 Soils Assessment	Yellow Earths and Lateritic Podzolic Soils no longer represented within REA area. Soils within the existing REA include Mine disturbance, Anthroposols and a small area of Lithosols.
Section 11.5.4 Topsoil Stripping Assessment and Balance	No topsoil stripping required outside the existing REA. Topsoil to be sourced from stockpiled topsoil from previous REA stripping, dehabilitated areas and additional topsoil may be sourced from the remaining natural area within the REA and import as required.
Section 11.5.5 Summary.	No additional disturbance required for the REA.

3.1.1 Proposed REA Expansion

It was previously proposed in the project amendment report (AECOM 2020b) that the REA be expanded and continue to be used throughout the proposed project life. The expanded footprint comprised an additional 11.06 hectares of disturbance outside the approved REA boundary. The REA has been redesigned specifically to reduce the disturbance footprint proposed and ensure no additional clearing of native vegetation will be required, particularly the Shale Sandstone Transition Forest (SSTF) endangered ecological community. Subsequently the amended REA will be located entirely within the existing approved REA boundary. However, to accommodate the reduced footprint, the height of the REA will be increased by 10 metres from a top of reduced level (RL) 310 metres that was proposed in the project amendment report (AECOM 2020b) to a top of RL 320 metres.

Progressive rehabilitation of the REA will continue to be undertaken during operations at the site, where possible. Rehabilitation will only start once the portion of the REA to be rehabilitated is sufficiently dry to allow the placement of permanent capping material.

The amended REA will be progressed in six stages as previously proposed in the project amendment report (AECOM 2020b) however staging areas have been altered to accommodate the amended REA design. The proposed stages of the REA are shown in **Figure 4**. Where practicable, each stage of the REA will be progressively rehabilitated when it is no longer in use. Where rehabilitation of the REA has previously been undertaken within the proposed REA 2020 staging boundary topsoil stripping will take place prior to further reject emplacement for use in later rehabilitation.



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Proposed REA Stages

FIGURE 4

3.2 Landform Design and Planning

The *Geotechnical Study and Supplementary Investigations* (SKM 2017) provided technical justification of the proposed final REA landform, including stability assessment of the substrates to be used and water management designs. Subsequently, Australian Mine Design and Development Pty Ltd prepared the revised REA design with consideration for geotechnical stability.

3.3 Topsoil Mass Balance

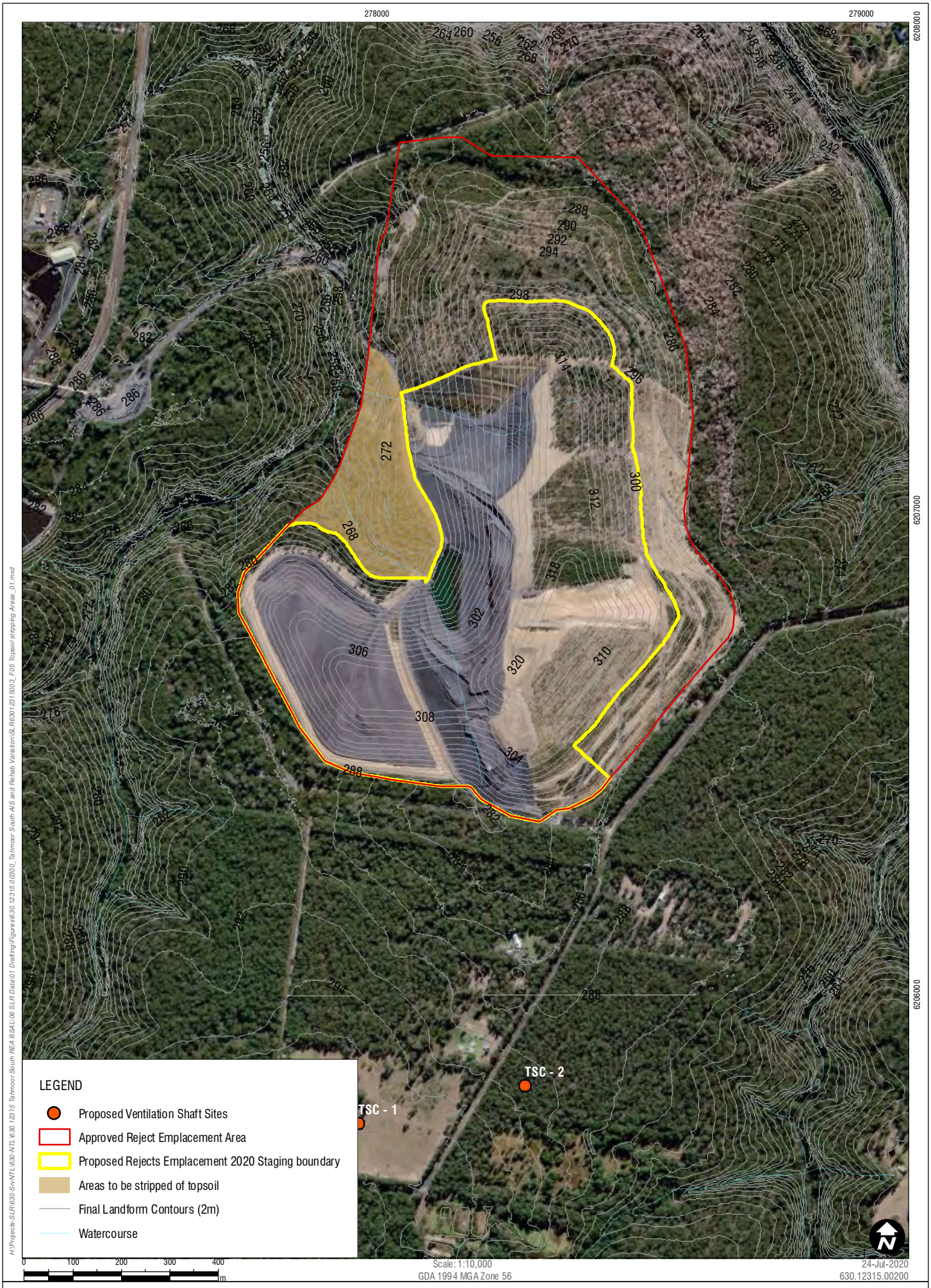
As part of preparing this Rehabilitation and Mine Closure Strategy, SLR undertook a soil stripping assessment and topsoil mass balance. The topsoil assessment of areas outside the existing REA provided in the project amendment report (AECOM 2020b) are no longer applicable. The following topsoil assessment encompasses the existing REA (**Figure 5**) based on the amended REA design.

3.3.1 Background

The area subject to the assessment encompasses two soil landscape units, Lucas Heights and Gymea (**Figure 6**). The Lucas Heights soil landscape unit covers gently undulating crests, ridges and plateau surfaces, with slopes less than 10% and local relief of 10-50 metres. It occurs on the Mittagong Formation geological unit consisting of shale, laminite and quartz sandstone. The dominant soils are typically moderately deep Yellow Podzolic Soils and Yellow Soloths on ridges and plateaus. Lateritic Podzolics are also present on crests, Yellow Earths and Lithosols on shoulders of plateaus and ridges, and Earthy Sands occur in valley flats. Lucas Heights soil landscape covers 6.17 hectares of the Study Area.

The Gymea soil landscape unit covers undulating to rolling rises and low hills, with slopes between 10-25% and local relief of 10-80 metres. It occurs on the Hawkesbury Sandstone geological unit consisting of sandstone with some shale and laminite. The dominant soils are typically shallow to moderately deep Yellow Earths and Earthy Sands on crests and inside benches, Gleyed and Yellow Podzolic Soils on shale lenses, and shallow to moderately deep Siliceous Sands and Leached Sands along drainage lines. Gymea soil landscape covers 0.66 hectares of the Study Area.

The remaining 145.95 hectares of the study area is disturbed terrain and consist of both mine disturbance and areas of rehabilitation.



Topsoil Stripping Areas

FIGURE 5

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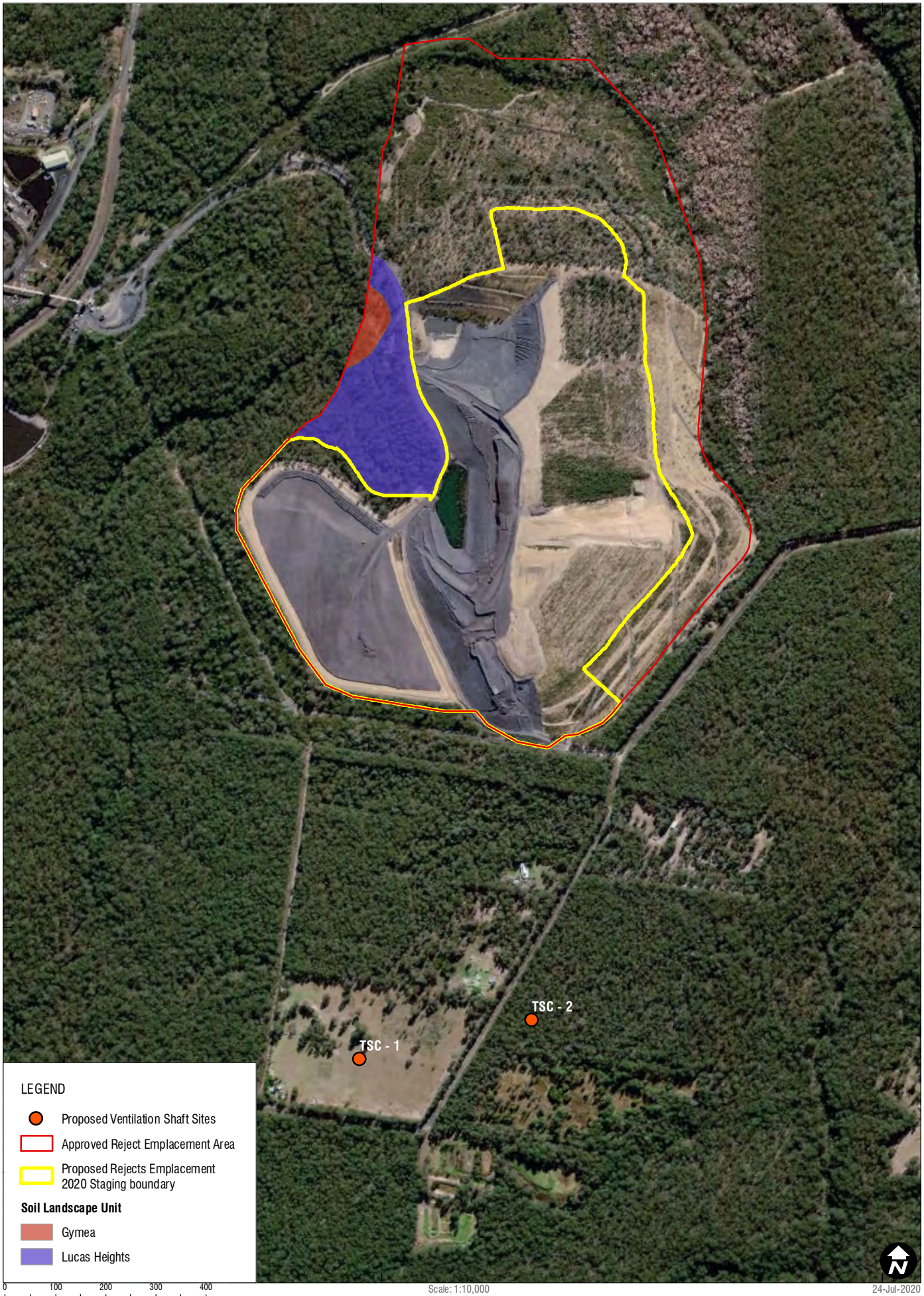

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Soil Landscape Units

FIGURE 6

3.3.2 Soil Assessment

Disturbance within three soil units (Yellow Earths, Lateritic Podzolic Soils, Lithosols) was previously proposed within the REA expansion area as discussed in the project amendment report (AECOM 2020b). The amended REA is to reside within the approved REA boundary therefore there will be no additional disturbance to soil units outside this area.

The previous soil survey of the existing REA, performed by AECOM, determined that the soils within the current REA correlated with the predicted Lithosols and Lateritic Podzolic Soils of the Lucas Heights soil landscape unit, as defined in the *Soil Landscapes of the Wollongong – Port Hacking 1:100 000 Sheet* (Hazelton and Tille 1990). However, the existing REA has since been disturbed and now consists predominantly of mine disturbance and Anthroposols with a small area of Lithosols situated on the on the western boundary. The soils within the Project Area are described below and shown in **Figure 7**.

Anthroposols

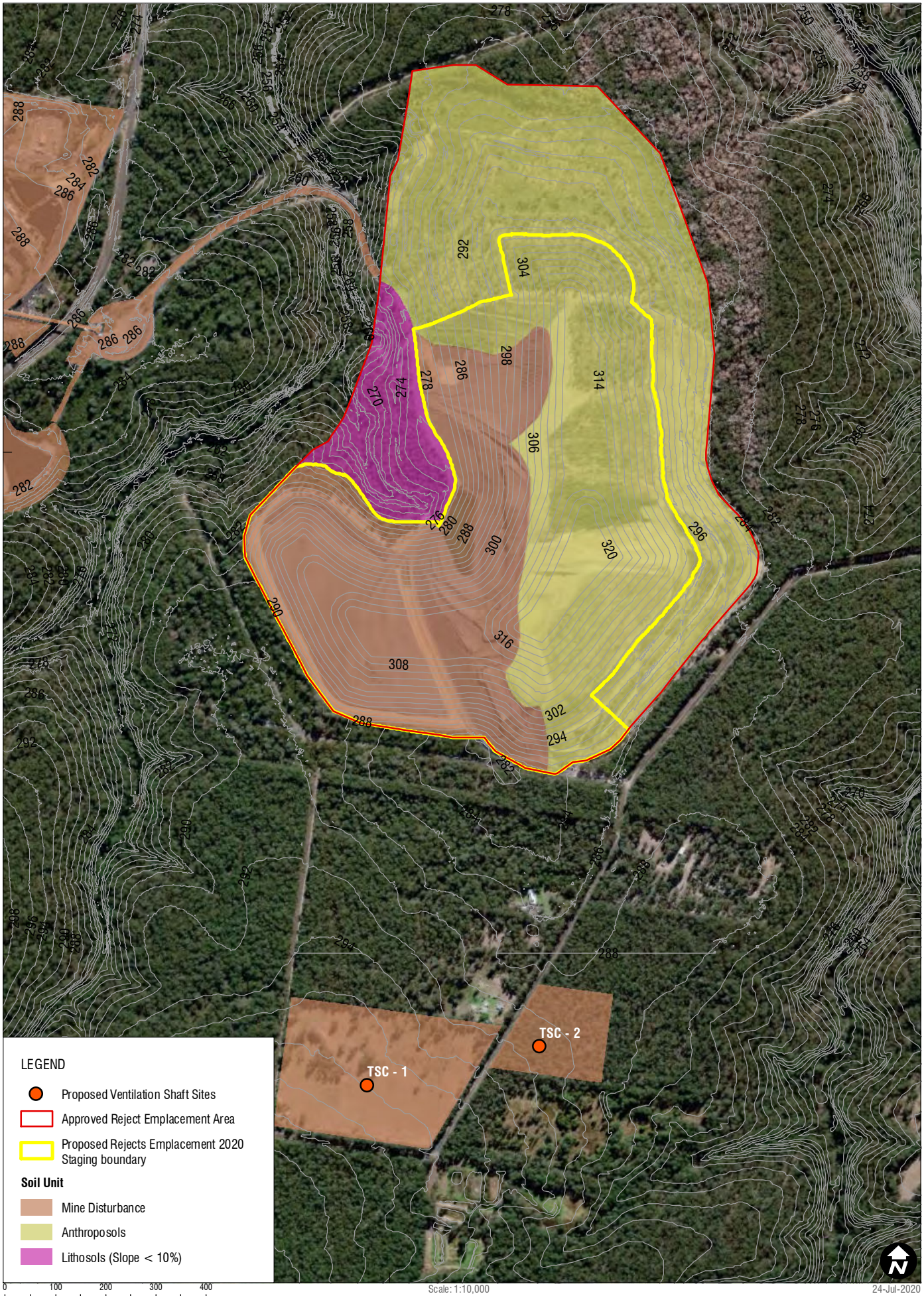
Anthroposols are soils resulting from human activities which have led to a profound modification, truncation or burial of the original soil horizons, or the creation of new soil parent materials by a variety of mechanical means. Anthroposols within the Study Area consist of rehabilitated areas where topsoil has been placed over the reject material.

Lithosols

Lithosols in the Study Area occur on crests and sideslopes and are characterised by shallow (less than 0.3 metres), loamy sand to sandy loam. Structure is typically apedal and the profile is strongly to slightly acidic (pH 4.0 – 6.0). Limitations include low fertility, acidity and presence of sandstone gravel and rock outcrop, particularly on steeper slopes.

Mine Disturbance

Mine disturbance within the Study Area consist of currently disturbed areas where reject placement and rehabilitation have not yet taken place or are currently in the process of being undertaken.



Soil Units

FIGURE 7

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3.3.3 Topsoil Stripping Assessment and Balance

Stripping of topsoil required in the previously proposed REA expansion area as described in the project amendment report (AECOM 2020b) is no longer applicable as the amended REA is located entirely within the approved REA boundary. Topsoil for the existing approved REA rehabilitation works is stripped from the existing natural, vegetated sections being utilised for rejects emplacement within the approved REA area. Where further reject emplacement is to take place on current rehabilitation, topsoil will be recovered prior to placement. Stripping occurs following clearing and prior to emplacement of the reject material. The depth of topsoil stripped is generally sufficient to provide for the depth of topsoil to be re-spread across the rehabilitated REA sections to the specified depth. Where there is insufficient topsoil, topsoil is imported to make up the deficit.

6.83 hectares of existing natural, vegetated area is yet to be stripped from within the approved REA from which topsoil may be sourced if there are insufficient quantities from previously stripped areas within the REA. This area consists of Lithosols. Lithosols are generally marginally suitable for reuse due to coarse topsoil texture and poor soil structure with limitations consisting of acidity and sandstone fragments, stones and rock outcrops characteristic of the Gymea soil landscape unit. Material may be stripped and reused in rehabilitation provided appropriate erosion and sediment controls are in place. They will need organic ameliorants to improve their structure.

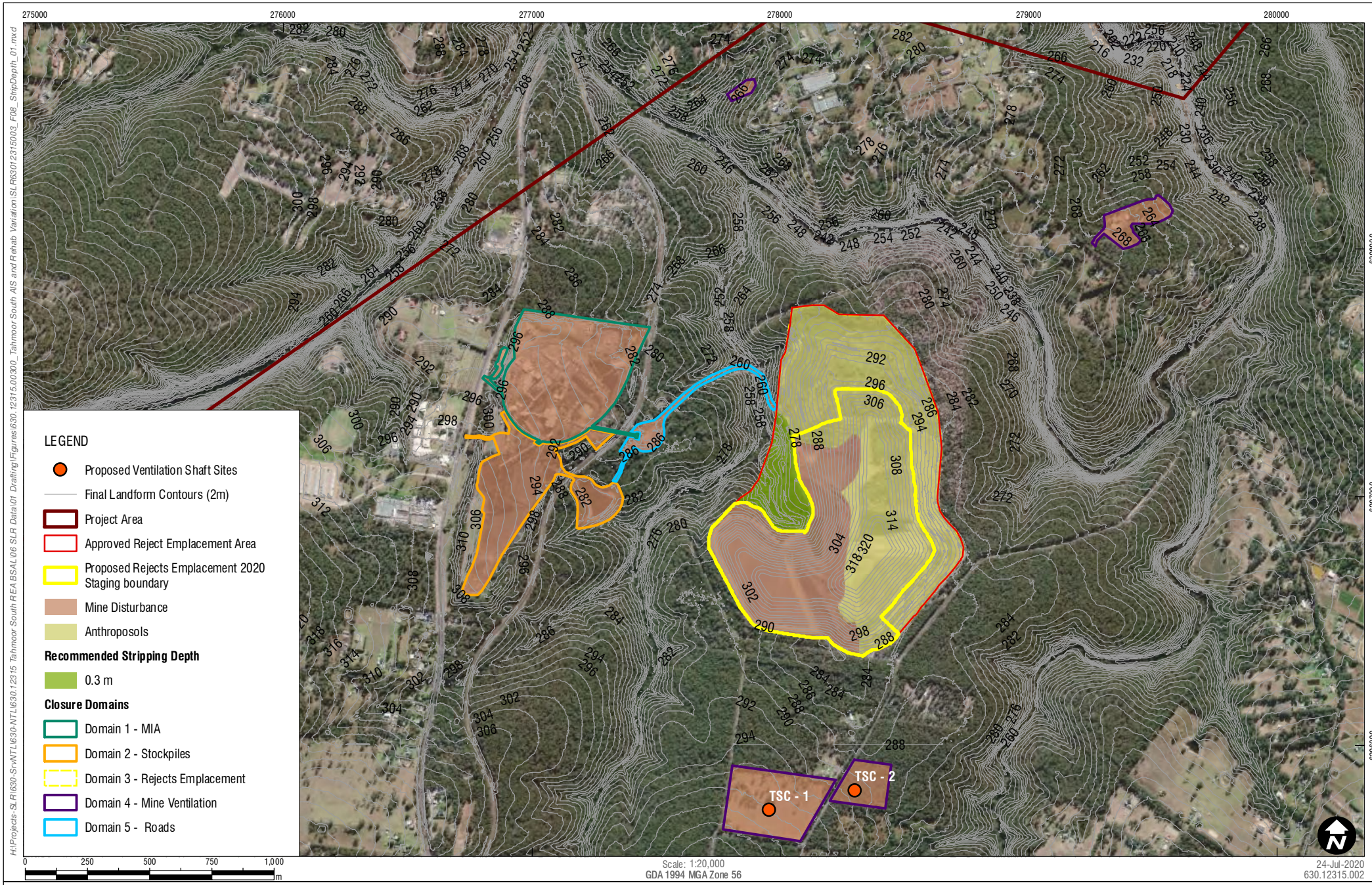
The recommended topsoil stripping depths for soils within the REA is shown in **Table 2** and **Figure 8**. Recommended topsoil stripping depth for areas to be de-habilitated will be determined via soil survey prior to removal as stripping depths will be dependent on the depth of capping across the existing REA. The total maximum remaining topsoil that can be sourced from areas of natural vegetation within the existing REA is 6.83 hectares, potentially providing an additional 20,476 cubic meters of topsoil.

Table 2 Soil Stripping Recommendations

Soil Unit	Topsoil Depth (m)	Stripping Depth (m)	Area (ha)	Volume (m^3)
Lithosols (Slope greater than 10%)	0.30	0.30	6.83	20,476
Anthroposols	*	*	58.29	*
Mine Disturbance	N/A	N/A	87.65	N/A
		Total	**152.77**	**20,476**

**Depth to be determined via soil survey*

Final land use post-rehabilitation is native tree, shrubs ad grassland as show on **Figure 9** along with final landform.



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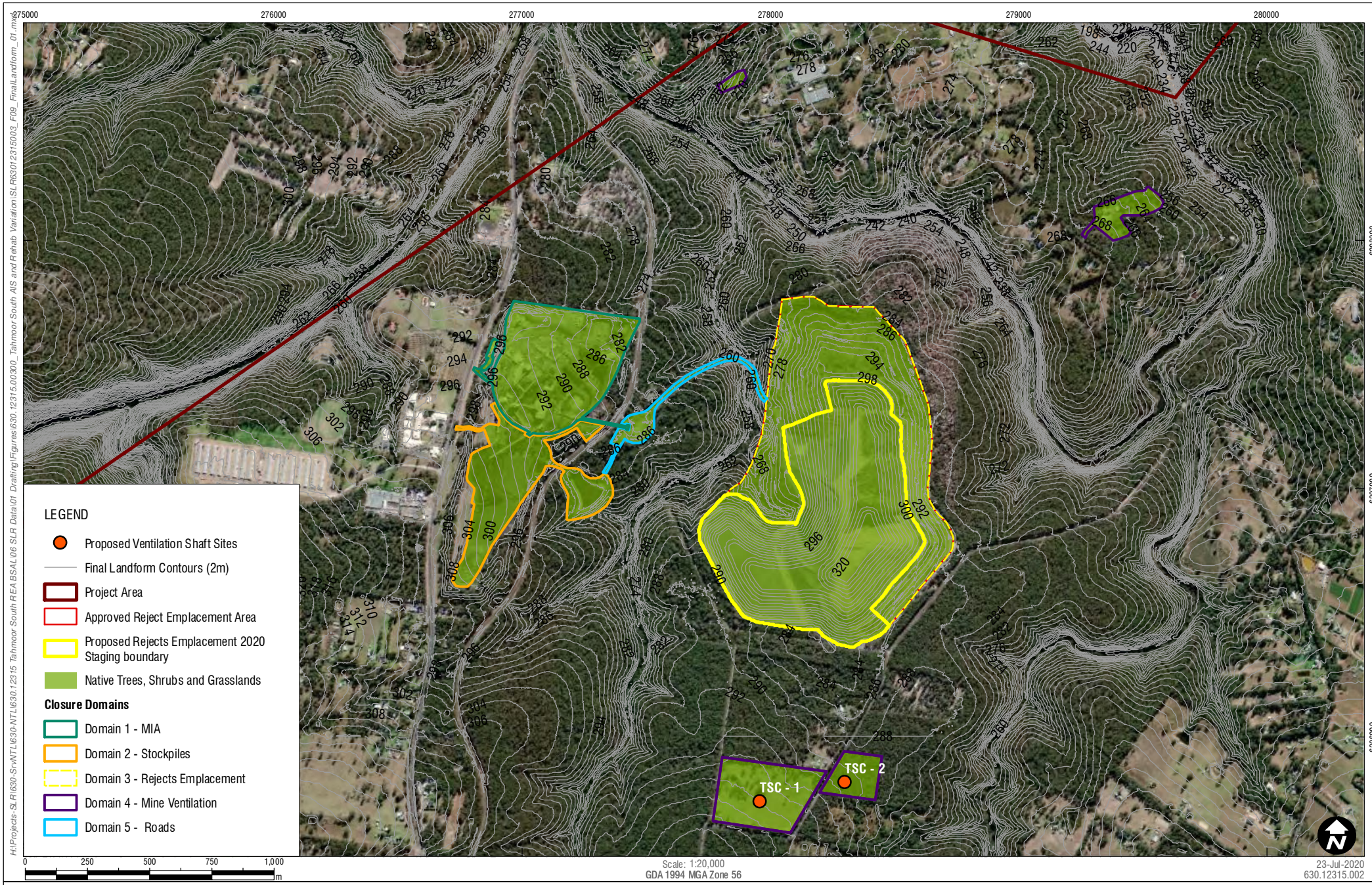
Recommended Stripping Depth

FIGURE 8



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Final Landform

FIGURE 9

3.3.4 Summary

A review of baseline soil information for the REA was conducted to provide a soil stripping assessment and mapping comparable to that previously undertaken as part of the project amendment report (AECOM 2020b). The major points of the assessment are summarised below:

- Topsoil stripping outside the approved REA boundary will no longer be required as the amended REA design is contained entirely within this boundary.
- Two soil landscape units, Lucas Heights and Gymea, remain within the Study Area.
- Three soil units were mapped within the Study Area: Lithosols, Anthroposols, Mine disturbance.
- Topsoil will be sourced from both remaining natural vegetation areas and rehabilitated areas along with previously stripped soil from within the approved REA boundary.
- An additional topsoil balance of 20,476 cubic metres was calculated for the maximum additional disturbance area of 6.83 hectares within the REA.
- Dehabilitation will take place prior to reject emplacement on rehabilitated areas within the REA including soil survey to determine topsoil stripping depths.
- Amelioration with lime is recommended for all stripped topsoil, due to the highly acidic nature of the soil within the Study Area.

4 Conclusion

Changes to the Rehabilitation and Mine Closure strategy as a result of the project amendments are primarily related to the amended REA landform design. This includes considerations for disturbance areas and variations to topsoil resources required for rehabilitation.

The amended REA reduces potential impacts that resulted from the additional topsoil stripping of the previously proposed REA expansion and contains all disturbance to the existing approved REA area. As a result, the existing REA will be required to be an additional 10 metres above the previously specified top landform RL (top final landform RL of 320 metres).

Topsoil for rehabilitation within the REA will be sourced from previously stripped and stockpiled areas of the existing REA and de-habilitated areas with the potential to source additional topsoil from the remaining native vegetation area within the approved REA boundary.

5 References

AECOM 2018, *Tahmoor South Project – Environmental Impact Statement*, prepared for Tahmoor Coal Pty Ltd by AECOM Australia Pty Ltd.

AECOM 2020a, *Tahmoor South Project – Response to Submissions*, prepared for Tahmoor Coal Pty Ltd by AECOM Australia Pty Ltd.

AECOM 2020b, *Tahmoor South Project – Project Amendment Report*, prepared for Tahmoor Coal Pty Ltd by AECOM Australia Pty Ltd.

ASIA PACIFIC OFFICES

BRISBANE
Level 2, 15 Astor Terrace
Spring Hill QLD 4000
Australia
T: +61 7 3858 4800
F: +61 7 3858 4801

CANBERRA
GPO 410
Canberra ACT 2600
Australia
T: +61 2 6287 0800
F: +61 2 9427 8200

DARWIN
Unit 5, 21 Parap Road
Parap NT 0820
Australia
T: +61 8 8998 0100
F: +61 8 9370 0101

GOLD COAST
Level 2, 194 Varsity Parade
Varsity Lakes QLD 4227
Australia
M: +61 438 763 516

MACKAY
21 River Street
Mackay QLD 4740
Australia
T: +61 7 3181 3300

MELBOURNE
Level 11, 176 Wellington Parade
East Melbourne VIC 3002
Australia
T: +61 3 9249 9400
F: +61 3 9249 9499

NEWCASTLE
10 Kings Road
New Lambton NSW 2305
Australia
T: +61 2 4037 3200
F: +61 2 4037 3201

PERTH
Ground Floor, 503 Murray Street
Perth WA 6000
Australia
T: +61 8 9422 5900
F: +61 8 9422 5901

SYDNEY
Tenancy 202 Submarine School
Sub Base Platypus
120 High Street
North Sydney NSW 2060
Australia
T: +61 2 9427 8100
F: +61 2 9427 8200

TOWNSVILLE
12 Cannan Street
South Townsville QLD 4810
Australia
T: +61 7 4722 8000
F: +61 7 4722 8001

WOLLONGONG
Level 1, The Central Building
UoW Innovation Campus
North Wollongong NSW 2500
Australia
T: +61 2 4249 1000

AUCKLAND
68 Beach Road
Auckland 1010
New Zealand
T: 0800 757 695

NELSON
6/A Cambridge Street
Richmond, Nelson 7020
New Zealand
T: +64 274 898 628