Constellation Project Scoping Report

PREPARED FOR
Aeris Resources

April 2022

aarc
ENVIRONMENTAL SOLUTIONS

BRISBANE OFFICE
164 Wharf Street
Spring Hill QLD 4000
P +61 7 3217 8772

E info@aarc.net.au
AARC.NET.AU

ABN. 71 620 818 920
ACN. 620 818 920

Document Control

Project Name:	**Constellation Project**
Report Title:	Scoping Report
Client:	Aeris Resources
Project Manager:	Aiden Campbell

Version	Comments	Author	Reviewer	Date
1	Draft issued for client review	BW	AC	9 March 2022
2	Revision issued for client review	AC	JB	28 March 2022
3	Revision issued for client review	AC	DH	8 April 2022
4	Final			11 April 2022

Table of Contents

List of Figures

List of Tables

1 Introduction

1.1 Document purpose

This scoping report has been prepared for the state significant development component of the Constellation Project by AARC Environmental Solutions on behalf of Aeris Resources, the applicant for the project. It has been prepared in accordance with the draft state significant project guideline 'Preparing a Scoping Report' (DPIE 2019a). The purpose of this scoping report is to request and inform the content of the Secretary's Environmental Assessment Requirements (SEARs) for the SSD EIS for the project.

1.2 Project title

The project to which this scoping report relates is the Constellation Project.

1.3 Proponent details

Tritton Resources (Tritton) is a wholly owned subsidiary of Aeris Resources Pty Ltd (Aeris). The details of the proponent and those who prepared this scoping report are provided in Table 1-1.

Table 1-1: Proponent details

Requirement	Detail
Proponent	Tritton Resources Pty Ltd (wholly owned subsidiary of Aeris Resources Limited)
Address	L 2 HQ South Tower 520 Wickham St Fortitude Valley, Queensland, 4006 Australia
ABN	30 147 131 977
Nominated contact	David Hume General Manager Projects and Technical, Aeris Resources - Tritton Operations
Contact details	P: + 61 07 3034 6227 E: dhume@aerisresources.com.au
Name and qualification of persons who prepared Scoping Report	Aiden Campbell Principal Consultant AARC Environmental Solutions Bachelor of Science (honours), Masters of Environment
Site owner	Tritton Resources Pty Ltd

1.4 Existing and proposed operations

1.4.1 Context of existing operations

Copper exploration and mining activity has occurred in the local and broader area since the mid 1800's. Tritton started mining in 1992 and involved open pit mining methods at the Murrawombie Pit and SX/EW processing. Underground mining activities at the Tritton ore deposit did not begin until 2004-2005, and then at Murrawombie in 2018. Development of nearby ore deposits, such as Constellation, will supplement and then replace production at the Tritton and Murrawombie deposits.

Tritton Copper Operations operates as a hub and spoke model with Tritton Copper Mine serving as the hub (where the processing facility is located) and other surrounding deposits supplying ore for processing. Mining of the Tritton orebody commenced in 2004 with the development of an access decline and construction of a sulphide ore processing plant. Copper is extracted via conventional crushing and flotation circuits producing a copper concentrate. Stope production commenced in March 2005. Of the surrounding deposits, only Murrawombie Copper Mine is currently producing ore, with active mining having ceased at North East Copper Mine and development of Avoca Tank Copper Mine commencing in 2022. The combined ore production from both Murrawombie and Tritton mines is treated at the 1.8 million tonnes per annum Tritton processing plant to produce approximately 20,000 – 23,000 tonnes of copper per annum.

The Life of Mine planning for Tritton Operations has identified that additional resource input is required to supplement and then replace the production for Tritton and Murrawombie deposits with current ore reserves of the Tritton and Murrawombie mines are forecast to be exhausted by the end of 2024. An ongoing regional exploration program has identified several deposits, including the Constellation deposit, which could be incorporated into the hub and spoke operational model and meet this demand requirements.

1.4.2 Existing approvals

Tritton owns and operates the Tritton Copper Operations north-west of Nyngan in the Bogan Shire Local Government Area (LGA) (Figure 2-1). Table 1-2 outlines the current Tritton Copper Operations.

Table 1-2: Mines own by Tritton Copper Operations

Mine	ML	Granted	Expiry
Tritton Copper Mine	ML1544	22 December 2003	21 December 2024
Murrawombie Copper Mine	ML1280	6 August 1992	5 August 2034
North East Copper Mine	ML1383	13 January 1996	19 March 2038
Avoca Tank Copper Mine	ML1818	5 November 2021	5 November 2042

Tritton holds development consents for their existing approved operations at Tritton Copper Mine as outlined in Table 1-3. Existing approvals are held for the Murrawombie, Avoca Tank and North East operations; these are not detailed here as they do not interact with the Constellation Project.

Table 1-3: Existing approvals for Tritton operations

Operation	Approval	Reference
Tritton Copper Mine	DA	S97/00305
	EPL	11254

1.4.3 Proposed development

Tritton is completing pre-feasibility studies on the development of the Constellation Project and the design and definition of the Project is yet to be finalised. However, broadly the Project will initially comprise a new open cut mining operation with underground operations following. The Project will include typical mine site infrastructure to support the operations and ore handling.

Once mined ore will either be hauled from the ROM Pad to the Tritton Copper Mine for processing in the existing processing plant or heap leached on-site at a new heap leach facility. Processing of ore at the Tritton Copper Mine (along with the receival of ore mined off-site) is covered by existing approvals and will not be considered within the scope of the Constellation Project assessment or approval.

The Constellation Project is further described in Section 3.

As the capital investment value for the proposed project would be greater than $30M, the development is considered a state significant development (SSD) under the *Environmental Planning and Assessment Act 1979* and the *State Environmental Planning Policy (State and Regional Development) 2011* and therefore requires approval from the State issued by the Department of Planning, Industry and Environment (DPIE).

1.4.4 Synergies with existing operations

Constellation Project will form part of the hub and spoke model of operation run by Tritton Resources. The operational model increases the economic viability of the Project and limits the disturbance footprint and allows for the development of a significant resource without the need for establishment of additional processing and waste (mining) disposal facilities.

There are two main synergistic operational relationships Constellation Project will have with the existing Tritton Copper Mine (excluding issues relating to workforce), namely:

- **Ore receival** – The mined ore from the Constellation Project would be transported to the Tritton Copper Mine for processing. The development consent for Tritton Copper Mine allows for the receival of 1 Million tonnes of ore per annum. It is not anticipated that the receival of ore from Constellation would exceed this threshold even with receival of ore from other operations. The ore would be stored and handled as per current Tritton Copper Mine Operations approved under the development consent**.** Processing would occur through the on-site processing plant as per current operations. Ore receival and processing is approved under the existing development consent for Tritton Copper Mine and occurs as part of current operations.

- **Tailings transport and disposal –** It is anticipated that tailings from processing of ore at Tritton Copper Mine will be disposed of at the existing tailings storage facility located on ML1544 and approved as part of the Tritton Copper Mine. Tritton is investigating the option of returning tailings to the Constellation Project site and depositing underground once the underground mining operation has commenced. If this option is selected, approval for the construction of a paste plant, receival of tailings and deposition of tailings in underground workings will be sought through the development consent for Constellation (i.e. this Project). The transport of tailings from Tritton Copper Mine is permitted as per the development consent for the Tritton Copper Mine, provided it is in accordance with the code of conduct for the transportation of waste rock and tailings on public roads (prepared in consultation with TfNSW and Council to the satisfaction of the Secretary)**.**

1.5 Strategic context

1.5.1 Need for the project

Tritton Operations has capacity in the processing plant, but without the development of additional resources, operation of the mill at full capacity will not be possible. Reduction in, or cessation of operations, could lead to the closure of the mine and processing plant and decrease in workforce numbers. As such Aeris Resources is looking to develop additional resources to replace the mill ore feed from.

The Constellation Project is designed to support the continued operations of the Mill at Tritton. This will:

- Enable the ongoing employment of the Tritton workforce which is sourced from the Bogan Shire LGA and surrounding regions.

- Enable the continuation of a regional exploration project designed to discover and define new deposits which could be developed, leading to ongoing employment opportunities.

1.5.2 Alternatives considered

1.5.2.1 Do nothing

If the Project was not to proceed, The Tritton Copper Operations would either need to find an additional resource to supplement supply to the processing plant, or Tritton Resources would need to begin the cessation of operations at the Tritton mine and processing centre. The following impacts would or could be realised in the local community if the Constellation Project was not to proceed:

- continuation of existing operations until the end of viable mine life;
- no continuation of employment for existing workforce;
- potential negative social and economic effects of mine closure on the local community;
- addition tax revenue from the development would not be realised;
- additional royalties for the State of NSW would not be created;
- any additional potential social and environmental impacts of the project would not occur; and
- the identified mineral resource would remain undeveloped.

1.5.2.2 Other alternatives

Tritton has considered several alternatives as part of mine planning for the Project. The key alternatives (apart from the do-nothing approach) to the current proposed plan are outlined below:

- Larger open cut pit – A large open cut pit was considered as part of the project would increase the surface disturbance area and the area required for placement of waste rock material. Several factors contributed to the selection of the combined smaller open cut pit and underground mining method, including economic feasibility, life of mine planning and environmental impact.
- Haul road alignment –Bogan Shire Council was engaged about the Project and specifically the alignment of the haul road. The feedback from Council was considered in the selection of the preferred haul road alignment options and several alternatives were eliminated following this engagement. The final haul road alignment has not yet been selected, however the current working options are detailed in Section 3.5.2.

1.6 EPBC Act referral

The Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) provides for the assessment of environmental impacts on matters of national environmental significance (MNES).

A preliminary review of the environmental risks of the project has identified negligible to low impacts on MNES.

Tritton will engage with the Commonwealth Department of Agriculture, Water and the Environment (DAWE) to seek confirmation that the action is not a controlled action.

2 Regional context and existing environment

2.1 Project location

The Constellation Project is located approximately 55 km north of Nyngan, 200 km north-west of Dubbo, in the Bogan Shire Local Government Area (LGA). The Project is within the northern region of the Bogan Shire LGA approximately 9 km east of the Bogan River. Constellation Project is 50 km north-east of the existing Tritton Copper Mine.

2.2 Land tenure and Land use

The Project site is located on freehold land and is primarily located within Lot 4 DP751341 with the haul road potentially traversing several freehold lots in addition to utilising or crossing sections of existing state and local roads. The land parcels intersected by the final project design may change slightly due to project optimisation and will be detailed in the EIS, with appropriate consultation with affected landholders undertaken. The land parcels intersected by the Project site are shown in Figure 2-2 and detailed in Table 2-1. Additional parcels will be traversed by the haul road. The preferred haul road alignment has not yet been determined and will be finalised in consultation with landholders and other relevant stakeholders. Initial engagement is being undertaken with all stakeholders along the potential haul road alignments.

Table 2-1: Land parcels intersected by Constellation Project.

Lot/Plan	Project Component	Property
4 / DP751341	Constellation Project site	Okeh
9 / DP751321	Constellation Project site	Okeh
4 / DP 751304	Constellation Project site	Okeh
10 / DP751321	Constellation Project site	Windella

Agriculture is the predominant land use within the Project region. There are also several mining operations within the nearby areas, while forestry, transportation, and village residential also form minor land uses.

Tritton Resources holds several exploration leases within the region covering both the areas of operational mines and surrounding area. The Project is located near the juncture of three exploration leases EL8987, EL6126, and EL8084 (Figure 2-1).

Table 2-2: Regional exploration leases held by Tritton Resources

Lease	Granted	Expiry
EL4962	19/03/1996	19/03/2022
EL6126	15/09/2003	14/09/2021
EL6346	23/11/2004	23/11/2022
EL6785	22/05/2007	22/05/2026
EL8084	10/05/2013	10/05/2023
EL8810	14/12/2018	14/12/2023

Lease	Granted	Expiry
EL8987	5/06/2020	5/06/2022
EL6105	28/07/2003	28/07/2024
EL9285	10/09/2021	10/09/2024

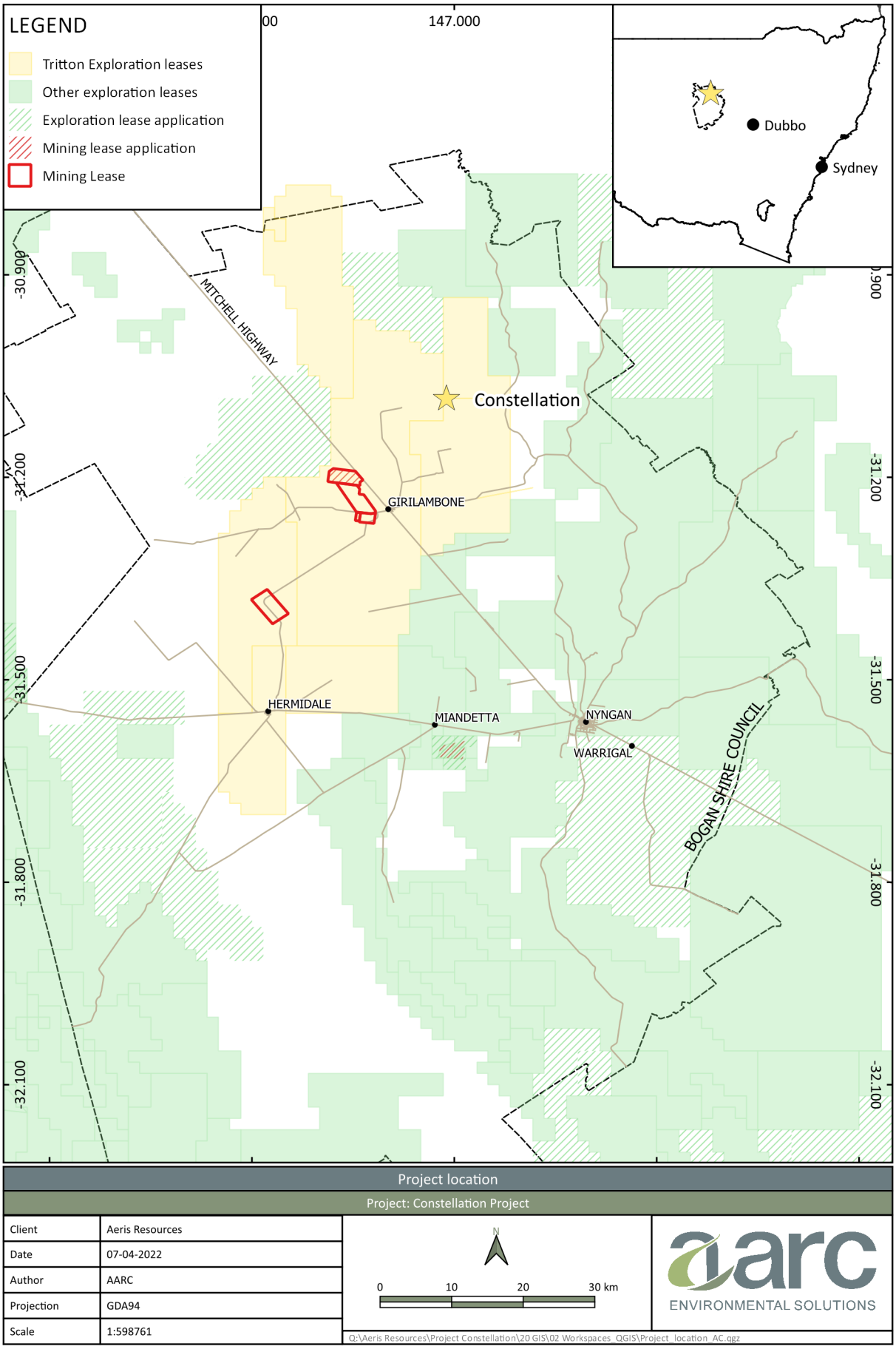


Figure 2-1: Location of Constellation Project in respect to granted mineral titles

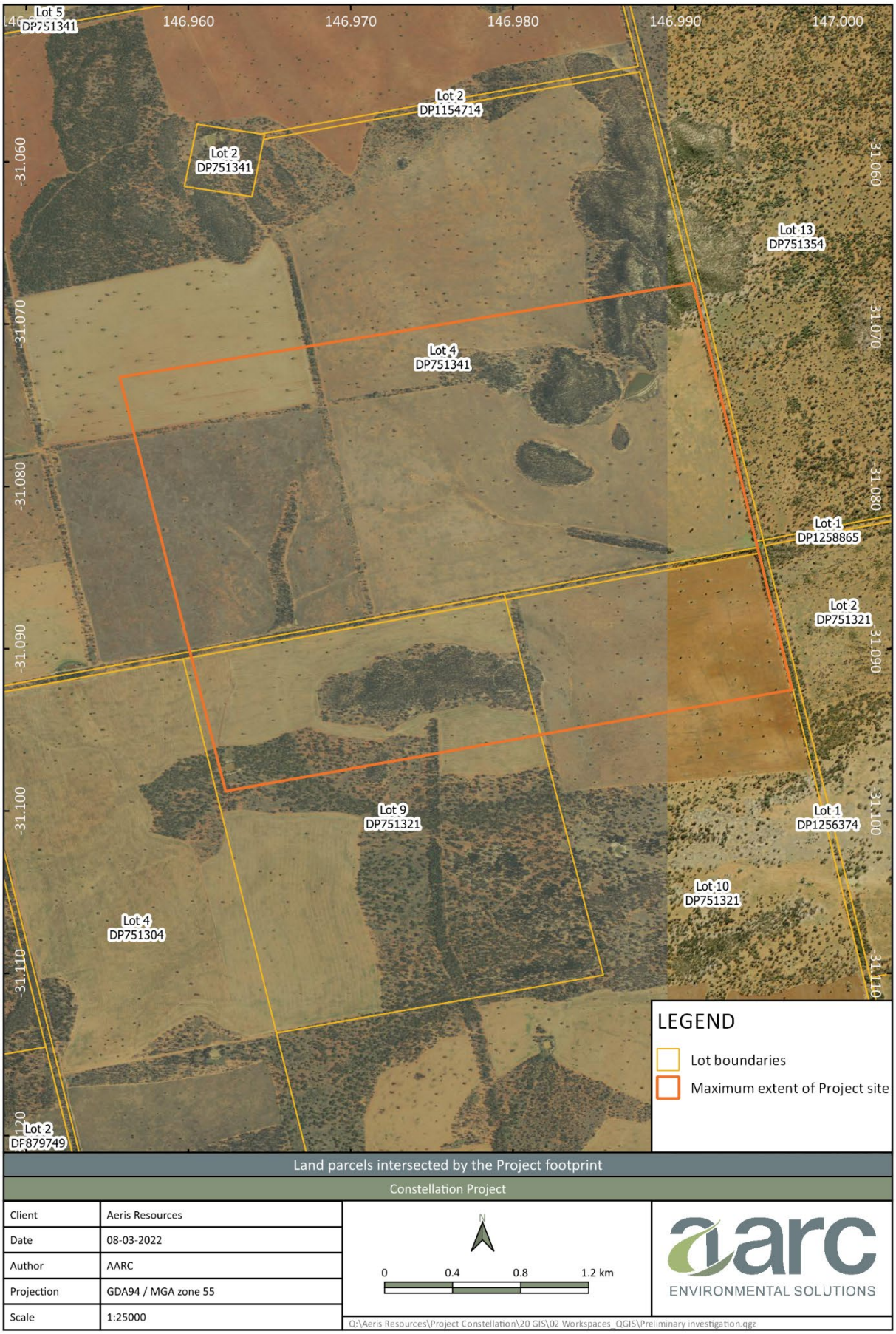


Figure 2-2: Land parcels intersected by the Project footprint

2.3 Climate

The Central West and Orana region experiences a distinct seasonal and regional variation in temperature. Average maximum temperatures during summer in the far north-west can reach 38°C. In winter, the average minimum temperature ranges from 4–6°C on the western plains. Seasonal variations are shown by the monthly average, minimum and maximum temperatures averaged across the region (Figure 2-3).

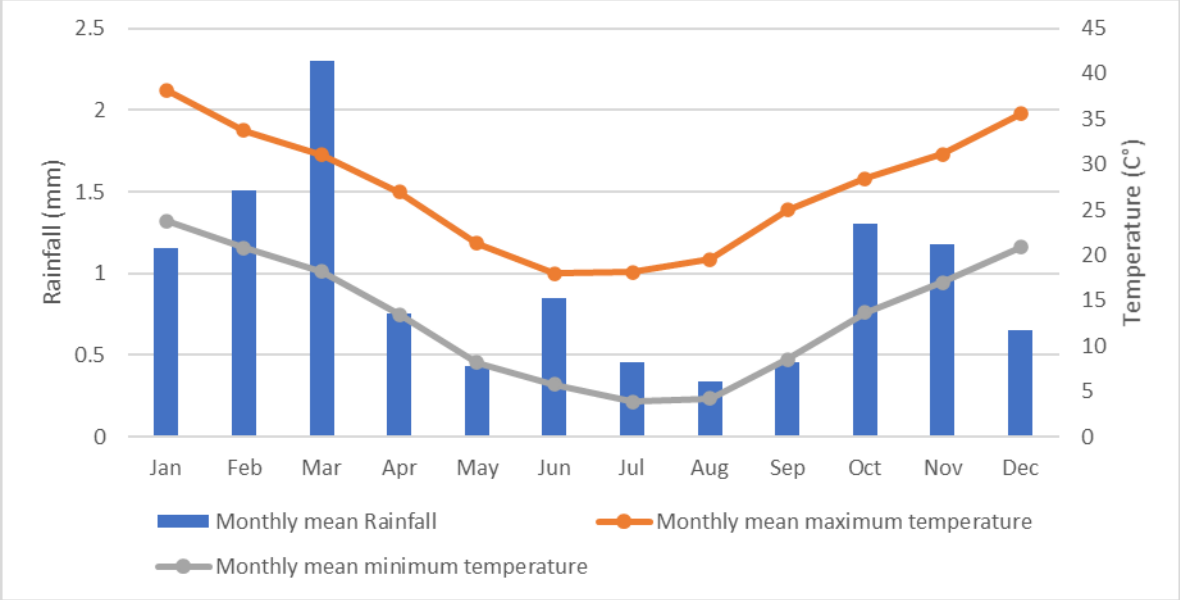


Figure 2-3: Climate of Central West and Orana in New South Wales

From the Bureau of Meteorology weather station 051164 'Girilambone (Okeh) AWS', 16 km from Constellation site.

Rainfall varies considerably across the region. Monthly average rainfall is low for all months (i.e. < 2.5 mm), however, significant rainfall events (thunderstorms) can occur in any month; the maximum monthly rainfall is over 60 mm which has occurred in both January and March.

2.4 Geology

The Constellation Project is located within the Lachlan Fold Belt. This area spans the Nyngan 1:250,000 geological map (Watkins 1996) and Cobar 1:250,000 geological map (Gilligan et al. 1994).

The surface geology of the area consists of the unconsolidated colluvial and residual sedimentary deposits of the Cenozoic that formed from Quaternary to the present and comprises silty clay, mud, and fine medium-grainedquartz, sand, polymictic pebble, to cobble gravel.

The unconsolidated residual sedimentary deposits overlay the deformed and metamorphosed Girilambone Group, a highly prospective ground for base metal deposits in NSW. Girilambone Group comprises fine-grained quartzose quartz-lithic sandstone, micaceous minor intercalations of polymictic conglomerate, siltstone, quartzite, and mafic and intermediate volcanics (Watkins 1996).

Budgery Sandstone (member of the Girilambone Group) outcrops approximately 1 km to the southwest of the Constellation Project site. Budgery Sandstone comprises the massive well-foliated fine to medium-grained quartz rich metasandstone to quartzite (Colquhoun et al. 2020).

Great Artesian Basin (GAB) sedimentary rocks underlie the alluvium of the Macquarie-Bogan Catchment to the east of the Constellation Project site. The rocks are Early to Middle Mesozoic and are overlain by Late Mesozoic age rocks which form a confining layer over the GAB rocks (Giambastiani and Kelly 2010). These rocks are overlain by the Cenozoic (Neogene-Quaternary) unconsolidated sediments which form the alluvial aquifer (Skelt et al., 2004).

2.5 Topography

The Constellation Project site lies in the western plains of NSW. Within this area, the topography is characterised by gently undulating pediplain and locally prominent hills. Elevation at the Constellation Project site ranges from approximately 160 m AHD in the southeast to 170 m AHD to the northwest. A local hill (220 m AHD) is located less than 1 km north of the deposit. The site location and topography map is shown in Figure 2-4.

2.6 Hydrology

The Constellation Project site is located within the lower Bogan River water sources of the Macquarie-Castlereagh Water Resource Plan Area (WRPA). The Macquarie-Castlereagh WRPA covers all of the surface water sources of the Macquarie, Bogan and Castlereagh rivers in the northern part of the Murray-Darling Basin in NSW.

The Macquarie River is a tributary of the Barwon-Darling River, beginning in the Great Dividing Range south of Bathurst, and flows in a north-westerly direction for 960 km until it joins the Barwon River near Brewarrina.

The Bogan River and its ephemeral tributary creeks are the primary surface water resources in the local area. The Bogan River to the east of the Constellation Project site (refer Figure 2-4) starts in the Hervey Range near Peak Hill and flows parallel to the Macquarie River across the northwest to Nyngan and to join the Darling River near Bourke.

In the lower part of the Bogan River catchment to the east of the Constellation Project site, a series of creeks break away from the Macquarie River, connecting with the Bogan River. Duck Creek is located to the east of the Bogan River and flows from the Macquarie River near Warren and joins the Bogan River downstream of the Nyngan.

Importantly the Project is located outside of the areas regularly inundated – particularly the areas associated with the floodplain of the Bogan River Figure 2-5. The measured inundation of the Project site and surrounding area shown in Figure 2-5 shows that apart from the existing farm dams on site, the site has never had standing water present.

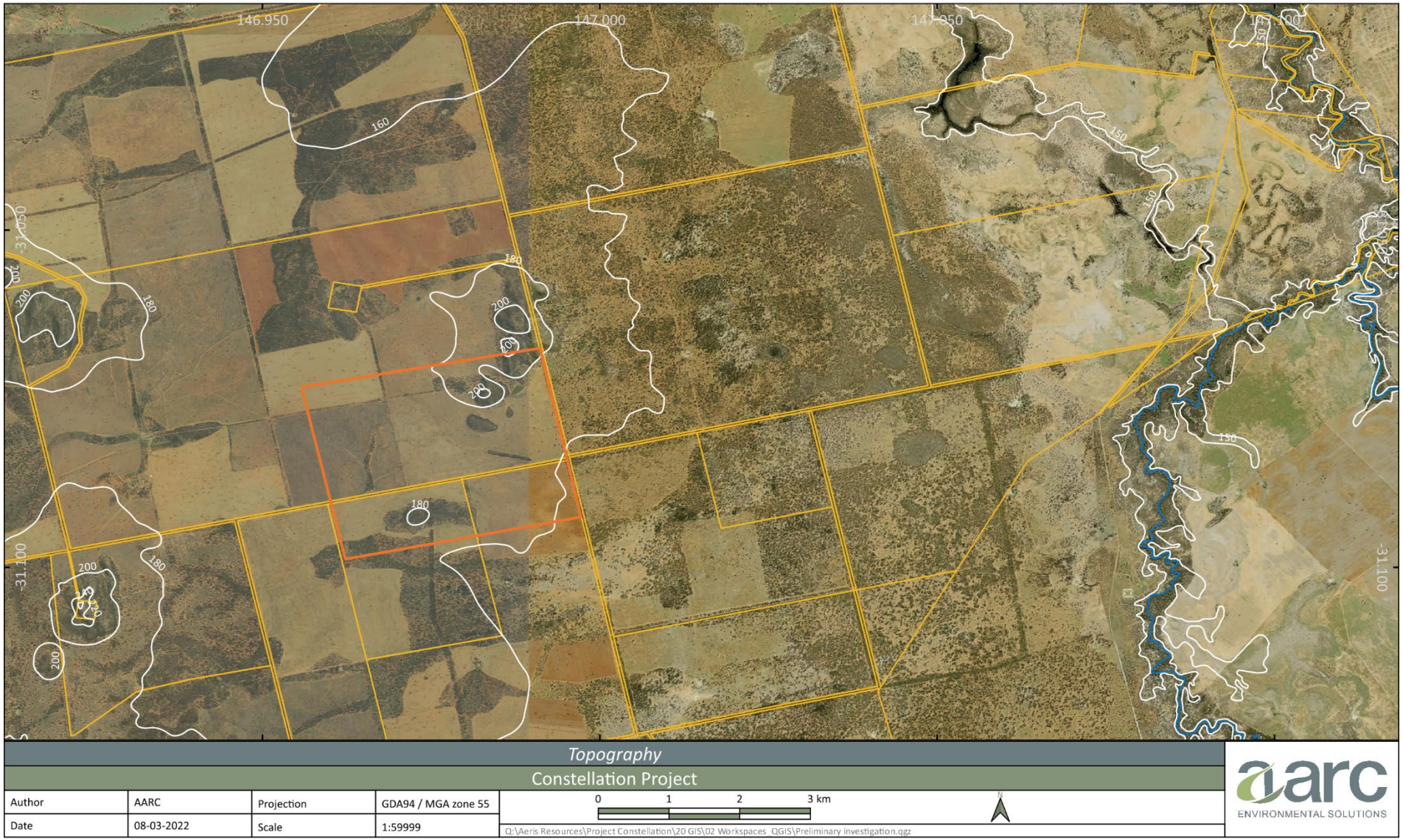


Figure 2-4: Topography of the Project site and surrounding area

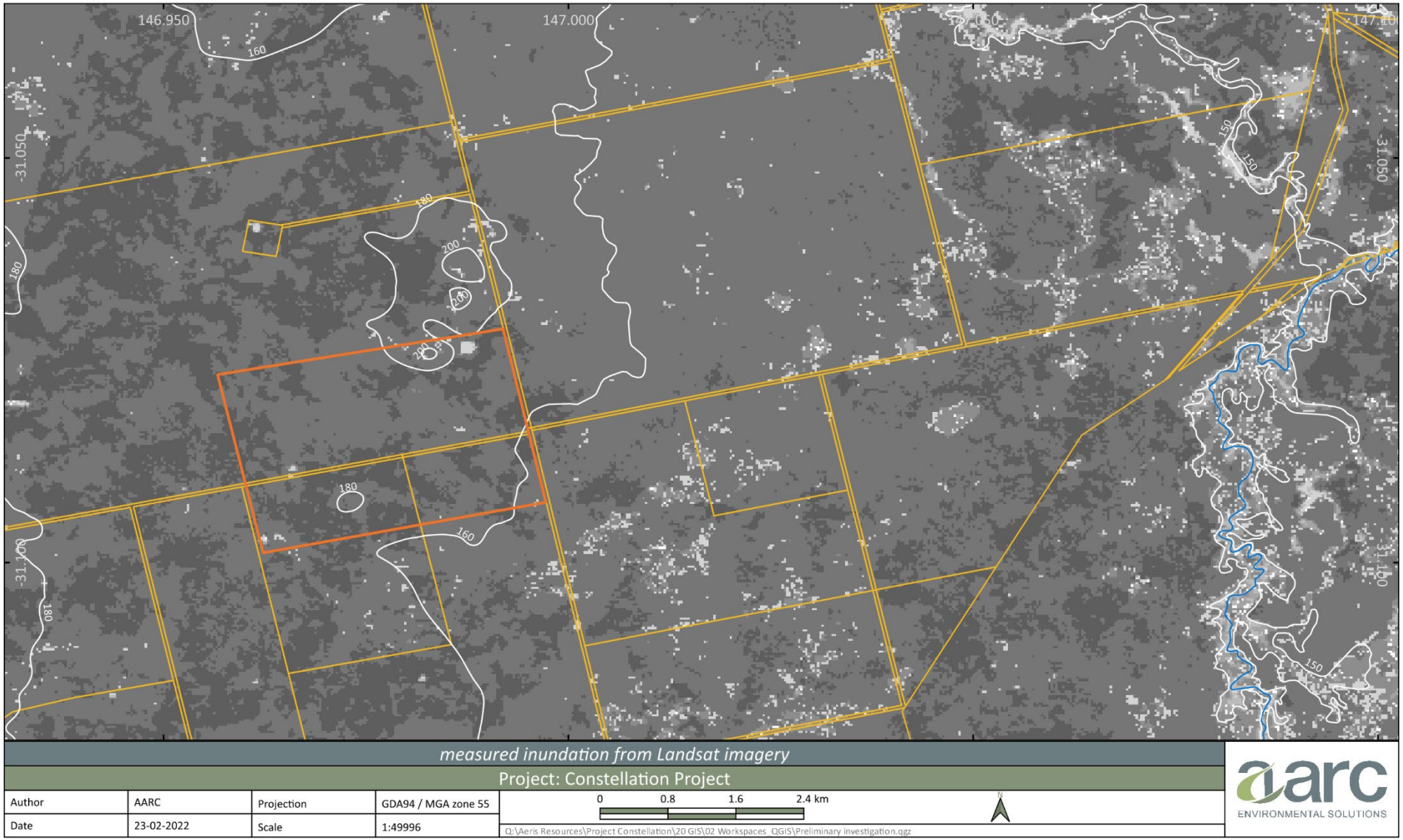


Figure 2-5: Map showing areas of regular inundation defining the floodplain extent of the Bogan River

2.7 Hydrogeology

Groundwater at the Constellation Project site occurs predominately in fractured rock aquifers (i.e. faults and fractures) within the Lachlan Fold Belt. The groundwater is managed under the NSW Murray-Darling Basin Fractured Rock Groundwater Sources Water Sharing Plan (WSP). Groundwater within the fractured rock aquifer is stored and moves through fractures, joints, bedding plains, faults and cavities within the rock mass.

Based on the groundwater monitoring conducted at the Murrawombie mine (approximately 20 km to the southwest) the depth to the water table ranges from approximately 10 m to 50 m below ground level (bgl) with temporal variation of approximately 10 m. There were no shallow strikes of groundwater during exploration drilling program, indicating that there is no perched or shallow groundwater source underlying the Constellation Project site.

Five groundwater monitoring bores have been installed at Constellation which have been fitted with groundwater level loggers (Figure 2-7). Groundwater levels from initial reading of installed groundwater loggers are shown in Figure 2-6.

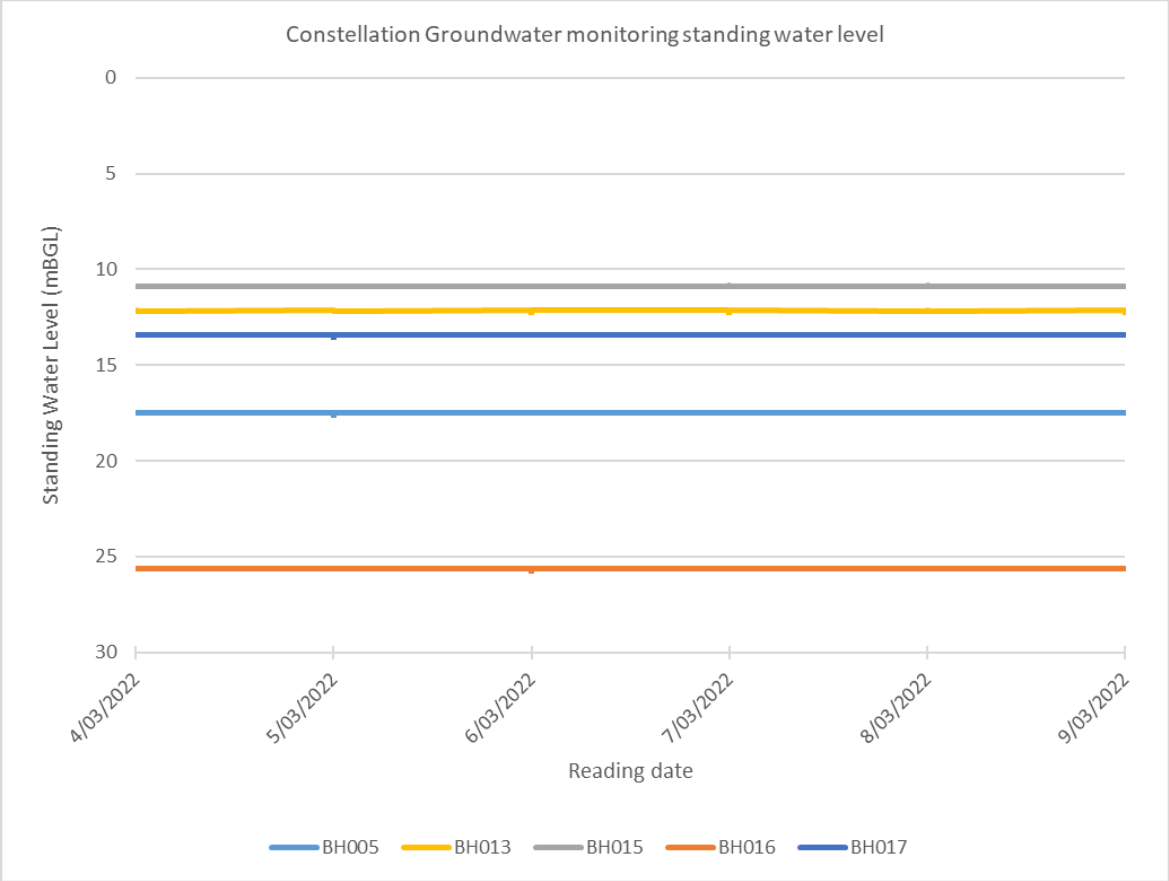


Figure 2-6: Constellation Project groundwater standing water levels

It is expected that the groundwater flow will replicate the topography of the landform and would flow east towards the Bogan River. However, given the fractured nature of the rocks, the groundwater would be restricted in flow and controlled by both the localised fracture system and regional structural features. To the east of the Constellation site, the fractured rock aquifer is overlain by the Great Artesian Basin (GAB) which is overlain by alluvial aquifers.

It is expected that the groundwater source at the Constellation site is low yielding of brackish to saline water, which is consistent with the groundwater quality at Murrawombie mine at the regional bores. The Bogan River catchment is generally unfavourable for the development of groundwater resources, with aquifers in the alluvium being relatively thin and low yielding, and the groundwater generally brackish or saline (WRC 1984; Water NSW 2019).

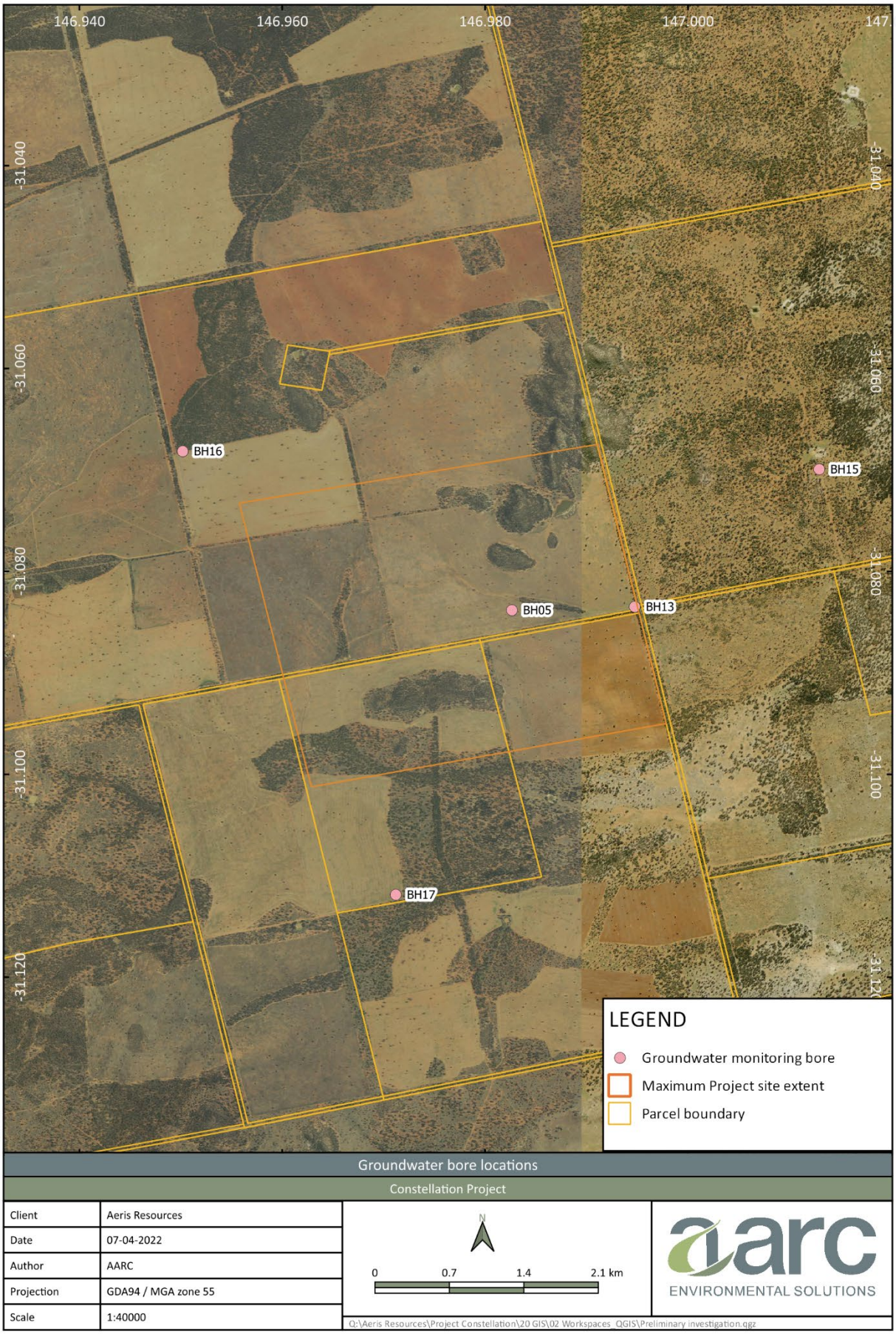


Figure 2-7: Groundwater monitoring network bore locations

2.7.1 Regional bores

A search of the Australian Groundwater Explorer (BoM 2021) and Water NSW Real-Time Data (Water NSW 2021) was undertaken to identify registered bores within approximately 20 km of the Constellation Project site. There are 50 bores within the search area, the majority of which are located east of the Bogan River and are associated with the GAB and/or overlaying alluvium.

The bore log of nearest registered groundwater bore is approximately 8 km south of the Project site indicates drilling encountered unconsolidated sediment (clay) to 30 m bgl which was underlain by slate and quartz.

2.7.2 Conceptual model

A conceptual model based on existing information and understanding of the groundwater system at the Constellation Project site is shown in Figure 2-8. The cross section is orientated from southwest to northeast from the Girilambone Mine, through the Constellation Project site and passing through the Bogan River and unconsolidated alluvial sediments to the east.

Based on the conceptual model, the water table occurs within the fractured rock groundwater source at a depth of between 10 and 50 m bgl and groundwater flows east towards the Bogan River. Rainfall recharge to the fractured rock aquifer is likely to be minimal. Rainfall recharge and river leakage likely occurs within the alluvium to the east of the Constellation Project site. Within this area there may also be inflow to fractured rock aquifers from downward percolation of groundwater from overlying alluvium. Discharge from aquifers occurs at the break of slope, in drainage lines, via production bores or where structural or stratigraphic conditions allow.

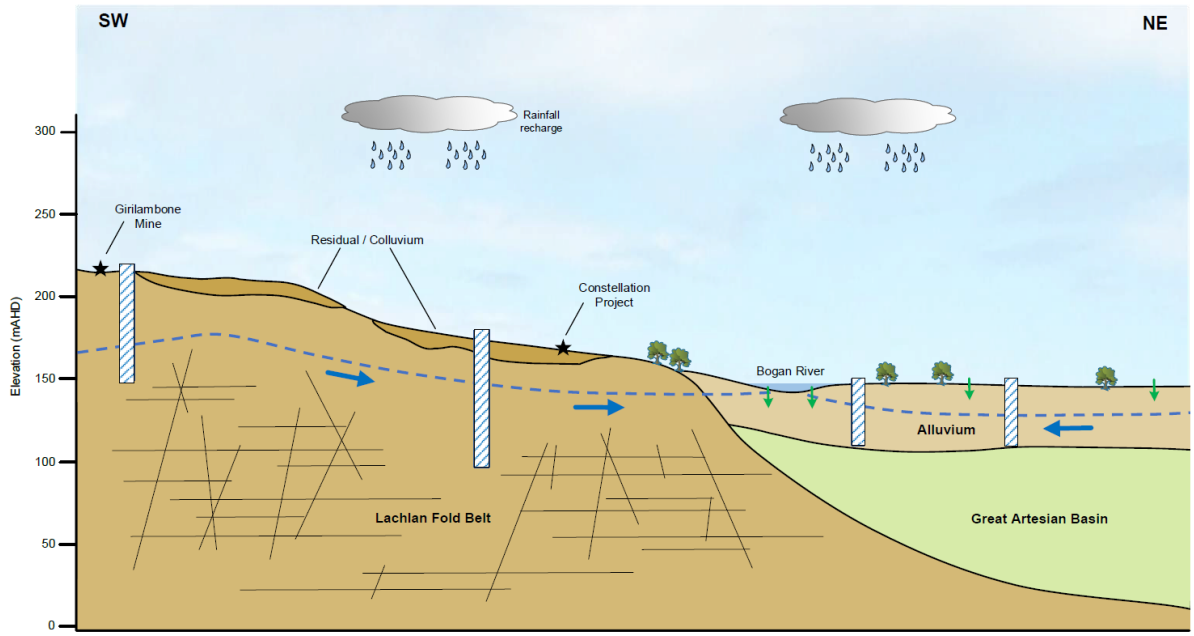


Figure 2-8: Conceptual groundwater model for the Constellation Project location

2.7.3 Groundwater dependant ecosystems (GDEs)

There are no high priority GDEs, listed in the NSW Murray-Darling Basin Fractured Rock Groundwater Sources WSP, within close proximity to the Project.

A search of the Groundwater Dependent Ecosystem Atlas (BoM 2021b) was undertaken to identify potential GDEs surrounding the Constellation Project site. Based on the conceptual model -indicating a groundwater flow direction towards the Bogan River GDEs in this direction were considered to have the greatest potential of impact from the Project.

There are areas mapped as both low and high potential aquatic GDEs along the Bogan River to the east of Project site Figure 2-10. These potential aquatic GDEs are associated with the Bogan River watercourse and associated floodplain water bodies.

Low and high potential terrestrial GDEs are mapped across much of the unmodified remnant vegetation surrounding the Project area. These potential terrestrial GDEs are from regional studies and are associated with areas mapped as Eucalyptus woodlands, including *Eucalyptus populnea* and *Eucalyptus viridis* dominated woodlands). Based on the lack of observed shallow groundwater, the level of dependence of the terrestrial GDEs on groundwater is likely to be low.

Locations of areas mapped as high, moderate or low terrestrial and aquatic GDEs are shown in Figure 2-9.

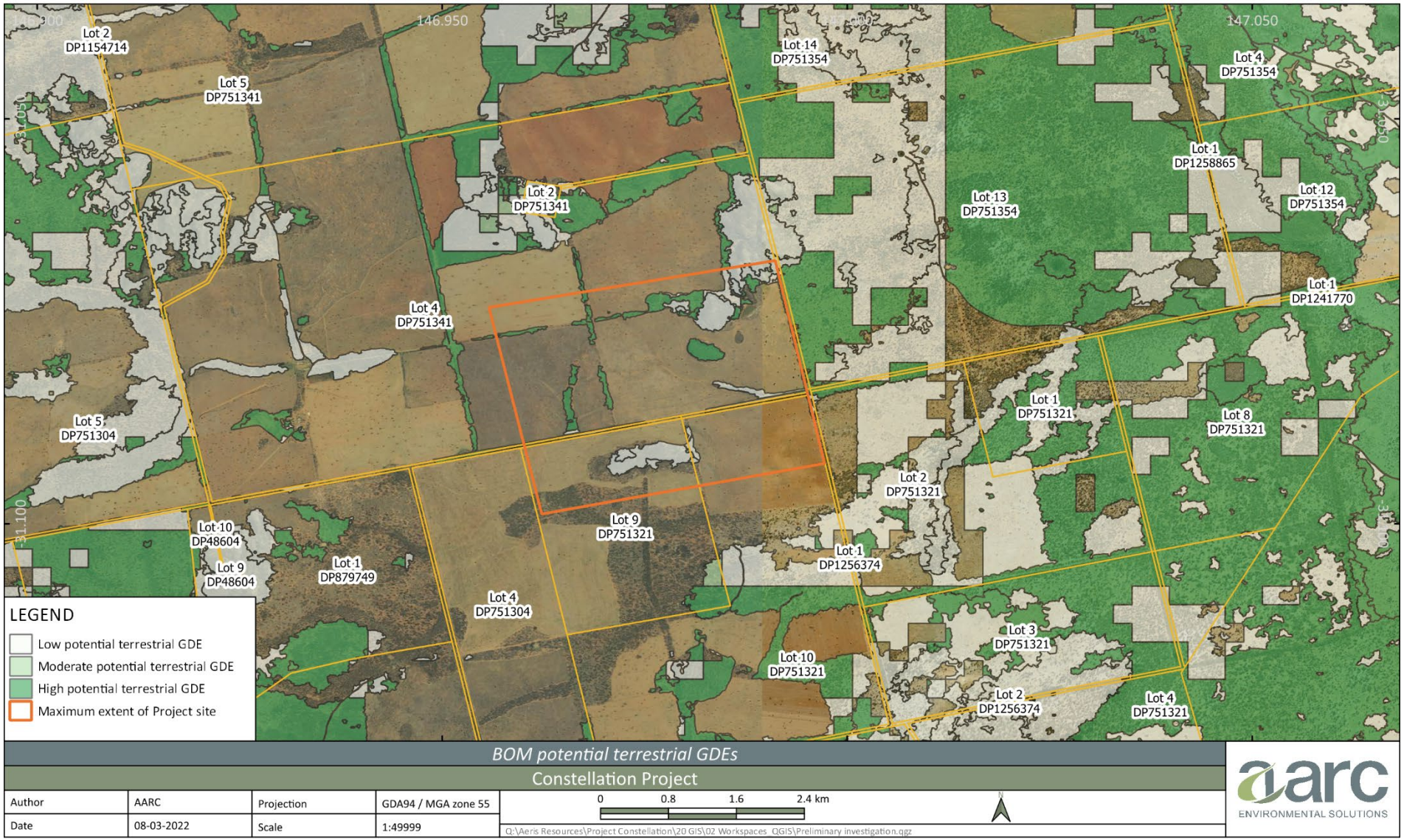


Figure 2-9: Potential terrestrial GDEs surrounding the Project

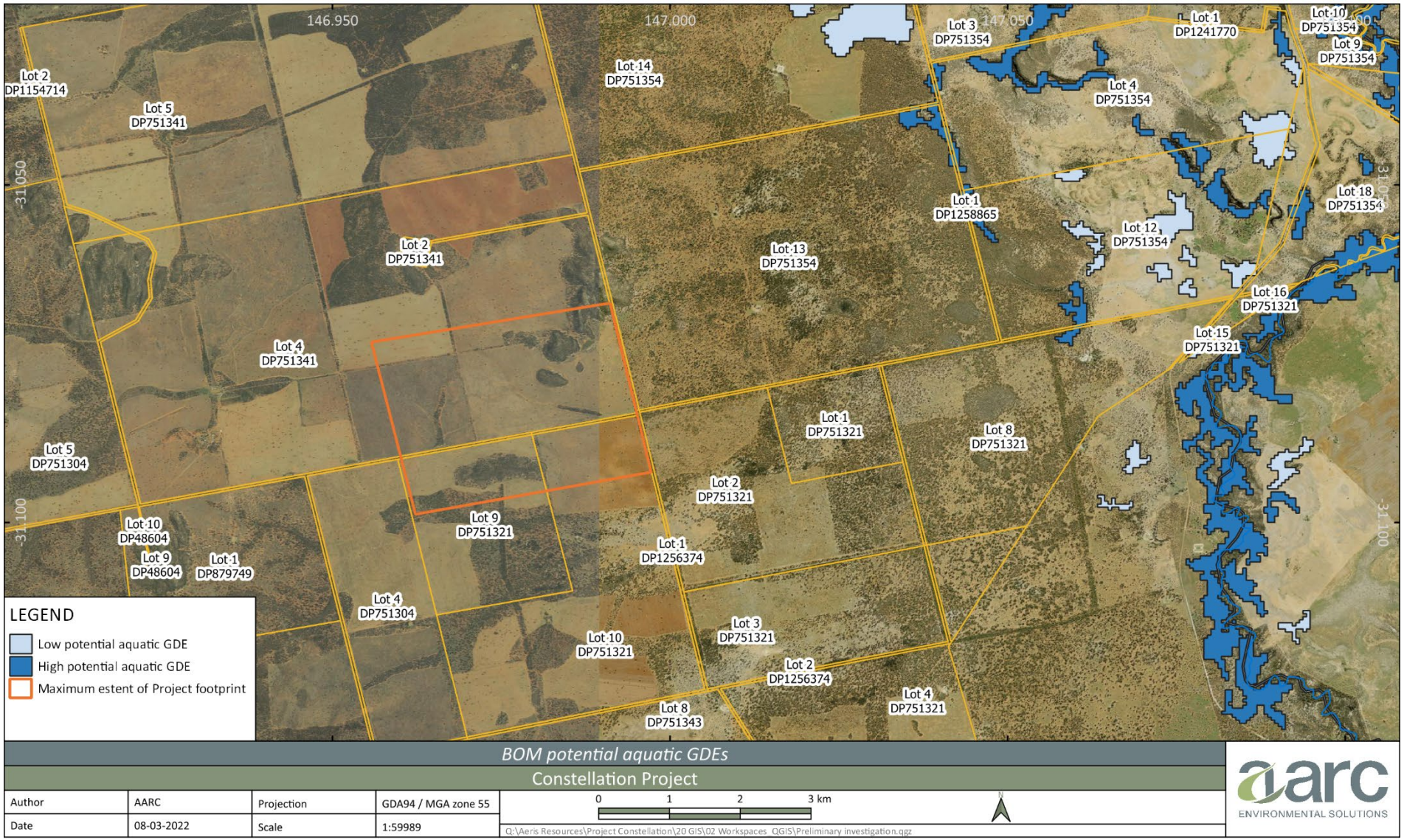


Figure 2-10: Potential aquatic GDEs surrounding the Project

2.8 Vegetation

The Project site comprises a mix of formerly cleared agricultural land and wooded vegetation, the latter occurring as two east-west strips of vegetation.

2.8.1 State vegetation mapping

The state vegetation mapping (State Vegetation Type Map: Central West / Lachlan Region Version 1.4. VIS_ID 4468) maps the majority of the Project area as non-native vegetation – particular areas where significant modification of remnant vegetation has occurred through historic agricultural practices. Areas where remnant vegetation is mapped as present have been mapped as Western Peneplain Woodlands and with smaller areas of Inland Rocky Hill Woodlands.

It is understood that the final haul road alignment will intersect multiple vegetation communities (PCTs) which may or may not be represented by those in Table 2-3. The exact vegetation communities interested by the haul road will be determined once the final alignment is selected.

Table 2-3: Representative vegetation communities within and surrounding the Project site

PCT ID	PCT Name
98	Poplar Box - White Cypress Pine - Wilga - Ironwood shrubby woodland on red sandy-loam soils in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
103	Poplar Box - Gum Coolabah - White Cypress Pine shrubby woodland mainly in the Cobar Peneplain Bioregion
104	Gum Coolabah woodland on sedimentary substrates mainly in the Cobar Peneplain Bioregion
105	Poplar Box grassy woodland on flats mainly in the Cobar Peneplain Bioregion and Murray Darling Depression Bioregion
176	Green Mallee - White Cypress Pine very tall mallee woodland on gravel rises mainly in the Cobar Peneplain Bioregion
180	Grey Mallee - White Cypress Pine woodland on rocky hills of the eastern Cobar Peneplain Bioregion
244	Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).

2.8.2 Vegetation Zones

Initial vegetation assessments have been completed at the Constellation site as part of the field surveys which will be completed to prepare the Biodiversity Development Assessment Report (BDAR) for the Project. The field surveys determined that the state mapped vegetation at the Project site was the incorrect PCT, and vegetation was PCT 103 rather than the mapped PCT 105 (both PCTs are Western Peneplain Woodlands).

Three vegetation zones are mapped for the Constellation site, intact, modified and cleared land. Intact vegetation consists of the relatively small to moderate sized patches of remnant vegetation surrounded by more extensive areas of modified agricultural land. Cleared land is represented by vehicular tracks and the ploughed paddock located along the southern edge of the site.

2.8.3 Habitat features

Timbered areas of the site provide a range of habitat features including stag trees, hollow bearing trees (mostly in Eucalyptus intertexta), woody debris comprising fallen trees and scattered timber, shrub patches and grassy swards.

Habitat features within areas of cleared land were few, mainly comprising dense areas of ground layer shrubs and grasses with little woody debris found. The lack of habitat features in these areas likely reflect long term agricultural and/or pastoral land use.

2.8.4 Weed species

A number of weed species were recorded, more commonly found within the cleared agricultural areas of the site. Within the northern timbered patch, areas of dense *Verbesina encelioides** (Goldweed), *Sigesbeckia orientalis* (Indian Weed), *Solanum nigrum** (Blackberry Nightshade) and *Malvastrum americanum** (Spiked Malvastrum) were observed where a localised depression provided for greater soil moisture retention and availability.

2.8.5 Vegetation condition

A number of the older trees within the southern timbered area showed declining health through canopy dieback. Individuals of *Callitris glaucophylla* were found in a senesced condition, suspected of having suffered from previous drought impacts during 2017-2019. Further, a number of shrub species within the southern timbered patch showed signs of unusual branch death considered to be a result of spray drift from previous agricultural activities undertaken in the paddock to the south.

Figure 2-11: Map showing state mapped vegetation within the Project area and surrounds.

3 Project description

3.1 Overview

Constellation Project is a relatively small planned open cut, and later underground, mining operation that would target the Constellation deposit. Depleting production at the existing mines of Tritton and Murrawombie will be replaced (in part) by ore feed from the Constellation orebody. The goal is to feed ore from Constellation to the existing processing facilities at Tritton within two years. The ore feed from the Constellation deposit will provide a high grade, high value ore feed to the Tritton mill.

The final Project design is still being determined through the pre-feasibility study; however, the Project in general would:

- mine the copper bearing ore through open cut and underground methods;
- either transport the ore to Tritton mine for processing or leach the ore on-site depending on mineralogical characteristics and economic value ;
- establish typical mine site facilities on site, including for administration, water management and ore management; and
- establish a waste rock emplacement (WRE) on site.

An appropriate haul road will be established for transport of ore to Tritton mine for processing. The final alignment of the haul road has yet to be finalised as the alignment is being determined through engagement with landholders along with economic and environmental considerations. All landholders through which the final haul road could potentially traverse have been engaged about the alignment.

Further detail on the Project is provided in the following sections. The report describes project elements which may or may not be included in the final Project, which have been included to ensure the scope of assessment covers all potential Project elements. The final Project may not include all options outlined here with the final Project design being subject to further consultation and feasibility work. The final Project design and relevant assessment will be detailed in the Environmental Impact Statement.

3.2 Exploration and resource definition

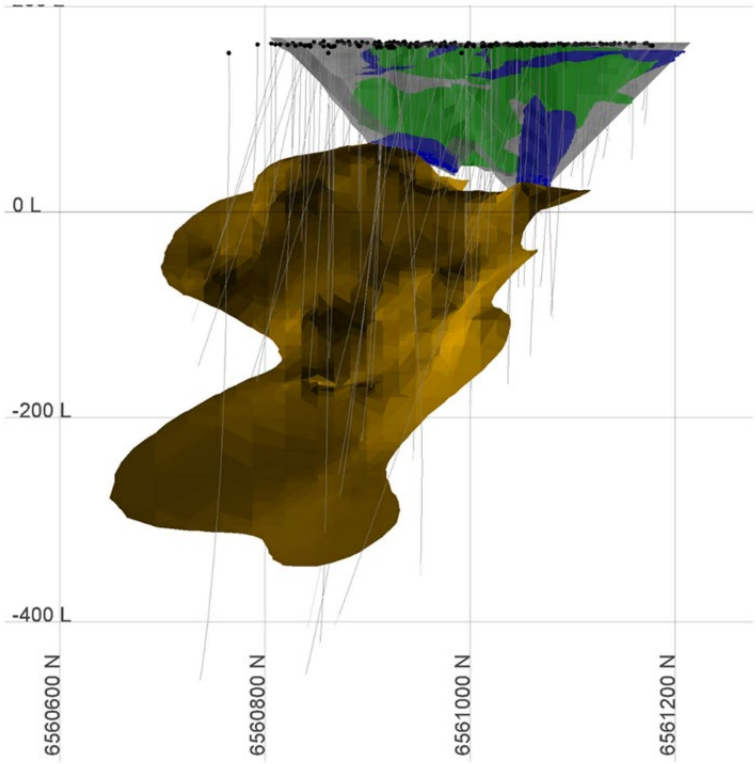
Tritton has undertaken an extensive exploration program to identify and define the Constellation deposit. To date this has consisted of an airborne electro-magnetic survey, moving loop transient electromagnetic survey, diamond drill holes, and reverse circulation (RC) drill holes.

In December 2021 Aeris announced a maiden Mineral Resource estimate for the Constellation deposit, of 3.3 Mt at 1.4% copper (47kt contained copper). In addition, an Exploration Target has been defined for the primary mineralisation below the current Mineral Resource down to RL-350m, approximately 750m down-plunge from the base of the Mineral Resource.

The Mineral Resource is based on an exploration and resource definition drill program totalling 144 drill holes and includes oxide (copper hydroxides), supergene (chalcocite) and primary copper (chalcopyrite) mineralisation.

An Exploration Target of 6Mt – 8Mt at a copper grade of between 1.7% and 2.2% (contained copper metal between 100kt to 180kt) has been defined for the primary sulphide mineralised system beneath the reported Mineral Resource at the Constellation deposit. The Exploration Target represents the down plunge continuation of the reported Mineral Resource at Constellation, starting from approximately 200m below surface and extending down plunge approximately 750m (RL-350m) below the reported Mineral Resource.

The Exploration Target is based off 63 diamond drill holes totalling 20,092m, of which 31 drill holes are awaiting assay results.



Note: Image shows the indicated (green) and Inferred (blue) Constellation Mineral Resource within the reporting pit shell (grey). The Constellation Exploration target is shown by the brown wireframe.

Figure 3-1: Long section view of the deposit looking northwest

3.3 Material estimates

The final material quantities will be determined as the exploration program provides further definition on the Project resource and the mine design is optimised. Initial material estimates are provided in Table 3-1.

Table 3-1: Indicative mining tonnages

Source	Material Type	Destination	Tonnage (Mt)
Open Pit	Sulphide material	Tritton Processing Plant	1.7
	Oxide	Heap Leaching	1.3
	Waste Rock	Waste Rock Emplacement	21
Underground mine	Sulphide material	Tritton Processing Plant	4[1]
	Waste Rock	Open Pit Void or Waste Rock Emplacement	<1

3.4 Production schedule

The open cut operation at the Project is anticipated to have a time frame of 3 years from the commencement of mining operations. It is anticipated that an additional period of 6 months, preceding the commencement of mining will be required for construction activities.

The underground operation will have a life expectancy of an additional 10+ years (approximately). Underground mining is expected to commence towards the end of open cut mining operations. As the initial underground mining activities (box cut and decline establishment) will not provide ore to the mill, there is expected to be some overlap of open cut and underground mining activities.

Currently the heap leaching operation has an expected life of 6-7 years following the commencement of leaching which would start approximately at the same time as open pit operations. However the length of the leaching process will be refined during through further Project planning and may vary (either more or less time) from the current life expectancy of the operation.

It is anticipated that ore production rates will be approximately 0.5 Mtpa, of ore delivered to the Tritton mill. This will be refined through the Project planning phase and finalised ore production rates will be detailed in the EIS.

3.5 Project layout and components

3.5.1 Constellation Project site facilities

The final Project design and layout are yet to be determined, however, the conceptual design shown in Figure 3-2, provides an indication of the elements and maximum footprint for the Project. The main components of the Project include:

- Open Pit;
- Run of Mine (ROM) Pad;

[1] The volume of sulphide material from the underground mine is a preliminary estimate and will be refined through additional drilling.

- Vent and return air rises;
- Ore Stockpiles;
- Waste Rock Emplacements;
- Dewatering Pond;
- Electrical infrastructure, including;
    - Powerlines;
    - Generators;
    - HV switch;
    - Solar plant (potential);
- Administrative facilities, including:
    - Offices;
    - changeroom;
    - ablutions;
    - crib room;
    - car park.
- Workshop;
- Washdown;
- Laydown;
- Water management infrastructure;
    - Sediment basins
    - Bunds
- Heap Leach pad and copper concentrating facility (eg. SX plant)
- Emulsion storage
- Paste plant
- Shotcrete batch plant
- Explosives Magazines
- Haulage road, access and site roads.

These are typical of open cut mineral mining operations.

3.5.2 Haul road alignment

The alignment of the haul road is yet to be determined and will be finalised in consultation with landholders and other stakeholders (e.g. Bogan Shire Council and Transport NSW). The haul road alignment will leave the site and head west along a haul road to be established to the south of an existing property access road and tree line. The proposed alignment of this section of the haul road is based on the landholder preferences so the tree line

provides a visual shield to the haul road and haul trucks. The haul road will likely follow Okeh road south for a distance until it turns west and heads to the Mitchell Highway at some point yet to be finalised.

Initial landholder consultation has assisted in refining the alignment of the haul road down to two potential options which are currently being considered. These options are shown on Figure 3-3. Additional landholder consultation as well as biodiversity and heritage assessments will assist in the final haul road alignment determination.

3.5.3 Powerline alignment

The alignment of the powerline has not yet been determined. The powerline may follow the road alignment, however, the considerable distance involved in achieving this poses an economic challenge. An additional powerline alignment option (Figure 3-3) is being considered. The alignment of this option means the distance between the existing 66 kV transmission line and the Project site is considerably shorter than following the road. This potential powerline alignment has been included in landholder consultation and will be considered as part of the biodiversity and heritage assessments. The terrain along this alignment is unlikely to allow the haul road and powerline to be co-located here.

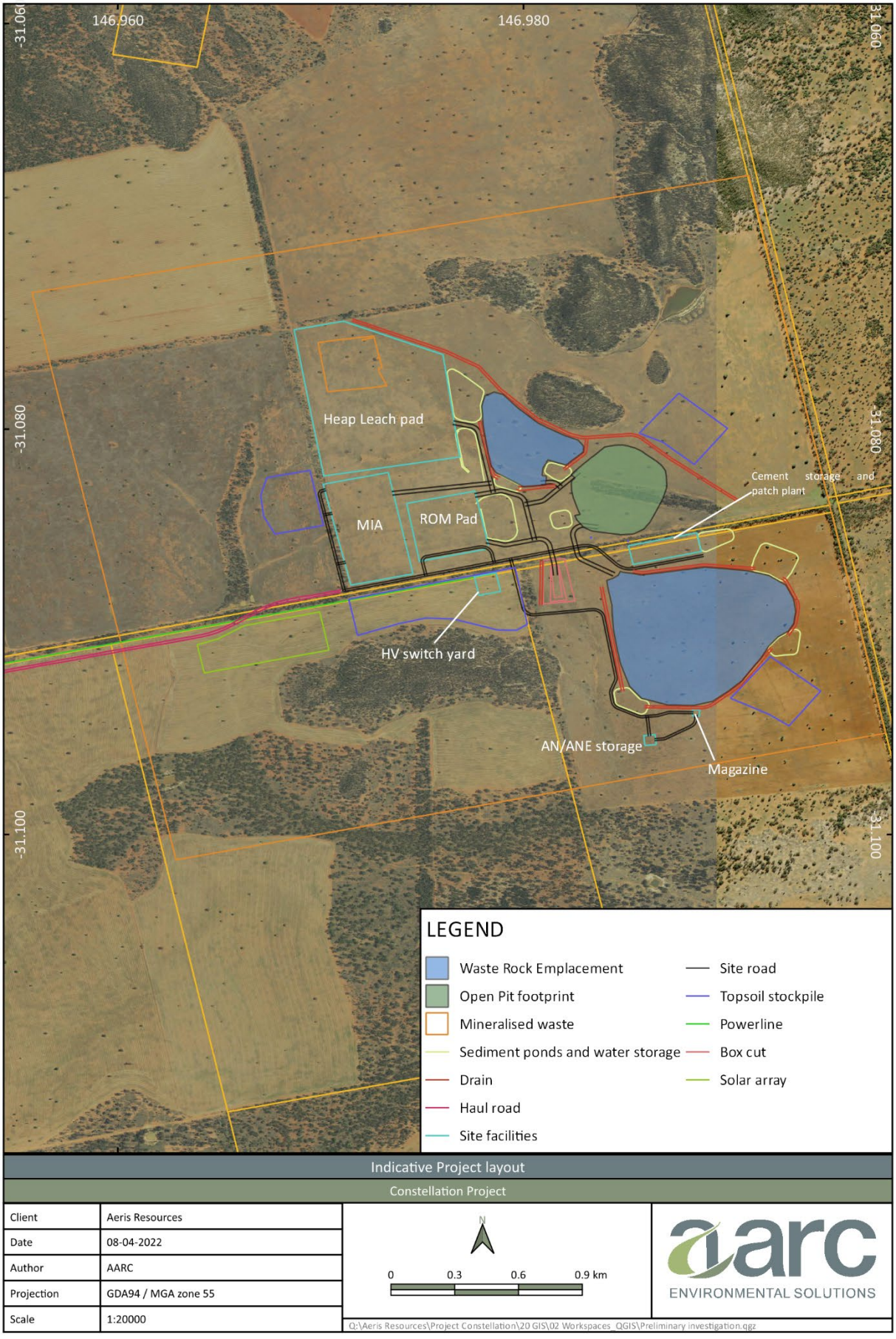


Figure 3-2: Conceptual Project layout showing Project elements and maximum disturbance footprint

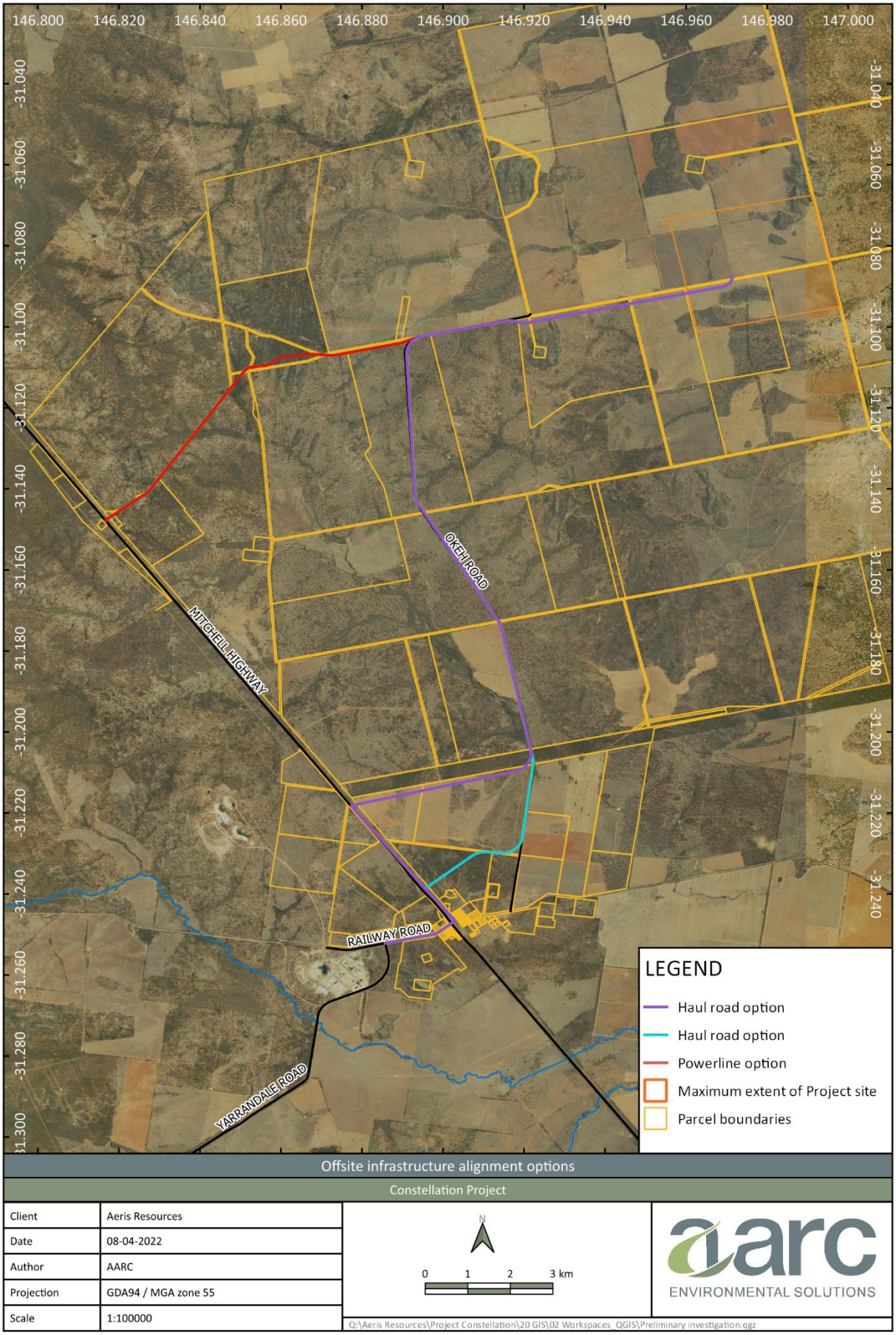


Figure 3-3: Map showing haul road and powerline options

3.6 Mining operations

The open cut mining operations will be undertaken by a contractor appointed by Tritton Resources. The agreement with the contractor will detail the nature of the open cut mining operations to be conducted.

3.6.1 Open cut mining methods

The initial phase of mining will be via open cut mining methods. It is anticipated that mining will occur via standard drill, blasting and extraction methods used in other Tritton operations in the region as well of other mineral mines.

Open cut mining will occur to an approximate depth of 150m (subject to further resource definition and economic feasibility analysis) and will have a surface footprint of approximately 18 ha.

Dewatering of the pit will be required, although the expected inflow volumes are still being determined. Water from the pit will be pumped to a dewatering pond appropriately sized based on the expected inflow volumes. This water will be incorporated in the site's water management system (Section 3.6.6).

3.6.1 Underground mining methods

Underground mining would only be undertaken once the open cut operation has been completed. The timeframe for the establishment of the underground operation is to be determined, however, would be undertaken using established methods that are described below.

3.6.1.1 Box cut and decline

The underground workings would be accessed via a box cut and portal. The box cut would be an elongated excavation that would permit access to the portal and decline via a haul road. The dimensions of the box cut are yet to be finalised, however, it would be suited to geotechnical conditions and allow for the movement of development equipment.

Once vegetation and soil material have been removed and stockpiled, and any necessary surface water management structures have been constructed, the box cut would be excavated by conventional load and haul methods. Once initial excavation has been completed, blasting would be undertaken to fragment remaining material which would be removed using load and haul techniques.

Once the box cut has been established such that material of suitable competency (i.e. suitably solid to establish a decline) has been exposed at the base of the box cut the box cut walls would be stabilised using a combination such as rock bolts, cable bolts and shotcrete, as determined by the geotechnical conditions. The portal to the underground workings would be established through a combination of drill and blast, and excavation and haulage techniques. Roof support would be established at the entrance to the portal using support such as rock bolts, cable bolts and shotcrete.

Once the portal was established, infrastructure required for underground mining operations would be installed during the progressive of the decline, which indicatively includes:

- underground power, including transformer for conversion of voltage;
- ventilation system including surface rises; and
- water supply and distribution infrastructure for underground mining operations;

It is anticipated that a single heading will be established initially, however, the final project design may include dual decline headings from the portal or from the initial extraction level. This will be determined through additional mine planning and the final design specified in the EIS.

Given the proximity of the box cut to the ore body a relatively short decline is required for access to individual mining areas. The specification of the decline and development drives (where required) will be specified in the

EIS. The decline and development drives would be developed using conventional underground drill and blast techniques. A jumbo (underground drill rig, would drill a pattern of holes (the pattern to be determined by the blasting engineer or shot firer) which would be loaded with explosives that would be used to fragment the material by blasting for excavation.

Fragmented material would be extracted using an underground loader and transferred to underground haul trucks and transported to the waste rock emplacement area or placed within the open cut pit. Some waste rock may also be used for stope backfilling operations.

3.6.1.2 Ventilation and emergency egress

Although initial ventilation will be provided by temporary ventilation infrastructure, once the decline progresses sufficiently, ventilation rise(s) would be installed to ensure sufficient ventilation to underground workings. Emergency egress would also be installed and would likely be co-located with one or more of the ventilation rises. The method of establishing the ventilation rise and emergency egress is yet to be determined, however, would be via an established technique such as long-hole raise mining or up-hole raise-boring.

3.6.1.3 Stoping operations

Underground mining would be conducted using conventional bench or single level open stoping mining techniques which are well suited to extract ore from elongate relatively flat (~40°) orebodies. The proposed mining method would generally entail:

- Construction of production drives along the long axis of the ore body via Jumbo
- Drilling a series of fans of holes between the lower and upper drives
- Loading of each fan of holes with pre-packed explosives
- Fragmenting the ore and allowing fragmented material to fall into the stope from where it would be extracted and transported to the surface;

The detailed design of the stopes will be determined following completion of additional drilling to better define the orebody shape at a localised level and determination of geotechnical characteristics. Geotechnical conditions will determine the need to backfill stopes and a geotechnical assessment is being completed to determine this requirement. Where backfilling is undertaken, this would be done following the completion of mining within each stope.

Backfilling would use paste fill for the majority of stopes, and where possible for some stopes, waste rock material sourced preferentially from underground development. The inclusion of a paste plant on site to allow for backfilling of stopes with tailings returned from processing plant will be assessed and detailed in the EIS.

3.6.1.4 Paste fill plant and operations

The option of including a paste fill plant for the return of tailings to the underground workings is being investigated as part of the Project. The location of the paste fill plant is yet to be determined and will be finalised following the completion of the underground design and consideration of environmental values on site.

Following the processing of ore at Tritton Copper Mine, tailings may be taken from the processing line or from the existing tailing storage facility and trucked to Constellation for feed to the paste fill plant and deposition underground.

The Tritton Copper Mine Development consent allows for the removal of tailings and waste rock material from the ML.

3.6.2 Waste rock emplacement and management

3.6.2.1 Geochemical classification

Geochemical classification of waste material has commenced and preliminary results of sulfur concentrations indicate that the majority of the waste material is Non-acid forming (NAF) material. Although results are to be confirmed through the completion of the geochemical classification study, initial estimates indicate that approximately 10% of waste rock contains any sulfur (>0.2% sulfur).

Further geochemical characterisation will be completed to determine volumes of potential acid forming (PAF) material such that appropriate designs and strategies can be put in place to manage the PAF material. Results of the geochemical classification will be presented in the EIS and incorporated into the final WRE design, however, the management of PAF material has been incorporated into the conceptual design of the WRE (Section 3.6.2.2).

3.6.2.2 WRE Location and design

It is anticipated that two waste rock emplacements (WREs) will be constructed for the emplacement and management of the waste rock extracted from the operation (Figure 3-2) (noting that these designs and locations are conceptual at this stage). The conceptual design and layout of the WREs has been guided by the estimated volumes of the waste rock material to be extracted.

The smaller northern WRE has been designed for receival and encapsulation of potentially acid forming (PAF) material. The final design elements for encapsulation of PAF material will be guided by the geochemical classification and it is not expected that there will be any Acid Mine Drainage (AMD) occurring due to the placement of PAF material. However, the northern WRE is upstream of the open pit which provides an additional level of protection in the event of unanticipated release (i.e. the pit would collect any drainage enabling management).

The southern WRE is expected to be for the emplacement of NAF material only, however, the final design is still being finalised.

3.6.3 Ore handling and processing

3.6.3.1 ROM pad design and ore clearance

The ROM pad would be used to temporarily stockpile ore material prior to transportation to the Tritton Mine for processing or addition to the heap leach process. The ROM would be sheeted with non-acid generating waste rock to ensure all weather access. The indicative size of the ROM has been determined to allow for placement of ore material, operation of a jaw crusher and undertaking of ore loading operations.

The surface water management system for the Project is still be finalised, however, any surface water from the ROM pad would be diverted to an appropriately designed sediment pond.

Ore material would be transported from either the open cut pit or underground operation to the ROM pad by haul trucks where it would be stockpiled before being crushed, loaded and transported for processing.

3.6.3.2 Ore transport

Ore suitable for treatment in the Tritton processing plant will be transported to Tritton Mine for processing via a haul road to be established along a route as yet to be determined. The alignment of the haul road will likely include both sections of freehold land and sections of state controlled and/or Council maintained roads. Empty road trains would arrive at the ROM Pad and would be loaded using a front-end loader or similar. All loads would be covered prior to the road trains leaving the ROM Pad. The route for haulage transport is being finalised through consultation with relevant stakeholders and regulatory agencies, as well as in consideration of the environmental values encountered along each haulage route option.

The fleet of vehicles used for transport of ore to Tritton Mine is yet to be determined, however, it would comprise a fleet of trucks such as B-doubles or road trains. The number of truck movements per hour would depend on the size of road trains selected for the operation and the finalised production rate is expected to be multiple truck movements per day. Haulage would be undertaken up to 24 hours a day, 7 days a week, but exact haulage hours are unknown at this stage.

All haulage that is part of the Tritton Operations is undertaken in accordance with an existing *Traffic Management Plan*. It is proposed that the *Traffic Management Plan* would be updated to include haulage from the Constellation Project and any specific requirements that may stem from the traffic impact assessment to be undertaken as part of the EIS. Drivers of all road trains carrying ore from Constellation to the Tritton Mine would need to comply within the requirements of the *Traffic Management Plan*.

Where ore material is destined for leaching, haulage from site will not be required. This material will be transported from the ROM Pad to the heap leach pad via haulage truck and deposited using loader or similar.

3.6.3.3 Sulphide material

Where sulphide material is transported to the Tritton Mine for processing, the material will be managed and processed through existing processing operations. There is no planned change to the processing facilities at Tritton Operations for the processing of sulphide material. The current Tritton Copper Mine approvals allow for the receival and processing of ore material from surrounding mines (such as Constellation). As there is no planned change to processing operations, and existing processing operations allow for the receival and processing of ore from Constellation Project, Processing operations at Tritton Mine are outside the scope of this assessment and application for development consent.

3.6.3.4 Leaching and liquor processing

Investigation is being undertaken to determine the viability of including a heap leach facility as part of the Project. If included, the heap leach facility would be located at the Constellation project site. It is anticipated that a heap leach facility would receive oxide material. The material would be leached through standard leaching processes, from which resource material would be recovered.

Heap leaching works by placing ore on an impermeable liner and (in the case of copper extraction) irrigated with sulfuric acid to dissolve the copper from the ore. The solution, now containing the dissolved copper in a pregnant liquid solution (PLS), percolates through the crushed ore until it reaches the liner at the bottom of the heap where it drains into a storage pond. Acid is recycled at the facility.

Investigation is also being given to the addition of a solvent extraction (SX) plant or a cement plant for the concentration of copper product which converts the pregnant liquor solution into a saleable product. A cement plant would be similar to the installation at Murrawombie Copper Mine, however, at this stage, a SX plant is preferred.

An SX plant would receive the PLS which is pumped through mix and settler tanks in two stages – extraction stage and stripping stage.

In the extraction stage the PLS is mixed with an organic solvent (organic phase) in the mix tank. The organic phase selectively bonds to and removes the copper from the PLS. The resulting PLS-organic emulsion is pumped to a settler tank which allows the solution to separate into copper loaded organic phase and barren solution (raffinate) due to density differences. Copper loaded organic phase is drawn off and sent to a stripping circuit while raffinate is returned to the leaching process.

In the stripping phase copper loaded organic phase is mixed with a solution containing sulphuric acid in a mix tank. The sulphuric acid removes copper from the organic phase into the strip solution and the emulsion overflows into a settler where the phases are allowed to separate. Barren organic is now pumped back to the extraction stages for reuse and copper loaded strip solution advances to crystallisation.

Copper sulphate is crystallised from copper loaded strip solution in a series of crystallisation tanks through a process that increases the acid concentration and reduces the temperature using cooling coils. A crystal slurry overflows the last tank into a thickener where crystals settle to the bottom and are removed by pump to a

centrifuge for dewatering and washing. Washed crystals are dried and bagged. Strip liquor (with copper removed) overflows the thickener and is reheated before recycling to the stripping stage.

It is anticipated that the heap leach facility and heap leach liquor processing facility will be located to the north west of the open cut pit – this location means the heap leach facility is upstream of the open cut pit. Although the heap leach facility will capture any discharge and surface water runoff, the location upstream of the open pit offers additional protection from uncontrolled releases of surface water. Any such releases would be captured by the open pit, enabling effective control and management, rather than being released to the receiving environment.

3.6.4 Site access

Access to Constellation Project site will be either via established roads and or an access road to be established for the Project. A site-specific access road would follow the alignment of the selected haul road.

Parking will be provided as part of the site facilities to accommodate parking for the required number of vehicles.

Transport of personnel to and from site would likely be via a combination of light vehicle and/or bus. Tritton currently utilises a company bus to transport personnel both from Nyngan to Tritton mine site for daily briefings and Murrawombie mine site. Use of the existing bus for the Constellation site will be considered as part of the final design.

3.6.5 Utilities and services

Tritton would establish the following services within and/or connecting to the Project site to support the proposed mining operations:

- Electricity supply;
- Water supply; and
- Communication facilities.

3.6.5.1 Electricity supply

It is expected that electricity supply will be through connection of new electricity lines from the existing grid, likely running as the most direct connection path west to Constellation from the existing 66kV line that runs parallel to the Mitchell highway.

Landholder engagement has included consultation on the alignment of the powerline between the 66 kV line at the Mitchell highway and the Constellation site. Where required easements will be established for the powerline. Heritage and biodiversity assessments will include the powerline corridor.

Connection to the site would occur near the Mine Infrastructure Area. Voltage of the supply would be reduced to 415/240V for the supply of electricity to the site facilities such as workshop, offices and crib room etc.

Power for surface water pumps and other infrastructure may be provided by diesel generators.

A solar farm facility is being considered at a supplementary option for power at Constellation, in addition to Grid tie-in.

3.6.5.2 Water supply pipeline

A water supply pipeline will be established connecting the existing water supply infrastructure feeding the Murrawombie mine from the Gunningbar Creek Weir to the Constellation Project site. The pipeline will be a buried polyethylene pipeline; the majority of the alignment is expected to follow the haul road alignment. Colocation of the pipeline and the haul road is practical from a construction perspective and minimises surface disturbance.

3.6.5.3 Communications

It is expected that a site-specific communications facility will be constructed as part of the Project. The facility will provide for all on site communications.

3.6.5.4 Hydrocarbons

All diesel fuel required for the operation of mobile equipment will be stored in tanks located within a dedicated fuel storage area. The required size of the fuel storage tanks is yet to be determined, however, the tanks would either be self-bunded or would be located within a covered, concrete-sealed bund that would be sized to meet the relevant containment requirements and Australian Standard *AS 1940:2017 The storage and handling of flammable and combustible liquids*. Specifically, the bunded areas would have a capacity of 110% of the volume of the largest tank.

A sealed refuelling area will be located adjacent to the fuel store with all drainage directed to an oil/water separator. All haul trucks and other mobile equipment that regularly frequent the surface will utilise the dedicated refuelling area. Underground plant such as jumbos and underground loaders and other less mobile plant will be refuelled at the work location via a mobile refuel tanker or tray mounted fuel tank.

3.6.6 Water management system

Tritton understands the value of efficient and effective use and management of water in the construction and operation of the Constellation Project. Although a comprehensive understanding of the site water balance and required water management system will be developed through the studies completed as part of the EIS information from the preliminary understanding of site water requirements and commitments to water management are outlined in this section.

3.6.6.1 Classes of water

The final water management system will consider all the classes of water which will be managed on site, however, it is likely that there will be five classes of water which will need consideration:

- Potable and ablutions water – would most likely be obtained through a potable water treatment plant on site.
- Make up water – would be pumped to site via a buried water pipeline (poly pipe) which would follow the same path as the haulage road for practicality of construction and minimisation of Project footprint. Water would be obtained under Tritton's existing water licence and supplied from a pumping station on the Bogan River located approximately 19 km south east of the Project site. This water is pumped to the existing Tritton operations through an established pipe, from where it would be pumped to Constellation for use through the new pipeline. Where the existing licence does not contain sufficient capacity to supply the required volume of water, an additional licence would be sought for the supply of water. Make up water would be used primarily for dust suppression.
- Clean water – is run off from undisturbed areas of the Project site and/or diverted around disturbed areas of the Project site. Tritton is endeavouring to design the surface water management infrastructure such that as much clean water as possible is diverted around the disturbed areas of the site. As part of this strategy an embankment is proposed for the northern boundary of the site to direct clean water to the east of the disturbance footprint, before being allowed to flow to natural drainage paths. Clean water diversions will be constructed in accordance with the recommendations of *Managing Urban Stormwater Volumes 1, 2C and 2E*.
- Dirty water – is run off from disturbed sections of the Project site. Dirty water would be directed to dirty water drains and captured in sediment ponds to allow sediment to settle. Water would be used on the mine site for operational purposes such as dust suppression. Dirty water would be managed in accordance with the recommendations of *Managing Urban Stormwater Volumes 1, 2C and 2E* (Landcom, 2004; DEC, 2008a; DEC, 2008b).

- Mine water – is water that would be removed from the open cut pit and underground mine to allow for activities to be undertaken safely. This water may contain suspended sediments, salts, metals and/or hydrocarbons and may have a reduced pH. Mine water would be pumped to the dewatering pond which would be lined to achieve a low permeability. Mine water may be used within the open cut or underground operations.

The volumes of each water class which will need to be managed will be determined through development of the site water balance.

3.6.6.2 Water balance and supply

The volume of water required for mining operations on site has not yet been determined but will bet detailed in the site water balance developed for site as part of the EIS. To the greatest extent possible, dirty water and mine water will be reused to minimise the volume of water required to be sourced from external sources. It is anticipated that the volume taken from each water class will vary over the life of the Project. Particularly the volume of mine water is expected to be low in the early stages of the operation until groundwater is intercepted by first the open cut pit and then the underground operation. The mine water balance will consider the temporal change in volume of water from different water classes.

Tritton has an existing water licence allowing for the take of water under licence from an existing pumping station on the Bogan River. It is anticipated that a portion of the make up water will be sourced under this licence, however, the final water balance will determine whether an additional licence is required.

3.6.6.3 Water management

The details of the water management system are being determined; however, final system would include:

- Clean water diversions around areas of proposed disturbance.
- Dirty water diversions that will divert all run off from disturbed areas to sediment ponds. Sediment ponds will be designed based on what is required to contain a 1% AEP 72-hour runoff volume. Where practicable, water within sediment ponds will be reused for operational purposes. The total size of the sediment ponds will be much less than the total harvestable water rights for the property (approximately 290ML). The inclusion of existing farm dams does not meet the harvestable water rights limit for the property.
- Mine water pond designed to separate potentially salt and/or hydrocarbon contaminated, or low pH water from dirty water for transfer to the mine water pond. This water will be managed such that it doesn't discharge and the mine water pond will be designed so that they can accommodate the water from a 1% AEP 72-hour runoff volume. Mine water would be used for underground mining operations and in-pit dust suppression.

Road-side drainage and sediment control structures will be constructed in accordance with requirements.

3.6.6.4 Erosion and sediment control

An *Erosion and Sediment Control Plan* (ESCP) will be prepared prior to the commencement of site establishment and construction operations. The plan will be prepared in accordance with the requirements of:

- *Managing Urban Stormwater: Soils and Construction – Volume 1* (Landcom, 2004);
- *Managing Urban Stormwater: Soils and Construction – Volume 2C – unsealed roads* (DECC, 2008a); and
- *Managing Urban Stormwater: Soils and Construction – Volume 2E – mines and quarries* (DECC 2008b).
- of *Managing Urban Stormwater: Soils and Construction – Volume 2C – unsealed roads* (DECC, 2008a).

3.6.6.5 Sewage management

An aerated wastewater treatment or pump out septic system would be installed in the vicinity of the ablution facilities located in the mine infrastructure area (MIA). The selected system would be appropriately sized to meet peak demand of site personnel and would comply with the requirements of Bogan Shire Council and would be approved for use by Council prior to being installed.

3.6.7 Workforce

Tritton operations currently employs approximately 383 full time equivalent (FTE) staff directly and engages contractors who employ up to 100 FTE. Of the 383 direct employees, 51% are local to Bogan and Cobar Local Government Areas.

It is expected that the workforce for the Project will be comprised primarily of personnel already employed or contracted as part of the existing operations. There is likely to be a requirement for additional contractors to provide services for various components of the Project, and where required, selection of contractors will consider local procurement plan.

There is expected to be a need for specialist contractors to be engaged for various aspects of the Project under shorter term arrangements. It is likely that specialist contractors will need to be sourced from outside western NSW.

3.6.8 Hours of operation

Operations will be undertaken 24 hours a day, 7 days a week, with some activities such as vegetation clearing topsoil stripping and rehabilitation activities to be conducted in daylight hours only.

3.6.9 Waste management

Non-productive waste would be managed in accordance with requirements of the *Protection of the Environment Operations (Waste) Regulation 2005*, the *NSW Waste Avoidance and Resource Recovery Strategy 2014-21* and *Waste Avoidance and Resource Recovery Act 2001*. The reduce, reuse and recycle hierarchy of waste management will be employed as the underlying strategy to reduce environmental harm and meet the principles of ecologically sustainable development.

Table 3-2: Non-productive waste management.

Waste type	Storage	Removal method
General solid waste (putrescible)	Covered bins or skips located at lunch areas, offices, outside workshops and elsewhere as required. Where these bins are located in open areas they will be fitted with animal proof lids.	Collected on a regular basis by a licensed contractor and transported to a licenced waste disposal facility.
General Recyclables	Covered bins or skips located at lunch areas, offices, outside workshops and elsewhere as required.	Collected on a regular basis by a licensed contractor and transported to an appropriately licensed facility for recycling.
Waste oils and greases	Placed within the bunded laydown pad within the workshop area.	Collected on a regular basis by a licensed contractor and transported to an appropriately licenced waste disposal facility.
Batteries	Placed within a covered and marked ‘used battery storage area’ until removed from site.	Collected on an ‘as needs’ basis by a licensed contractor and transported to an appropriately licensed facility for recycling.

Waste type	Storage	Removal method
Tyres	Placed within a marked used tyre storage area until removed from site.	Tyres will be disposed of at a licensed waste management facility or removed by a third party approved to recycle tyres.
Scrap Steel / Metal	Stored in a specified area within the workshop or elsewhere as required.	Collected on an as needs basis by a scrap metal recycler.

3.7 Rehabilitation and final landform

The final landform and details of the rehabilitated mine site are still being determined. The details on how the site will be rehabilitated will be provided in the EIS. However, Tritton are committed to the guiding principles of rehabilitation, including ensuring the final landform is:

- Safe;
- Stable;
- non-polluting;
- sustainable;
- require minimal active management; and
- stakeholder expectations are considered.

Rehabilitation actions at the conclusion of mining operations will include:

- All buildings and temporary structures would be removed;
- Ventilation risers and underground portal sealed in accordance with the relevant guidelines applicable at the time;
- All hardstand areas removed, with the exception of the Site Access Road and a range of other site roads required for management of the final landform; and
- Disturbed areas not to be retained in the final landform are reshaped and revegetated.

It is expected that the open cut pit will remain in the final landform along with the WRE. The open pit is expected to form a pit lake following the cessation of dewatering activities, and, although not confirmed, it is expected that this pit lake will become a sink for local groundwater. The WRE will be profiled where necessary, covered in stockpiled topsoil and revegetated.

Tritton are also completing investigation in the adoption of alternative land uses post mining which may include use of the mined area for renewable energy Projects or other alternatives. For instance the solar farm, if installed, may be retained to provide renewable energy to the grid, or to provide power to other Tritton operations.

Details of the final landform – particularly the waste rock emplacement – as well the need for permanent water management infrastructure and active management measures are being determined. The final design will be developed in consultation with the relevant government agencies and in consideration of landholders' preferences.

As per the conditions of any mining lease granted for the Project, a Rehabilitation Management Plan including a Rehabilitation Objectives and Completion Criteria statement that is approved by the Minister. The Rehabilitation Management Plan will detail the final landform and land use post mining.

4 Statutory context

This chapter details the applicable Commonwealth and State legislation and regulations for which this scoping report and proposed project will be assessed and determined.

4.1 Commonwealth legislation

4.1.1 Environmental Protection and Biodiversity Conservation Act 1999

The *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) administered by the Department of Agriculture, Water and the Environment (DAWE), is the preeminent Commonwealth legislative framework to protect and manage the environment. The legislation provides for the assessment of proposals that will have significant impacts on 'matters of national environmental significance' (MNES). Approval is required from the Minister for the DAWE if a proposed action is deemed to likely have a significant impact on a MNES. The Minister may declare the action as a 'controlled action' subject to an impact assessment specified under part 8 of the EPBC Act.

For completeness and transparency, Aeris Resources will engage with DAWE about the requirement to refer the Project to the Minister.

4.1.2 Native Title Act 1993

The *Native Title Act 1993* (NT Act) is the primary Commonwealth legislation that recognises and protects Native Title. Individuals or organisations are able to submit native title claims to the Federal Court under section 13 of the NT Act. The Project is located on freehold land, and as such, Native Title does not apply to the development. However, a review of claims and potential claims will be performed as part of an EIS process for the Project.

4.2 NSW planning framework

The *Environmental Planning and Assessment Act 1979* (EP&A Act) provides the statutory framework for development and guides environmental impact assessments in NSW. Development consent triggers are listed under section 4.2(1) of the EP&A Act.

The EP&A Act together with the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation) are the state-wide legislative providing planning approval frameworks and are supported by Environmental Planning Instruments (EPIs) inclusive of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (Mining SEPP) and Local Environmental Plans (LEPs).

4.2.1 State Significant Development

Clause 8(1) and clause 5 to Schedule 1 of the State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP) declares that mining projects with capital expenditure greater than $30 million are State Significant Development (SSD). Such projects declared SSD require approval from the Minister for Planning (or delegate).

A properly made environment impact statement (EIS) is required to be submitted by the applicant for a SSD project in order to gain planning approval. As part of the EIS, the EIS must be made available for public exhibit and the applicant is required to respond to any public submissions made during the exhibition period that highlight potential issues.

The final investment for the Constellation Project is still being finalised, however, capital expenditure will be in excess of $30 million. As such, the Project will be considered an SSD project.

4.3 Summary of approvals and licences

Table 4-1 outlines the associated approvals and licences which may be required as part of the Project.

Table 4-1.: Associated approvals and licences

Stakeholder agency	Legislation	Requirement
DPIE Environment Energy and Science (EES) – NSW Environment Protection Authority (NSW EPA)	*Protection of the Environment Operations Act 1997 (POEO Act)*	The project would likely require an amendment to EPL 6126 as a scheduled activity under the POEO Act.
DPIE EES – Biodiversity and Conservation Division (BCD)	*Biodiversity Conservation Act 2016 (BC Act)*	Impacts on threatened species and endangered ecological communities are likely to be minimal. A Biodiversity Development Assessment Report (BDAR) will be prepared and submitted as part of the EIS, with appropriate offset obligations delivered.
	Heritage Act 1977	No impacts to non-Aboriginal heritage expected as part of the project.
	National Parks and Wildlife Act 1974 (NPW Act)	Impacts to Aboriginal heritage and archaeology likely to be negligible. Aeris Resources will carry out due heritage assessments as part of EIS preparation. Permits are not required for an SSD mining project for impacts to Aboriginal heritage (section 4.41 of the EP&A Act).
Department of Primary Industries (DPI) - Fisheries	*Fisheries Management Act 1994* (FM Act)	No impacts to threatened species or key fisheries habitat likely as part of the project. No permits likely to be required under the FM Act.
NSW Resources Regulator	*Mining Act 1992*	A new mining lease would be required for the Project which would be administered through the NSW Resources Regulator. As a condition of the mining lease, a Rehabilitation Management Plan will need to be developed.
	Pipelines Act 1967	A water supply pipeline will be required between the site and existing water infrastructure owned and operated by Tritton. It is unclear at this stage if this pipeline will require licencing.
DPIE - Water	*Water Management Act 2000 (WM Act)*	The project may require a new water use permit. The project may also interfere with an aquifer. A full assessment will be undertaken during the EIS preparation and the need for a water use approval under the WM Act will be determined.
Rural Fire Service (RFS)	*Rural Fires Act 1997 (RF Act)*	A bushfire safety authority would not be required under the RF Act for the project.
Transport for NSW	*Roads Act 1993*	Works for mine development may require works approvals under section 138 of the Road Act 1993 for the development of the haul road.

5 Engagement During scoping

5.1 Overview

Tritton appreciates the importance if engaging to the local community as part of the Project development, throughout the Project's assessment phase and throughout the life of the Project. This is an approach Tritton has taken with their existing operations within the Bogan LGA.

Tritton appreciates that there is significant engagement of regulators, landholders and community stakeholders still to be undertaken through the assessment phase of the Project and is committed to undertaking this engagement in a meaningful manner that allows for input into the project design.

As part of the Scoping Phase of the Project, the stakeholders identified in Table 5-1 were engaged. Details of the engagement are provided. Additional engagement will be undertaken with all stakeholders (particularly landholders) through the assessment phase and the life of the Project.

Table 5-1: Stakeholders engaged as part of scoping phase

Stakeholder	Details of Engagement	Date
Regulators and government departments		
DPIE Mining Exploration and Geoscience (MEG) and NSW Resources Regulator	A presentation of the Constellation Project was given to the MEG group and representatives from the NSW Resources Regulator on the Constellation Project including the details on the Project description planned assessment and timeframes.	3 December 2021
Bogan Shire Council	Bogan Council was engaged to understand the preference for the haul road alignment.	December 2021
	Engagement with Council (Development and Environmental Services) was undertaken to provide an overview of the Project, understand any issues raised by the Council and commence engagement for the SIA. Council staff were able to provide some important information that will assist in guiding engagement and potential issues for the local communities arising from the Project.	23 February 2022
Department of Planning, Industry and Environment (DPIE) - Major Projects	A Scoping meeting was held with members of the DPIE Major Projects team and members of the Constellation Project team.	1 February 2022
Landholders		
Owners of Okeh property	Okeh property is that on which the operational site is planned to be located. A meeting between the owners of Okeh and Tritton Resources representatives was held in late 2021. The objectives of the engagement were to: • Provide an overview of the project • Understand landholder concerns and expectations • Work towards agreement on formal arrangements (e.g. acquisition) and compensation for land use. The owners of Okeh were pragmatic about the development of the Project and were not opposed subject to assurances that environmental management controls, access arrangements, amenity provisions and land access agreements were in place.	21 December 2021

Stakeholder	Details of Engagement	Date
Owners of Windella	Windella property is that on which the operational site is planned to be located. A meeting between the owners of Windella and Tritton Resources representatives was held in February 2022. The objectives of the engagement were to: • Provide an overview of the project • Understand landholder concerns and expectations Work towards agreement on formal arrangements (e.g. acquisition) and compensation for land use. The owners of Windella were receptive of the Project and provided additional options for consideration about the design – particularly the haul road.	14 February 2022
Owners of Einalla	Einella property is adjacent to the Constellation Project site. Engagement was undertaken to provide a description of the Project to the Einalla owner, with focus on the haul road. Several haul road options were presented and discussed with one option being opposed by the owners. Practical details of haul road design and construction were also raised by the landholder.	23 February 2022 (via Teams)
Owners of Karingal	Haul road alignment may pass through Karingal property. Engagement was undertaken to provide a description of the Project to the Karingal owner, with focus on the haul road. The owner noted that haul road would impact Karingal and that noise and dust would be of key concern. Several design and mitigation measures were noted that could be considered.	1 February 2022
Owners of Yumba Thuddi	Haul road alignment may pass through Yumba Thuddi property. Engagement was undertaken to provide a description of the Project to the Yumba Thuddi owner, with focus on the haul road. The owner had no concerns with the mine site development and was open to the prospect of the presented haul road alignments, noting that dust would be an issue to be addressed.	2 February 2022
Owners of Neilly's	Haul road alignment may pass through Neilly's. There is no dwelling on the property and the owner lives in Nyngan. The owners were strong supporters of the Project for economic benefit it brought. There was no concerns of the haul alignment options, apart from noting that there would be strong opposition if it were to pass through Girilambone (this is no longer being considered).	3 February 2022
Mulga and Fairlight Owner	Haul road alignment may pass through Mulga and/or Fairlight property(ies). Owner is supporting of the project for the benefit it provides the community. The owner had no concerns about the proposed haul road alignments but noted that there would be strong opposition if it were to pass through Girilambone (this is no longer being considered).	2 February 2022
Owners of Bald Hill	Haul road alignment may pass through or adjacent to the Bald Hill property. Initial contact made however, formal consultation has not been undertaken. Engagement pertaining to the alignment of the haul road will be undertaken depending.	-
Owners of Frenchmans	Haul road alignment may pass through or adjacent to the Frenchmans property. Initial contact made however, formal consultation has not been undertaken. Engagement pertaining to the alignment of the haul road will be undertaken depending..	
Owners of Herstlet	Haul road alignment may pass through or adjacent to the Herstlet property. Initial contact made however, formal consultation has not been undertaken. Engagement pertaining to the alignment of the haul road will be undertaken depending.	

Stakeholder	Details of Engagement	Date
Owners of Glendale	The haul road alignment may pass through the Glendale property. Engagement was undertaken to provide a description of the Project to the Glendale owner, with focus on the haul road. Several haul road options were presented and discussed. The owner raised concerns with some options (due to noise and dust) and indicated the preference on another. The owner also raised another option for the alignment which will be considered.	1 February 2022
Owners of Avondale	The haul road alignment may pass through or adjacent to the Avondale property. The owners are, or have been, employed at Tritton Operations. The owners noted the reliance on mining of the community and business it provides. No concerns were raised about the mine site. Of the haul road options the owners had a strong preference against one of the options and noted they preferred one of the options. The owners noted the noise and dust issues the haul road would raise and the strong opposition of the community if the road was to pass through Girilambone.	2 February 2022

Contact with an additional landholder, whose property is intersected by the potential powerline alignment, has not been able to be made. It is understood that the landholder does not reside on the property. Assistance in gaining contact with the landholder has been made through Bogan Shire Council.

Table 5-2 provides a list of stakeholders with which engagement and consultation will be completed. This engagement is expected to occur in the first half of 2022 to allow for feedback to be incorporated into final project design. It is noted that there may be additional stakeholders with whom consultation is required who are identified through the assessment and consultation process. These stakeholders will be added to the stakeholder management register and consulted as part of the Project's Community and Stakeholder Engagement Plan.

Table 5-2: List of identified regulatory stakeholders to be consulted

Regulatory stakeholder	Identified potential issues
NSW Resources Regulator	• Mine Closure • Operational management
Natural Resources Access Regulator	• Access to water • maintenance of water supply and quality
Environmental Protection Authority	• Mine closure and rehabilitation • Air and noise impacts • Impacts to water quality
Biodiversity Conservation Trust	• Impacts to biodiversity values • Provision of biodiversity offsets
Roads and Maritime Services	• Road and traffic impacts • Road upgrade requirements • Road safety impacts
Heritage NSW	• Impacts to heritage items

Indigenous stakeholders will be consulted as part of the Project. Engagement with indigenous stakeholders will occur as part of three components of the overall assessment: engagement for project design, engagement for social impact assessment and engagement as part of the Aboriginal Cultural Heritage Assessment.

The indigenous stakeholders identified for consultation are outlined in Table 5-3. Additional stakeholders may be identified through the course of the assessment and will be included in the consultation program.

Table 5-3: Indigenous stakeholders identified for consultation

Indigenous stakeholder	Purpose	Potential issues/ opportunities
Traditional owners	• Determine potential impact to heritage items • Ensure protection of values • Determine and enact requirements for approval	• Access to jobs for Aboriginal people e.g. job readiness and skills training programs • Cultural heritage and site values, cultural landscape and stories tied to them • Displacement e.g. from country
Nyngan Local Aboriginal Land Council	• Identify community values • Seek inputs on opportunities for economic and community development • Identify potential impacts and benefits	
Bogan Aboriginal Corporation		
AECG - Nyngan Local Aboriginal Education Consultative Group		

Additional stakeholders have been identified in the Community and Stakeholder Engagement Plan (CSEP). These stakeholders largely consist of organisations and service providers, community groups and business organisations. Engagement of these groups will occur throughout 2022, and will be conducted through community meetings, surveys and direct engagement where necessary.

5.2 Findings

The outcomes of the initial engagement have generally been positive. Although stakeholders have raised questions about how particular aspects of the project will be implemented there has not been any direct opposition to the project at this stage. The findings from the stakeholder engagement has been presented under two representative headings – regulators and landholders. Outcomes from landholder engagement have not been attributed to particular landholders out of privacy considerations.

5.2.1 Regulators

5.2.1.1 Mining, Exploration and Geoscience (MEG) and Resources Regulator

The MEG group was receptive to the Project and did not raise specific concerns during the engagement. Members of the MEG group participating in the meeting noted that they would like to see further information on the geology of the deposit during future engagement and consultation. Tritton noted this and would provide further detail following further exploration work and development of the block model which was not completed at the time.

The Resources Regulator noted that the details on the final landform design would need to be provided and meet the closure and rehabilitation expectations of both the landholders and the department. Tritton noted that final landform design was being considered as part of the Project design and that it would be aiming for a design that required the least active management of final landform as possible. The Resources Regulator noted that they could provide input into the final landform design, Tritton acknowledged this and noted they would share and seek input into the final land form design as part of the engagement through the assessment phase.

5.2.1.2 Department of Planning Industry and Environment

The Department was briefed on the Project and the planned assessment to meet the requirements of the development consent. The Department noted that engagement would need to be undertaken in accordance with the current guidelines. There was no objection or specific concerns raised by the Department at the time of the engagement.

5.2.1.3 Bogan Shire Council

Bogan Shire Council expressed general support for the Project during the engagement meeting. The Council noted the significant contribution that Tritton Resources Operations made to the local community. Of particular note were the significant numbers of local residents that were employed at the mine and the good will gestures that Tritton has shown previously in diverting water from its pipeline for Council use in Girilambone which has unreliable and poor-quality water supply.

Bogan Shire Council staff also raised the following questions about the design and operation of the Project:

- **What was the life of mine and production schedule for the operation?** The life of the open pit is approximately 3 years. With the total operation of the underground and open cut pit extending for over 10 years.
- **Has consideration been given to use of the existing heap leach facility at Murrawombie?** Use of the existing heap leach facility was considered as part of the early options assessment for the Project. A decision was made to progress with a stand-alone facility at Constellation. This allows for best practice design to be implemented at the new facility as well as locating the heap leach facility in a location which allows passive drainage and water management on site. The use of the Murrawombie heap leach facility would also increase the volume of traffic along the haul road.
- **Will the accommodation arrangements change for drive-in, drive-out employees, either at Nyngan or at Hermidale?** The is no plan to change the accommodation arrangements as part of the development consent for Constellation Project. The Constellation Project will maintain the existing workforce and will not change the accommodation numbers required for operational activities. As there is a general shortage of rental accommodation in Nyngan, Tritton Operations works with the Nyngan Council to facilitate accommodation arrangements for employees. This will continue through the life of the Tritton Operations.

Council identified that haulage route and haulage activities would be of interest to the local communities – especially Girilambone, which was the community located closest to the planned haulage route. Tritton noted that engagement activities were planned for the Community to identify and address issues raised. Council also noted the work which Girilambone Community groups were undertaking to promote the needs of the town and drive development opportunities.

5.2.2 Landholders

No landholders have objected to the Project to date. Both the landholders on which the Project site will be located have been engaged. Although neither landholder objected to the Project, they understandably noted they had certain requirements which would need to be met prior to acceptance or support of the Project. The key considerations are outlined below:

- The land required for the development of the project is limited to the extent required (i.e. landholders would not consider selling the entire land holding to Tritton Resources for the project).
- There would need to be assurances about the scale and intensity of the development and about the impacts which the development would create.
- Access to certain portions of the land which are key for ongoing agricultural operations would need to be retained, e.g. farm dams.
- The following impacts were raised regarding the haulage road:
    - Dust impacts would need to be appropriately mitigated and managed. Design options should be explored for minimising dust impacts;
    - Noise (operations and Haul Trucks);
    - The alignment of the haul road should minimise impacts to property access, allow for separation of traffic and provided a visual buffer where possible; and
    - The haul road would need to consider potential impacts to the Girilambone Village.

6 Key issues and proposed assessment approach

6.1 Overview

In scoping the Constellation Project, AARC has conducted a risk assessment and desktop study drawing upon technical specialists, and existing information/data from past and ongoing environmental studies/investigations in the surrounding areas (New Cobar Complex).

A risk assessment was conducted (facilitated by Allman Consulting) through which specialist technical consultants involved in the planning and delivery of the Project and environmental impact assessment were engaged to identify and describe the issues and risks along with proposed assessment and management measure which should be employed.

Further desktop analysis key risks and engagement with community and stakeholder agencies has resulted in the following environmental specialist assessments methodologies being proposed by technical specialists for the preparation of the EIS.

Key environmental aspects and the scale and nature of likely impacts of the project are summarised in the attached DPIE scoping worksheet (Appendix A), which it is understood will be used by the DPIE to inform discussions when preparing SEARs.

6.2 Groundwater

6.2.1 Key environmental risks

Although it is expected the groundwater environment at the Constellation site is low yielding and groundwater is brackish to saline, dewatering associated with the open cut and underground mining operations is expected to have some impact on the local groundwater environment. Dewatering is expected to cause localised drawdown of groundwater. The extent of this drawdown is yet to be determined, however it is expected to be restricted and controlled by the localised fracture system of the underlying geology.

Ground movement associated with underground mining and blasting may result in changes to the stress field in the host rock surrounding the working and this may affect the hydraulic properties of the rock. These stress changes may arise from creation of the mine void and from blasting operations associated with stope mining. These potential changes to the hydraulic properties of the host rock could influence ground transmissivity of the local geology.

Most of the bores within the region of the Project are on the east of the Bogan River in the unconsolidated alluvial aquifer will not be impacted be groundwater drawdowns.

Potential impacts to the few groundwater bores near the Project which are in the Lachlan fold belt groundwater source will need to be considered as part of the Project. Where a potential impact is determined, appropriate mitigation measures and or make good arrangements will be implemented.

In addition to potential impacts to water availability in the local hydrogeological environment, there is potential for impact to groundwater quality from the Project. Such impacts could arise from the chemical properties of the host rock, ore bearing material, or waste rock. Where geochemical properties of host rock could result in acid, neutral, saline or metalliferous mine drainage (collectively AMD), there is potential that groundwater could be impacted. Although any impact is expected to be highly localised given the local groundwater environment, it is important to understand the geochemical characteristics and groundwater movement to validate this assumption and determine any mitigation and management measures that need to be implemented.

6.2.2 Assessment methods

Tritton Resources will complete a groundwater impact assessment for the Constellation Project. Baseline (desktop) data collection and review has been conducted to understand the local and regional hydrogeological

environment. The information has been used to develop a conceptual hydrogeological conceptual model (Section 2.7.2) and design a groundwater monitoring network (Figure 2-7). The groundwater monitoring network includes 5 bores both up gradient and down gradient of the predicted groundwater flow.

The groundwater monitoring network has been established and hydraulic testing completed. Data loggers have been installed in each of the groundwater monitoring bores for continual capture of groundwater level data and quarterly water sampling is being undertaken to obtain information on the local groundwater quality. Initial information on water level is provided in 2.7.

As part of the groundwater impact assessment a numerical (predictive) model will be developed which will enable detailed assessment of impacts to the local groundwater environment. The numerical model will be used to complete a quantitative assessment of groundwater drawdown and determine groundwater connectivity. The model will allow for assessment of:

- the area of influence of dewatering and the level and rate of drawdown at specific locations;
- groundwater take from aquifer resources;
- potential impacts on private water bores and environmental receptors;
- project induced groundwater quality changes;
- areas of potential risk where groundwater impact mitigation/control measures may be necessary; and
- identification and assessment of potential post mining groundwater impacts.

The groundwater impact assessment (GIA) will assess the potential impacts of the Project on the local groundwater against the criteria identified in the *NSW Aquifer Interference Policy (AIP)*, *Water Sharing Plan for the NSW Murray-Darling Basin Fractured Rock Groundwater Sources Water Sharing Plan*, and Water Sharing Plan for the Macquarie-Bogan Unregulated and Alluvial Water Sources (if relevant).

A geochemical characterisation program is also being undertaken which will identify the chemical properties of the host rock, ore bearing zones and waste material. Samples have been collected for the geochemical test program which provide comprehensive characterisation of geological materials.

6.3 Surface water

6.3.1 Key environmental risks

The Project site is relatively dry; water may flow through the site for short periods within an unmapped drainage line. The distance to the nearest major watercourse reduces the potential risk posed by the Project to surface water values. Following the completion of the flood modelling and water balance for the Project, appropriately sized water management infrastructure will be designed to manage water on-site.

Although the Project will result in a reduction in the catchment area, this will be a small portion of the overall catchment area. Clean water will be diverted around the Project site and will remain available for users downstream.

In addition, groundwater will be extracted from the pit and held in a dewatering pond for use within the open pit and underground for operational purposes. It is not anticipated that groundwater will be released to surface water environments.

Water is currently sourced from the Bogan River via a pump and pipeline to Murrawombie mine under an existing licence. It is proposed that water would be pumped from Murrawombie to Constellation site for use where additional water was required for operational purposes. It is unclear at this stage whether water requirements at Constellation will exceed the volume of water licenced for extraction, however, once the water balance has been determined all water extraction will be appropriately licenced.

Suitably sized water management structures such as sediment retention basins will be constructed on-site to manage surface water. As such it is not anticipated that there will be sediment laden water released to the surrounding environment

6.3.2 Assessment methods

A surface water assessment will be completed for the Project, the results of which will be detailed in the EIS. The assessment would include detailed description of hydrological setting of the Project based on lidar data, meteorological information and recorded surface water flows and levels.

The assessment would include the following:

- Detailed flood assessment for local drainage paths for the new site, haul road alignment and potentially the tailings storage facility (TSF).
- Design of site water management system, including location of clean and dirty water drains and site water storages.
- Detailed water balance modelling to assess site water demands and storage requirements.
- Optimisation of site water management system, including concept drainage design, storage sizes, pumping rates and operating rules.
- Advice on water supply sourcing and licensing for external water supply requirements.
- Assessment of water quality impacts on the new mine site and along the haul road alignment. The characterisation of waste rock materials will be used to assess the likely quality of waste rock runoff.

Together which information from the hydrogeological assessment and final mine design an assessment of the final pit lake will also be made.

6.4 Geotechnical

6.4.1 Key environmental risks

The largest potential impact from the open cut pit arising from geotechnical environment would be a pit wall failure due to incorrect design. As the open pit mining will be designed in consideration of the local geotechnical environment, it is not anticipated that there will be significant environmental impacts arising from geotechnical issues.

The underground component of the mine plan was designed to have minimal surface impacts. Preliminary investigations indicate the key risks for the project, with respect to surface subsidence assessment for the EIS preparation, include:

- damage to surface mine;
- rock mass damage due to underground mine workings resulting in changes to rock mass permeability and groundwater flow; and
- changes to groundwater flow paths may increase water egress into underground workings.

A preliminary geotechnical assessment has been completed for the Project to provide initial inputs to mine planning. The assessment considered:

- 3D as-built surfaces of near-by open pits providing local slope performance for the Constellation design;
- 3D ore model, weathering surfaces, an 3D fault surfaces;
- Borehole data, including:
    - 107 RC boreholes;
    - 47 diamond drilled holes without core photos from Aeris;
    - 26 cored boreholes with core photos from Aeris; and
    - 11 geotechnical boreholes drilled by PSM;

- Borehole structural data;
- Standing water level measured in nine boreholes; and
- Point load strength index testing data for 11 geotechnical logged boreholes.

The geotechnical assessment concluded:

- Ore body rockmass unit is expected to be relatively high quality and is not expected to constrain the stope size;
- The hanging wall conditions are expected to be good;
- The immediate footwall may have a basal shear zone unit present (thickness typically up to 1 m). It is expected to be heavily brecciated with increased fracturing and possible graphite infill. This immediate footwall has potential for planar sliding and is a likely source of dilution.
- The general footwall condition away from the zone immediately adjacent to the footwall is good. Localised zones of graphite are possible (with thickness ranging from a few millimetres up to 30 mm);
- Occasional localised zones of faulting in the hanging wall and footwall are expected. The faulting zones are not expected to affect the stope design. Further assessment will be undertaken as part of further assessment during the feasibility phase.

6.4.2 Assessment methods

Further geotechnical assessment will be undertaken to finalise the mine design. Further geotechnical work will include assessment for the open cut and underground components.

6.4.2.1 Open cut

The following geotechnical work will be undertaken for the open cut pit:

- Update top of fresh rock 3D surface incorporating new geotechnical drill data;
- Rock mass and defect strength characterisation based on laboratory testing;
- Consideration of groundwater impacts on slope design;
- Assessment of major structure beneath the ore in the footwall;
- Structural and rock mass stability analysis; and
- Consideration of in-pit underground portal, if required.

6.4.2.2 Underground

The following geotechnical work will be completed for the underground mine:

- Structural model reassessment based on additional borehole imaging data;
- Rock mass and defect strength characterisation based on laboratory testing;
- Consideration of groundwater impacts on underground design; and
- Detailed consideration of the mining method following update of mine design updates that considered the initial geotechnical assessment.

6.5 Noise and blasting

6.5.1 Key environmental risks

Currently, the noise levels of the area are those typically associated with a rural environment with agricultural and traffic noise during the day and limited noise at night. Potential noise created by haulage operations was raised as a key concern through landholder consultation. This consultation has assisted in determining the potential alignment of the haul road such that noise impacts can be minimised through design the greatest extent practicable. However, it is noted that there will be changes in the noise environment along the alignment due to haulage operations.

Additionally, the development of the proposed open pit would utilise typical blast, load and haul techniques which would create noise and vibration. This noise and vibration will change the local noise environment which could impact nearby residents. However, the nearest residence is approximately 5 km from the open cut pit (where blasting would occur) and given the scale and nature of the blasting which is likely to be undertaken, it is unlikely that there will be significant impacts to sensitive receptors. Blasting will not have any impact on physical structures.

A noise quality impact assessment will be undertaken for the Project which will identify the potential impacts from noise and vibration created by haulage and mining operations.

6.5.2 Assessment methods

A quantitative desktop noise and blast assessment will be prepared in accordance with the EPA Noise Policy for Industry (NPfI) and Australian and New Zealand Environment and Conservation Council (ANZECC) blast guidelines, as follows:

- Gather and review relevant information for the Project and review of available assessments for other projects in the area;
- Review of existing noise environment to characterise the site and to determine likely criteria and constraints for the Project (no direct noise monitoring is proposed);
- Assessment of site meteorology and analysis of local topography;
- Identification of the sources of noise emissions from the Project in detail (1x worst-case scenario);
- Develop a noise propagation model to determine the extent of predicted operational air quality impacts for the worst-case operating scenarios (1x scenario); and
- Describe and discuss options for noise controls as required for the Project surface operations and haul route.

6.6 Dust and air quality

6.6.1 Key environmental risks

Current dust emissions are that of a typical rural environment and come from agricultural and natural sources. The Project is expected to cause an increase in dust emissions, initially due to the construction of the mining infrastructure, and then subsequently from mining operations and the transportation of ore via the haul route to the Tritton processing plant.

Dust created through haulage operations was a key concern raised in the initial stakeholder consultation (raised by multiple landholders). This consultation has guided the alignment of the haul road and led to several of the options initially identified in Project planning being removed from consideration. Landholders also raised the option of sealing the haul road, and although this may be a significant cost to the project, sealing the haul road will be considered as part of the project refinement as a method of reducing potential dust impact. Continued

engagement with landholders will include additional discussions of potential dust impacts from the haulage operations.

An air quality impact assessment will be conducted to help facilitate this engagement, so that the potential impacts to air quality at local residences is understood. Dust created on the project site from operational activities will also be included in the assessment. Dust suppression measures will also be undertaken on the Project site to minimise creation of airborne dust and particulate matter. The dust suppression requirements will be guided by the outcomes of the air quality impact assessment and landholder consultation.

6.6.2 Assessment methods

The assessment would investigate the potential for impacts associated with dust emissions from the operations. Air dispersion modelling would be used to predict the extent of operational air quality impacts from the Project, including the haul road (if unsealed). The study covers the following components:

- Gather and review relevant information for the Project and review of available assessments for other projects in the area;
- Review of existing environmental air quality (dust only) conditions to characterise the site and to determine likely criteria and constraints for the Project;
- Assessment of site meteorology and analysis of local topography;
- Identification of the sources of air emissions (dust only) from the Project in detail (1x worst-case scenario), and in summary form for identified surrounding sources (if applicable);
- Develop an air dispersion model to determine the extent of predicted operational air quality impacts for the worst-case operating scenarios;
- Describe and discuss options for air emission controls (dust only) as required for the Project surface operations and unsealed haul route; and,

The air assessment scope of work is for dust only. It does not include specialised calculations for sulphurous and other gaseous emissions from ore processing as these are assumed to be within the existing approved operations at Tritton.

6.7 Social

6.7.1 Key social risks

The discontinuation of mining operations at Tritton Mines would likely have a social cost to the local community and the broader regional economy of Far West New South Wales. Tritton Operations is an existing Copper Operation, operated by Tritton Resources and employs approximately 450 staff and engages approximately 100 contractors. Approximately 50% of whom come from Bogan Shire LGA, with 25% from western NSW and the remaining 25% for the rest of NSW. In addition to being a large employer in the local community, the mine is an active participant in the local community and supports the social fabric of Bogan Shire.

Although the Tritton Operations has capacity in the processing plant, there will not be sufficient ore in the coming years to continue a viable operation. As such Aeris Resources is looking to develop additional resources to fill the capacity of the mill.

The Constellation Project is designed to support the continued operations of the Tritton Mine, this will:

- Enable the ongoing employment of the Tritton workforce which is sourced from the Bogan Shire LGA and surrounding regions.
- Enable the continuation of a regional exploration project designed to discover and define new deposits which could be developed, leading to ongoing employment opportunities.

The consultation done to date has identified potential social impacts associated with the alignment and operation of the Project's haul road. These impacts include issues arising from:

- Noise and dust;
- Alignment of haul road in respect to local properties and residences;
- Interaction with other road users; and
- Location of haul road in proximity to Girilambone.

6.7.2 Assessment methods

Upon issuing of the Planning Secretary's Environmental Assessment Requirements (SEARs) by the Department, commencement of the Social Impact Assessment (SIA) will be undertaken. It is noted that the SIA will be an input into the broader Environmental Impact Statement (EIS) for the project.

The SIA will include the following components:

- Consultation and engagement with the identified impacted stakeholders as required to inform the SIA. Document outcomes of consultation and integrate findings into baseline reporting and impact assessment;
- Detailed social baseline assessment including distribution of impacts through communities including vulnerable members;
- Evaluation of social impacts across the life of the project in relation to significance, likelihood and magnitude; and
- Mitigation measures that could potentially avoid or reduce potential negative impacts. Also, measures that could enhance positive social impacts will be noted.

The SIA will be conducted in accordance with the DPIEs *Social Impact assessment guideline: For significant mining, petroleum production and extractive industry development* (DPIE 2021). To comply with the guidelines a suitably qualified social impact practitioner will undertake the SIA. The SIA will consider:

- Potentially affected people and local community surrounding the Project;
- Nature and scale of the Project;
- Supply chains and procurement processes;
- Haulage routes;
- Movement of workers;
- Social infrastructure, built and natural, that have social value to the community; and
- the existing Tritton operations and the interaction of these operations with the community.

Particular focus will be applied to the potential impact along the haul route as impacts of the haul road (noise, dust, and local traffic) were identified as a source of social impact to the local community.

The SIA scoping report has been provided along with this scoping report as part of the request for SEARs.

6.8 Visual amenity

6.8.1 Key environmental risks

The surface infrastructure to be established on the Project site is a considerable distance from the majority of sensitive receptors and public viewing locations. Notably the Okeh property is the closest homestead to the Project (located on Okeh property) and would potentially see components of the Project infrastructure. Consultation is being undertaken with the owners of Okeh property to ensure that Project is designed in a manner that meets their expectations in relation to visual amenity.

Some surface activities will occur at night which will require the use of night lighting of the ROM pad and other facilities within the Project site. Lighting from the mine is not a matter of concern raised by the community (or

regulators) during the scoping consultation. Given the non-permanent nature of the lighting on the ROM pad and absence of community concern and only rehabilitation of the site and final post-closure landforms will require visual impact assessment.

6.8.2 Assessment methods

GIS modelling software will be used to prepare a viewshed analysis (using topographical contours, vegetation; operational infrastructure and final landform data) for the current landform.

This analysis will be run on the existing landform, a nominated 'working' landform and the final post mining landform for the purpose of assessing the likely visual impact on visual receptors. This may include photomontage images for representative viewpoints. The significance of changes compared to the existing and approved development will be assessed.

6.9 Biodiversity

6.9.1 Key environmental risks

Initial surveys show a highly modified form of PCT103 dominates the Constellation site where canopy and shrub species have been historically removed for agricultural and pastoral activities. This modified form is represented by a very sparse canopy and shrub layer over a ground layer of smaller shrubs, grasses and forbs.

Although it is unclear of the area of vegetation required for clearing, it is estimated that clearing would be in the order of 300 – 500 hectares. Initial surveys indicate that ecosystem credits will be required to meet obligations under the *NSW Biodiversity Offset Scheme (BOS)*.

Targeted seasonal threatened species surveys have been conducted for BAM candidate species. The surveys were conducted in accordance with the BAM guidelines for the relevant species, none of which were detected. As such it is anticipated that species credits will not be required to meet the requirements of the NS BOS.

It is not likely that the Project will cause any significant impacts to any MNES.

6.9.2 Assessment methods

A Biodiversity Development Assessment Report (BDAR) will be required to assess the impacts of the Constellation Project on the regional biodiversity values. The BDAR will include calculation of biodiversity credit requirements.

It is anticipated that offsets will be delivered on a property owned by Tritton Resources. The potential for delivery of offsets on this property will be included in the assessment and will be undertaken in consultation with BCT.

6.10 Aboriginal and non-Aboriginal heritage

6.10.1 Key environmental risks

Vegetation clearing and ground disturbance from the proposed Project could result in impacts to Aboriginal cultural heritage items. An Aboriginal Cultural Heritage Assessment (ACHA) including Aboriginal community consultation will be conducted to determine and mitigate any potential impacts caused by the Project. There is also a low likelihood that European cultural heritage values are located within the area to be disturbed by the Project. A Historical Heritage Assessment (HHA) will be conducted to ensure compliance with the following legislation and best practice guidelines:

6.10.2 Assessment methods

The assessment of Aboriginal heritage impacts would be undertaken in accordance with the *DECC Interim Community Consultation Requirements for Applicants* and *Guidelines for Aboriginal Heritage Cultural Heritage Assessment and Community Consultation*.

The following key tasks would be undertaken to further assess the heritage impacts associated with the proposal:

- A detailed literature review including a description of the context of the Subject Area, identification of known Aboriginal cultural heritage sites and/or places in the Subject Area and surrounds.
- A description of the historical context of the Project Area and identification of previously identified Aboriginal cultural heritage items in the area and surrounds.
- Documentation of:
    - consultation process and responses from registered Aboriginal stakeholders;
    - mapping of relevant Aboriginal heritage items in the Subject Area and surrounds; and
    - archaeological significance of items and cultural heritage values.
- Assessment of the potential impacts and cumulative impacts of the proposal on Aboriginal cultural heritage, and recommendation of management measures to avoid, mitigate and/or remediate potential impacts.
- A compliant community consultation process, including the following stages:
    - Stage 1 – Notification
    - Stage 2 - Presentation of Information
    - Stage 3 - Gathering Information about Cultural Significance
    - Stage 4 –Draft Report Review

The HHA will involve the following sections:

- A description of the historical context of the Study Area and the surrounding region which includes the identification of historical heritage items or places of significance within this zone. This section would be prepared with consideration of available historical sources, previous assessments, and relevant registers and plans.
- Documentation of:
    - the survey and assessment methodology
    - mapping of relevant historic heritage items and historical archaeological significance in the Study Area and surrounds.
- Assessment of the potential impacts and cumulative impacts of the proposal on historical heritage, and recommendations of management measures to avoid, mitigate and/or remediate potential impacts.

6.11 Traffic and transport

6.11.1 Key environmental risks

Potential impacts relating to traffic and transport include:

- the construction and/or resurfacing of the haul route
- additional traffic on roads in the vicinity of the Project such as the Mitchell Highway, Murrawombie Road, and other local roads as a result of mine development related traffic.
- Associated additional road maintenance due to the additional traffic relating to mine development.

Haulage numbers are yet to be defined but will include multiple truck movements per day to the Tritton Mine site. The key environmental risks include the potential to increase traffic numbers on local roads during construction and operation. In particular, there is a need to focus on transport impacts at intersections and locations near Girilambone.

6.11.2 Assessment methods

An assessment of transport impacts of the mine development on the local road network and transport routes for the life of the mine including:

- Current and potential future traffic generation with weekday AM/PM counts, and 7-day tube counts
- An assessment of potential haulage route options, identifying constraints and opportunities, and road safety implications at intersections for each option.
- Assessment of current and future operational performance of the nominated study intersections during the surveyed peak periods using the SIDRA modelling software.
- Determination of the cumulative impact of other surrounding projects on the surrounding road network.

6.12 Economic

6.12.1 Key environmental risks

The Project site is located in the Bogan Shire LGA. The Bogan Shire LGA has an area of 14,611 km^2 and an estimated resident population at the 2016 Census of 2,692 persons. The town of Nyngan is the administrative centre of the Bogan LGA with an estimated resident population of 1,988 people (ABS 2016). The largest industry of employment in the area is copper ore mining (12.8% of the population), followed by sheep farming (6.4%), and Local Government Administration (5.7%).

The discontinuation of mining operations at Tritton Mines would likely have a deleterious impact on the local economy of Nyngan and the broader regional economy of Far West New South Wales. The project would allow continuation of ore production and processing, and likely increase local employment and local domestic product.

There may be local benefits from increased demand associated with staff increases including local salary inflation and increased demand for local services and supplies.

6.12.2 Assessment methods

Assuming the project is deemed a SSD, the economic assessment will be required to be prepared in accordance with the Secretary's Environmental Assessment Requirements (SEARs) as well as the NSW Government *Guidelines for Economic Assessment of Mining and Coal Seam Gas Proposals* (December 2015).

- An overview of the existing economic environment.
- A local effects analysis. This is typically undertaken using either Computable General Equilibrium (CGE) or Input-Output (IO) modelling to estimate the impacts in the local area, in terms of direct and flow-on industry output, gross product, employment and employee incomes supported. Other economic impacts in the local area not appropriately captured in CGE or IO modelling are described qualitatively. This may include:
    - Impacts to local business, both beneficial and adverse.
    - Impacts to property markets, if relevant.
    - Government revenues generated, including royalty revenues.
    - Potential additional costs to Government for provision of local infrastructure and services to support the project (this information would typically be provided by the proponent).
- A cost benefit analysis, examining the net benefit/ cost of the project to the State in present value terms.

7 Stakeholder engagement approach

A Community Stakeholder Engagement Plan (CSEP) has been prepared for the Project. The proposed community and stakeholder engagement outlined in the CSEP is based on the International Association of Public Participation (IAP2) spectrum of participation. The IAP2 participation spectrum is shown in Table 7-1. The required level of engagement for each stakeholder, or group of stakeholders identified in stage 1, will be dependent on the potential sensitivity, impact and/or outrage determined in stage 2 (assess) and the complexity of the engagement required and/or the issue determined in stage 3 (prioritise). Where the sensitivity and/or the complexity is low, engagement will be on the inform end of the spectrum whereas high degree of outrage and/or complexity will result in engagement on the collaborate end of the spectrum.

Table 7-1. Modified IAP2 spectrum of participation applicable to the Project

	Inform	**Consult**	**Involve**	**Collaborate**
Public participation goal	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the community throughout the process to ensure that concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.
Promise to the public	We will keep you informed	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision.	We will work with you to ensure that concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will look to you for advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.
Methods of engagement	• Information sheets • Website • Information sessions	• Community survey • Information sessions	• Individual briefings	• Direct engagement

Although the complete IAP2 spectrum includes an 'empower' component, the Project will not be undertaking engagement that aligns with empowerment. Aeris and AARC will endeavour to empower stakeholders such as landholders and Indigenous communities to garner full Project buy-in and contribute to community well-being, however, this doesn't form part of the engagement strategy at this stage.

The engagement strategy will focus on inform, consult and involve, and in some cases collaborate.
Reports on stakeholder engagement activities will be included as part of Project reporting and incorporated into the EIS.

Monitoring and evaluation will be undertaken on a continuous basis and fed back into the process through development of a stakeholder and issues register. This will enable Aeris and AARC to operate an adaptive engagement program. Namely, through the monitoring and evaluation, Aeris and AARC can:

- monitor stakeholder sentiment and perceptions to the Project;
- identify the issues held by stakeholders and respond to issues directly or implement a process for addressing issues as part of the EIS and mine planning;
- identify additional stakeholders not initially captured; and

- adapt stakeholder prioritisation and engagement methods from the feedback.

The CSEP identifies:

- stakeholders who will be consulted as part of the Project;
- purpose of engagement with stakeholders;
- method of engagement for each stakeholder
- issues each identified stakeholder may raise; and
- engagement plan.

Stakeholder engagement has commenced and will be undertaken throughout the Project assessment phase. The CSEP is a live document that will be updated as stakeholder engagement is undertaken. This engagement may identify new stakeholders, additional issues or methods of engagement as required.

8 Conclusion

The purpose of this scoping report is to provide an overview of Tritton Resources planned Constellation Project and accompany the request for SEARs.

The Project would comprise a new mining operation north east of the existing Tritton Mining Operations. The Project would utilise open cut and underground stope mining methods to extract copper bearing ore from an identified resources.

The Project would have an anticipated life of 10 + years with open cut mining commencing first followed by underground operations. Sulphide bearing ore would be transported to Tritton Copper Mine for processing with oxide material being heap leached on site.

The scoping report outlines the key environmental and social values which may be impacted by the Project and the planned assessment which will be undertaken to identify and quantify these potential impacts. It also (along with the associated SIA scoping report and CSEP) identifies the consultation which has been undertaken to date and the consultation planned for the assessment.

The following technical assessments are planned to be completed for the Project and discussed in the EIS for the Project:

- Noise and blasting assessment;
- Air quality and greenhouse gas assessment;
- Geotechnical assessment;
- Surface water assessment;
- Groundwater assessment;
- Visual impact assessment;
- Biodiversity assessment;
- Aboriginal and non-aboriginal cultural heritage assessment;
- Traffic and transport impact assessment;
- Geochemical classification of waste materials;
- Soil and land suitability assessment;
- Social impact assessment; and
- Economic impact assessment.

9 References

DPIE 2019, Preparing a Scoping Report Guidance for State Significant Projects. NSW Government Department of Planning, Industry and Environment, Sydney, NSW.

Gilligan L.B., Byrnes J.G., Watkins J.J. and Pogson D.J, 1994, Cobar 1:250000 Metallogenic map, 1st edition, Geological Survey of new South Wales, Sydney.

Watkins J.J., 1996, Nyngan 1:250000 Geological Sheet SH/55-15, 1st edition, Geological Survey of new South Wales, Sydney.

Colquhoun, G.P. Hughes, K.S. Deyssing, L. Ballard, J.C. Phillips G. Troedson, A.L. Folkes C.B. Fitzherbert J.A., 2020, NSW Seamless Geology Version 2.1, https://geonetwork.geoscience.nsw.gov.au/geonetwork/srv/eng/catalog.search#/metadata/3dfbc096-ab1f-4b34-92a1-5e347bfaecb8

Giambastiani B.M.S and Kelly B.F.J. 2010, Macquarie-Bogan Catchment Groundwater Hydrographs, School of Biological, Earth and Environmental Science, The University of new South Wales, Australia, August 2010.

Skelt K., Ife D., Woolley D., Hillier J., Evans R., 2004. Murray-Darling Basin groundwater status 1990-2000: catchment report. Technical report, Murray-darling Basin Commission, Canberra.

Water Resources Commission (WRC) 1984, Groundwater in New South Wales, NSW Water Resources Commission Sydney.

Water NSW 2019, Macquarie River Drought Temporary water security works at Warren – Review of Environmental Factors, August 2019.

Bureau of Meteorology (BOM) 2021, Australian Groundwater Explorer, Australian Government Bureau of Meteorology, viewed online 9 September 2021 at http://www.bom.gov.au/water/groundwater/explorer/map.shtml

Water NSW 2021, Real-time data, viewed online 9 September 2021, https://realtimedata.waternsw.com.au/

Bureau of Meteorology (BOM) 2021, Groundwater Dependent Ecosystems Atlas, Australian Government Bureau of Meteorology, viewed online 9 September 2021 at http://www.bom.gov.au/water/groundwater/gde/map.shtml

A1 DPIE Scoping Worksheet

Environmental and social matters			Without any mitigation, will the proposal impact on the matter?	If there is a "likely" impact: 1. list the activities likely to cause the impact; and 2. if applicable, list the receptor being impacted and its status. *E.g. clearing 100ha EEC, or construction noise nearby school* If "unlikely", why? has the impact been actively avoided through project design or site location?	Is the impact, without mitigation, likely to cause a material effect with regard to its				Does the impact need assessment in the EIS?	Is the impact, without mitigation, likely to have a material cumulative effect with other impacts from emerging projects?	What safeguards and management measures are likely to be required to address the impact?	Are there community & other stakeholder concerns regarding the impact or activity? *(requires consultation)*	Likely level of assessment and/or engagement required *(auto fills)*
					Extent	Duration	Severity	Sensitivity					
What does the proposal mean for people?	AMENITY	acoustic	Likely	Mining operations including haulage of material will generate noise that is audible in the surrounding area. Noise impacts could be generated from blasting, excavation and loading and haulage activities. Impacts could be apparent at residences near the site and/or along the haul road route. Noise impacts will be assessed during the EIS under a worst-case scenario.	Y	Y	Y	Y	Yes	No	Project Specific	Yes	Other Issue + Focussed Engagement
		visual	Likely	Surface infrastructure will be established as part of the Project, including a waste rock dump which will be rehabilitated and remain as part of the post mining landform. The changes are expected to be visible from neighbouring private residences, but not from publicly accessible areas.	Y	Y	Y	N	Yes	No	Project Specific	No	Key Issue
		odour	n/a										No assessment necessary - Worksheet only
		microclimate	n/a										No assessment necessary - Worksheet only
	ACCESS	access to property	Likely	The Project is located on Private land. The area of the land occupied by the Project will not be able to be accessed by the landholder for the duration of the Project. An agreement with the landholder will be reached on this matter. Haul Road has the potential to impact property through which it passes as easements will be required. Access to property may also be impacted.	Y	Y	Y	N	Yes	No	Standard	Yes	Other Issue + Focussed Engagement
		access to services	Likely	Raw and potable water will need to be used for mining operations, site facilities and dust suppression. Additional licence arrangements would need to be secured for water access and water would be required for the duration of the Project. Electricity will be supplied via transmission lines. Access to property may be impacted by the establishment of easements for services.	Y				Yes	No	Standard	No	Other Issue
		road and rail network	Likely	Ore will be transported from Constellation to Tritton Mine via a haul road which will cross and potentially traverse a portion of the Mitchell Highway. The rate of truck movements per day is still to be determined however an indicative estimate is 50 movements per day. This could have a minor impact on resident and visitor road users.	N	Y	Y	N	Yes	No	Project Specific	No	Key Issue
		offsite parking	n/a										No assessment necessary - Worksheet only

Environmental and social matters			Without any mitigation, will the proposal impact on the matter?	If there is a "likely" impact: 1. list the activities likely to cause the impact; and 2. if applicable, list the receptor being impacted and its status. *E.g. clearing 100ha EEC, or construction noise nearby school* If "unlikely", why? has the impact been actively avoided through project design or site location?	Is the impact, without mitigation, likely to cause a material effect with regard to its				Does the impact need assessment in the EIS?	Is the impact, without mitigation, likely to have a material cumulative effect with other impacts from emerging projects?	What safeguards and management measures are likely to be required to address the impact?	Are there community & other stakeholder concerns regarding the impact or activity? *(requires consultation)*	Likely level of assessment and/or engagement required *(auto fills)*
					Extent	Duration	Severity	Sensitivity					
	BUILT ENVIRONMENT	public domain	Unlikely	The Project is located on Private land and is not in close proximity to areas in the public domain								No	Scoping Report
		public infrastructure	Likely	Ore will be transported from Constellation to Tritton Mine via a haul road which will cross and potentially traverse a portion of the Mitchell Highway. The rate of truck movements per day is still to be determined however an indicative estimate is 50 movements per day. This could have an impact on road infrastructure.	Y	Y	N	N	Yes	No	Standard	Unknown	Other Issue
		other built assets	n/a										No assessment necessary - Worksheet only
	HERITAGE	natural	Unlikely	There are no natural heritage features within close proximity to the Project.								No	Scoping Report
		cultural	Likely	There is a low likelihood that European cultural heritage values are located within the area to be disturbed by the Project, however, assessment will need to be undertaken to assess if heritage sites will be impacted by the Project.	N	Y	Y	N	Yes	No	Project Specific	No	Key Issue
		Aboriginal cultural	Likely	Vegetation clearing and ground disturbance could result in impacts to Aboriginal cultural heritage items.	N	Y	Y	Y	Yes	No	Project Specific	Yes	Key Issue + Focussed Engagement
		built	Unlikely	No built heritage values are located within close proximity to the Project area								No	Scoping Report
	SOCIAL	health	Unlikely	The Project is not in close proximity to any sensitive receptors at which human health could be affected.								No	Scoping Report
		safety	Likely	Ore will be transported from Constellation to Tritton Mine via a haul road which will cross and potentially traverse a portion of the Mitchell Highway. The rate of truck movements per day is still to be determined however an indicative estimate is 50 movements per day. This may impact safety of other road users.	N	Y	Y	Y	Yes	No	Project Specific	Yes	Key Issue + Focussed Engagement
		community services and facilities	Unlikely	The workforce and accommodation arrangements will remain consistent with the current levels and arrangements in place for Tritton Operations.								No	Scoping Report
		housing availability	Unlikely	As the workforce and accommodation arrangements will remain consistent with the current levels and arrangements in place for Tritton Operations it is unlikely that there will be any significant change to the housing availability in the region due to the Project. However, increases in workforce associated with the construction workforce may temporarily affect housing availability. Nyngan is currently experiencing a housing availability shortage. Housing availability will be assessed as part of the SIA.									Scoping Report

Environmental and social matters			Without any mitigation, will the proposal impact on the matter?	If there is a "likely" impact: 1. list the activities likely to cause the impact; and 2. if applicable, list the receptor being impacted and its status. *E.g. clearing 100ha EEC, or construction noise nearby school* If "unlikely", why? has the impact been actively avoided through project design or site location?	Is the impact, without mitigation, likely to cause a material effect with regard to its				Does the impact need assessment in the EIS?	Is the impact, without mitigation, likely to have a material cumulative effect with other impacts from emerging projects?	What safeguards and management measures are likely to be required to address the impact?	Are there community & other stakeholder concerns regarding the impact or activity? *(requires consultation)*	Likely level of assessment and/or engagement required *(auto fills)*
					Extent	Duration	Severity	Sensitivity					
What does the proposal mean for the natural environment?		social cohesion	Likely	Mining is important for the community and social fabric of the region. Tritton Operations is the largest employer in the Bogan Shire Council. The commencement of the Constellation Project and continuation of processing operations may have a positive and/or negative impact on the social cohesion.	Y	Y	Y	Y	Yes	No	Project Specific	No	Key Issue
	ECONOMIC	natural resource use	Likely	The Project will extract mineral bearing ore to produce metals for sale.	Y	Y	Y	N	Yes	No	Standard	No	Other Issue
		livelihood	Likely	Mining is important for the community and social fabric of the region. Tritton Operations is the largest employer in the Bogan Shire Council. The commencement of the Constellation Project and continuation of processing operations may have a positive impact on those employed by the mine with flow on effects to the community	Y	Y	Y	Y	Yes	No	Project Specific	Yes	Key Issue + Focussed Engagement
		opportunity cost	n/a										No assessment necessary - Worksheet only
	AIR	particulate matter	Likely	Mining (and potentially haulage) activities will result in airborne dust, the potential impacts to local residents and/or visitors will be assessed as part of the EIS. Residents along the haul road may be particularly impacted by dust.	Y	Y	Y	N	Yes	No	Project Specific	Yes	Key Issue
		gases	Likely	Mining vehicles and plant will release CO2, Nox and other gases which may have an impact on the local atmosphere.	N	Y	N	N	No			No	Scoping Report
		atmospheric emissions	Likely	Project will result in land clearing and including burning of fossil fuels causing the generation of greenhouse gas emissions.	N	Y	Y	N	Yes	No	Project Specific	No	Key Issue
	BIODIVERSITY	native vegetation	Likely	Surface disturbance will result in clearing of native vegetation. Seasonal surveys have not detected presence of threatened species or habitat.	N	Y	Y	N	Yes	No	Project Specific	Unknown	Key Issue
		native fauna	Likely	Surface disturbance will result in clearing of fauna habitat. Seasonal surveys have not detected presence of threatened species or threatened species habitat.	N	Y	Y	N	Yes	No	Project Specific	Unknown	Key Issue
	LAND	stability / structure	Likely	Mining activities will remove and expose soil and subsurface material. Underground mining has the potential to impact the stability of the surrounding geology with impacts at the surface.	Y	Y	Y	N	Yes	No	Project Specific	No	Key Issue
		soil chemistry	Likely	Operation has the potential for local contamination or leaching from waste rock emplacement which could impact the local soil chemistry.	N	Y	N	N	No			Unknown	Scoping Report
		capability	Likely	Mining will change the capability of areas of the Project site to support existing agriculture activities, however, the site is not within a BSAL area.	N	Y	Y	N	Yes	No	Standard	Yes	Other Issue + Focussed Engagement

Environmental and social matters			Without any mitigation, will the proposal impact on the matter?	If there is a "likely" impact: 1. list the activities likely to cause the impact; and 2. if applicable, list the receptor being impacted and its status. *E.g. clearing 100ha EEC, or construction noise nearby school* If "unlikely", why? has the impact been actively avoided through project design or site location?	Is the impact, without mitigation, likely to cause a material effect with regard to its				Does the impact need assessment in the EIS?	Is the impact, without mitigation, likely to have a material cumulative effect with other impacts from emerging projects?	What safeguards and management measures are likely to be required to address the impact?	Are there community & other stakeholder concerns regarding the impact or activity? *(requires consultation)*	Likely level of assessment and/or engagement required *(auto fills)*
					Extent	Duration	Severity	Sensitivity					
		topography	Likely	Open cut and underground mining will result in a residual pit void and the establishment of a waste rock emplacement on site.	N	Y	Y	N	Yes	No	Project Specific	No	Key Issue
	WATER	water quality	Likely	Mining activities and dewatering may have an impact on groundwater or surface water quality.	Y	Y	Y	Y	Yes	No	Project Specific	Yes	Key Issue + Focussed Engagement
		water availability	Likely	Dewatering may reduce the availability of groundwater to other potential users, however, there are limited users of groundwater within the immediate vicinity.	Y	Y	Y	Y	Yes	No	Project Specific	Yes	Key Issue + Focussed Engagement
		hydrological flows	Likely	Change to topography as a result of the operational and post mining landform may impact hydrological flows.	Y	Y	Y	Y	Yes	No	Project Specific	No	Key Issue
What risks does the proposal face?	RISKS	coastal hazards	n/a										No assessment necessary - Worksheet only
		flood waters	Likely	There is potential for localised flooding of the site, however, the Project is not located within a flood plain and doesn't experience regular inundation. The haul road has the potential to change the local flood regime along the haul road alignment in a small number of lots.	N	N	Y	Y	No	No	Standard	No	Other Issue
		bushfire	Likely	Project is within a bushfire prone area as shown on the online bush fire prone land tool operated by the NSW fire service. However, the area has been extensively cleared of vegetation.	N	N	N	Y	No			No	Scoping Report
		undermining	Unlikely	There is no other Project within the area for which underground excavation has taken place.								No	Scoping Report
		steep slopes	Unlikely	There are no steep slopes in close proximity that pose a risk to the Project.								No	Scoping Report