CopperString 2.0

Assessment of the impact to aviation

Volume 3 Appendix Y

July 2020

AVIATION IMPACT ASSESSMENT

COPPERSTRING 2.0 PROJECT

Prepared for GHD Pty Ltd

AVIATION PROJECTS

AVIATION PROJECTS

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1.0	Final	17 July 2020		

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GLOSSARY

AGL	above ground level
AHD	Australian Height Datum
AIP	aeronautical information package (Airservices Australia)
AMSL	above mean sea level
ARP	aerodrome reference point
CAAP	Civil Aviation Advisory Publication
CAR	Civil Aviation Regulations (1988)
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulations (1998)
CNS	Communications, Navigation and Surveillance
DAH	Designated Airspace Handbook
ERSA	En Route Supplement Australia (Airservices Australia)
FAC	Facilities Information Chart
ICAO	International Civil Aviation Organisation
LSALT	lowest safe altitude
MSA	minimum safe altitude
MOC	minimum obstacle clearance
MOS	Manual of Standards Part 139—Aerodromes
OLS	obstacle limitation surface(s)
RAAF	Royal Australian Air Force
RPT	regular public transport
SSR	secondary surveillance radar

UNITS OF MEASUREMENT

ft	feet	(1 ft = 0.3048 m)
km	kilometres	(1 km = 0.5399 nm)
m	metres	(1 m = 3.281 ft)
nm	nautical miles	(1 nm = 1.852 km)

1. INTRODUCTION

1.1. Situation

GHD Group Pty Ltd (GHD), in collaboration with CuString Pty Ltd is preparing an Environmental Impact Statement (EIS) with the Queensland Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP) for the proposed CopperString 2.0 Project (the Project).

The Project involves the construction and operation of approximately 1,000 km of extra high voltage overhead electricity transmission line that will extend from the main high voltage bus on the North West Power System (NWPS) at Mount Isa to the Powerlink 275 kV transmission line, via a new connection point at Woodstock, south of Townsville. The Project includes development of a 330 kV transmission line from Woodstock (South of Townsville) to the Dajarra Road Substation, near Cloncurry. Then from Cloncurry a 220 kV transmission line west to Mount Isa and a 220 kV transmission line south to a southern connection point before splitting to enable connection of southern mines, such as the Cannington Mine, the Mount Dore Mine and the Phosphate Hill Mine that are presently not connected to the NWPS.

The Project has been classified as a Coordinated Project by the Queensland Coordinator General, and as part of the EIS process with DSDMIP, GHD requested to prepare an aviation impact statement, and assessment on any potential aviation impacts, that the Project may have to aerodromes and communities which are located in proximity to the Project.

1.2. Purpose and scope of task

Undertake an assessment of the impact of the Project to aviation activities in accordance with the Project EIS terms of reference (dated September 2019). The aviation activities may include, but are not limited to the following:

- aerial stock mustering;
- landing strips for homesteads and other facilities;
- aircraft conducting power line surveys for the power company;
- registered or certificated aerodromes; and
- RAAF and Defence activities, if any.

1.3. Methodology

The task was performed according to the methodology outlined below:

1. reviewed supplied client material and establish the appropriate planning and regulatory framework;
2. reviewed the report prepared by RD Collins & Associates;
3. reviewed the project for aviation impacts through desktop analysis and telephone enquiry where required;
4. prepared a draft report for client review; and

5. prepared a final report for client acceptance.

1.4. Client material

The following material was provided by GHD for the purpose of this preliminary feasibility study:

- GHD, CopperString Easement and conterline Layers,kmz, received 26 February 2020;
- GHD, CopperString Project, 220kV Overhead Lines at Dajarra Tower Suite Preliminary, Drawing no. 101010-00543-ST-DSK-0054, revision B, dated 29 October 2010;
- GHD, CopperString Project, Woodstock-Dajarra Road Tower Suite for 330kV Overhead Line Preliminary, Drawing no. 101010-00543-ST-DSK-0055, revision B, dated 29 October 2010; and
- GHD, Transport Airport, TRAN_Airport_0.kmz, received 27 February 2020.

1.5. References

References used or consulted in the preparation of this report include:

- Aerial Agriculture Association of Australia (AAAA), *Powerlines Policy*, dated March 2011;
- Aerial Agriculture Association of Australia (AAAA), *Tall Structures Policy*, February 2017;
- Airservices Australia, Aeronautical Information Package (AIP); including En Route Supplement Australia (ERSA) effective 27 February 2020;
- Airservices Australia, Designated Airspace Handbook (DAH), effective 27 February 2020;
- AMSTEC, *Copperstring EIS – Technical Report Traffic Prepared for RLMS*, dated October 2010;
- Australian Transport Safety Bureau, *Avoidable Accidents No. 2 Wirestrikes involving known wires: A manageable aerial agriculture hazard,* dated March 2013;
- Civil Aviation Safety Authority, Advisory Circular (AC) 139-8(2): *Reporting of Tall Structures*, dated March 2018;
- Civil Aviation Safety Authority, Civil Aviation Regulations 1998 (CAR), currently in force, 14 July 2019;;
- Civil Aviation Safety Authority, Civil Aviation Safety Regulations 1998 (CASR), as amended;
- Civil Aviation Safety Authority, *Manual of Standards Part 139 – Aerodromes*, version 1.14: dated January 2017;
- Civil Aviation Safety Authority, Manual of Standards Part 173 – *Standards Applicable to Instrument Flight Procedure Design*, version 1.5, dated March 2016;
- Department of Infrastructure, Local Government and Planning, QLD State Government, Development Assessment mapping system and State Planning Policy Planning interactive mapping system;
- Department of Infrastructure and Regional Development, Australian Government, *National Airport Safeguarding Framework;*

- International Civil Aviation Organization, Aircraft Operations Volume II – *Construction of Visual and Instrument Flight Procedures*, 6th edition, 2014;
- Mount Isa City Council, *City of Mount Isa Planning Scheme,* effective 9 March 2020;
- OzRunways, dated 27 February 2020; and
- RD Collins & Associates, *Assessment of the Impact to Aviation of the Proposed CopperString Project in North Queensland,* dated 3 November 2010.

2. BACKGROUND

2.1. Project history

The Project was initially proposed in 2010 and was designated as a Significant Project under the State Development and Public Works Organisation Act 1971 (SDPWO Act). The Project was required to submit an Environmental Impact Statement and had collected the baseline data and assessment of impacts when the Project was suspended.

For the previous EIS, an aviation impact assessment was completed by RD Collins and Associates in *Assessment of the Impact to Aviation of the Proposed CopperString Project in North Queensland* dated November 2010. The report has been validated against the updated Project, and an additional assessment of potential impacts to aviation has been evaluated.

The key findings of the RD Collins and Associates assessment are presented below, verbatim:

> *All protruding infrastructure such as transmission towers can pose a risk to aviation and the CopperString power line may be a local hazard to aviation as there is some risk of a wire strike. Although the consequences of this may be catastrophic, the likelihood is generally low. Notwithstanding there are specific areas where the risk is higher.*
>
> *In a number of cases the transmission line poses a wire strike risk to:*
>
> - *Aircraft involved in aerial stock mustering*
> - *Small general aviation aircraft using airstrips on rural properties*
> - *Aircraft conducting powerline surveys for Ergon Energy.*
>
> *Generally these risks can be adequately mitigated by:*
>
> - *Providing general advice to the general aviation community in the areas where the route is proposed, and consulting landholders on the potential impact to specific rural airstrips.*
> - *Providing large scale maps of the transmission line route to landholders to supply to pilots undertaking aerial mustering activities on their properties.*
> - *Providing specific advice to AOC holders, Ergon Energy, the RAAF and the owners of properties where airstrips are situated.*
> - *Affixing wire sight balls on hazardous areas in accordance with AS 3891.2*
>
> *There are some issues relating to Trepell aerodrome (Cannington). I am informed that there have been discussions with the Aerodrome Manager and these should continue. Notwithstanding, affixing hazard lighting on pylons and sight balls on wires in close vicinity of the aerodrome should be considered.*

The following recommendations were made:

- *General advice is promulgated to aviators in area immediately before construction of a section of line commences. This advice could be in the form of local newspaper advertisements or similar.*
- *Specific advice about the line is promulgated to Air Operator Certificate (AOC) holders who conduct aerial stock mustering in areas immediately before the construction of a section of line commences.*
- *Specific advice about the line is promulgated to property owners who are in close proximity to the line immediately before the construction of a section of line commences. Large scale maps indicating the route of the transmission line on individual properties are supplied to landholders after construction is completed.*
- *Specific advice is provided to Ergon Energy Ltd about the line with a request that this be forwarded to their Area Managers who procure aviation services.*
- *Specific advice about the line is provided to the RAAF immediately before the construction of a section of line commences.*
- *Discussions continue with the Manager of the Trepell aerodrome about the line with a view to placing hazard lights on the pylons and sight balls on the wires in close vicinity of the aerodrome.*
- *Wire sight balls are affixed to wires in accordance with AS 3891.2 on wires in the vicinity of stockyards and airstrips, across small valleys where the wires will be strung from ridge to ridge and any other hazardous areas. The tables in this report should be used as a guide to the locations.*

2.2. Project description

GHD is preparing an EIS with the DSDMIP and the Queensland Government for the development of the CopperString 2.0 Project. The high-voltage transmission line will connect the people and communities of Mt Isa and the North West Minerals Province to the National Electricity Grid.

Figure 1 shows an aerial view of the proposed Project (source: Copperstring 2.0, date accessed 9 March 2020).

Figure 1 Proposed Project

Transmission towers will be designed to maintain a mid-span clearance of the power line above local terrain in compliance with Queensland legislation. Nominal transmission tower heights above ground level and distances between transmission towers are described in Table 1. Transmission towers heights will vary from location to location depending on the topography of each specific location.

Table 1 Transmission tower physical description

Transmission line route	*Minimum height (m)*	*Maximum height (m)*	*Typical spacing (m)*
Renewable Energy Hub	50	75	400-500
CopperString Core	50	75	400-500
Mount Isa Augmentation	45	70	400-450
Southern Connection	45	70	400-450
Cannington Connection	35	50	400-450
Phosphate Hill Connection	35	50	400-450

The distance between transmission towers will typically be in the range of 400–500 m. This may vary depending on the topography and conductor clearance required in particular areas of the easement.

The final transmission tower sites will be determined after careful consideration of all physical constraints such as sensitive environmental areas, rock/soil types, significant watercourse/infrastructure crossings, existing land use and amenity.

2.3. Site overview

An overview of the Project site located in Far North Queensland, is provided in Figure 2 (source: GHD, Google Earth).

Figure 2 Project site

There are many aerodromes and certified airports located nearby the Project site. The closest ALA to the Project is located 723 m from the Project site. Trepell Airport is the closest certified airport, located 1.6 km from the Project. Refer to Figure 3 for certified airports located in proximity to the Project (source: GHD, Google Earth).

Figure 3 Aerodromes located in proximity to Project

3. PLANNING CONTEXT

3.1. Airports (Protection of Airspace) Regulations 1996

This sub-section sourced from *Airports Act 1996 (Cth)* and Airports (Protection of Airspace) Regulations 1996 (Cth), is applicable to Mount Isa Airport

Part 12 of the ***Airports Act 1996*** and the **Airports (Protection of Airspace) Regulations 1996** establish a framework for the protection of airspace at and around airports.

The *Airports Act 1996* defines any activity resulting in an intrusion into an airport's protected airspace to be a "controlled activity", and requires that controlled activities cannot be carried out without approval.

The Regulations provide for the Department or the airport operator to approve applications to carry out controlled activities, and to impose conditions on an approval.

Carrying out a controlled activity without approval is an offence under Section 183 of the *Airports Act 1996*, and is punishable by a fine of up to 250 penalty units. It is an offence under Section 185 of the Act to contravene any conditions imposed on an approval. Under Section 186 of the Act it is an offence not to give information to the airport operator that is relevant to a proposed controlled activity.

Any activity that infringes an airport's protected airspace is called a **controlled activity**, and requires approval before it can be carried out. Controlled activities include the following:

- permanent structures, such as buildings, intruding into the protected airspace;
- temporary structures such as cranes intruding into the protected airspace; and
- any activities causing intrusions into the protected airspace through glare from artificial light or reflected sunlight, air turbulence from stacks or vents, smoke, dust, steam or other gases or particulate matter.

The Regulations differentiate between ***short-term*** (less than 3 months) and ***long-term*** controlled activities. The Regulations provide for the airport operator to approve *short-term* controlled activities, excluding PANS-OPS (Procedures for Air Navigation Services – Aircraft Operations) infringements, and for the Department to approve long-term controlled activities, or *short-term* controlled activities referred to it by the airport operator, including short-term infringements of the PANS-OPS surface. However, long term intrusions of the PANS-OPS surface are prohibited.

Applications to carry out a controlled activity are to be made to the airport operator in writing. The information required in the application must include:

1. a description of the proposed controlled activity (building construction, crane operation etc);
2. its precise location (street directory grid references are suitable);
3. if the controlled activity consists of the erection of a building or structure:
    a. the proposed maximum height of the structure above the Australian Height Datum (including any antennae or towers), and

b. the proposed maximum height of any temporary structure or equipment (e.g. cranes) intended to be used in the erection of the structure.

4. the purpose of the controlled activity.

The airport operator will conduct the initial assessment of the application in terms of:

- whether the activity results in an intrusion into the OLS or PANS-OPS surface;
- the extent of the intrusion; and
- the precise location of the development or activity.

The airport operator is required to invite the following organisations to assess or comment on an application:

- **the Civil Aviation Safety Authority (CASA)** for an assessment of the impact on aviation safety;
- **Airservices Australia** for assessments of proposals resulting in a penetration of the PANS-OPS surface or temporary redirection of flight paths;
- **the local council authority** responsible for building approvals; and
- **the Department of Defence** in the case of joint-user airports.

For short-term controlled activities, comments are only required from CASA and Airservices.

The approval process varies depending on the type of controlled activity:

- **short-term controlled activities** which penetrate the OLS can be approved/refused by the airport operator after consultation with CASA and Airservices, or referred by the airport to the Department for a decision. However, if the short term controlled activity penetrates the PANS-OPS airport operators are required to consult with CASA and Airservices and then refer applications to the Department for a decision. This referral is to include advice about whether the short-term penetration of the PANS-OPS has the support of the airport operator;
- **long-term controlled activities penetrating the OLS** are referred by the airport to the Department for a decision after consultation with CASA, Airservices and the relevant building authority; and
- **long-term controlled activities penetrating the PANS-OPS airspace** are not permitted, and the airport operator can notify the refusal of such controlled activities.

The Regulations require any decision by the airport operator to be made in the interests of the *safety, efficiency* or *regularity* of existing or future air transport operations into or out of the airport.

3.2. CAAP 92-1(1) Guidelines for aeroplane landing areas

As a means of providing guidance to Aeroplane Landing Area (ALA) operators, CASA has published recommended practices in its Civil Aviation Advisory Publication (CAAP) 92-1(1) *Guidelines for aeroplane landing areas*.

The purpose of the CAAP 92-1(1) guidance is described as follows:

These guidelines set out factors that may be used to determine the suitability of a place for the landing and taking-off of aeroplanes. Experience has shown that, in most cases, application of these guidelines will enable a take-off or landing to be completed safely, provided that the pilot in command:

a. has sound piloting skills; and

b. displays sound airmanship.

A copy of CAAP 92-1(1) Figure 2A – *Single engine and Centre-Line Thrust Aeroplanes not exceeding 2000 kg MTOW (day operations),* which shows the physical characteristics applicable to the circumstances, is provided in Figure 4.

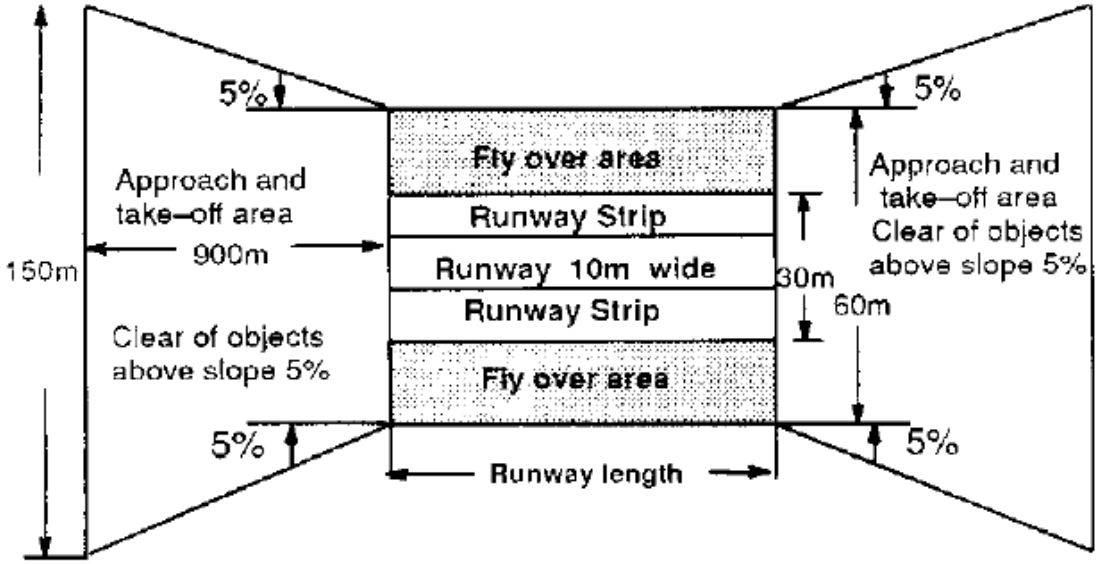

Figure 4 CAAP 92-1(1) Figure 2A

The approach and take-off surfaces for each runway end commence at the runway end (threshold) at a distance of 30 m either side of the runway centreline and diverge at a rate of 5% to a distance of 900 m. The surfaces increase in height at a rate of 5%, or 5 m in every 100 m.

3.3. QLD State Planning Policy 2017

The Queensland Government has introduced a State Planning Policy (SPP, 2017) that sets out policies on matters of state interest in relation to planning and development, including strategic airports and aviation facilities. The SPP sets out the state interests and related policies that local governments must take into account in preparing or amending local planning instruments. The state may also consider preparing and amending regional plans.

Mt Isa Airport is identified as a strategic airport under this policy.

All of the following requirements are assessment benchmarks, in accordance with Part E of the SPP:

- Development and associated activities do not create a permanent or temporary physical or transient intrusion into a strategic airport's operational airspace, unless the intrusion is approved in accordance with the relevant federal legislation.
- Development and associated activities do not include light sources or reflective surfaces that could distract or confuse pilots within a light restriction zone or lighting area buffer.
- Emissions do not significantly increase air turbulence, reduce visibility or compromise the operation of aircraft engines in a strategic airport's operational airspace.
- Development and associated activities do not attract wildlife or increase wildlife hazards within a wildlife hazard buffer zone.
- Development and associated activities within a building restricted area do not interfere with the function of aviation facilities.
- Development does not increase the risk to public safety within a public safety area.
- Development within the 20 ANEF (Australian Noise Exposure Forecast) contour or greater is appropriately located and designed to prevent adverse impacts from aircraft noise.

3.4. National Airports Safeguarding Framework

The National Airports Safeguarding Advisory Group (NASAG) was established by the Commonwealth Department of Infrastructure and Transport to develop a national land use planning framework called the National Airports Safeguarding Framework (NASF). The purpose of this framework is to enhance the current and future safety, viability and growth of aviation operations at Australian airports through:

- the implementation of best practice in relation to land use assessment and decision making in the vicinity of airports;
- assurance of community safety and amenity near airports;
- better understanding and recognition of aviation safety requirements and aircraft noise impacts in land use and related planning decisions;
- the provision of greater certainty and clarity for developers and land owners;
- improvements to regulatory certainty and efficiency; and
- the publication and dissemination of information on best practice in land use and related planning that supports the safe and efficient operation of airports.

3.5. Civil Aviation Safety Regulations 1998 Part 139—Aerodromes

The Civil Aviation Safety Authority (CASA) regulates aviation activities in Australia. Applicable requirements include the Civil Aviation Safety Regulations 1998 Part 139—*Aerodromes* (CASR 139), the associated Manual of Standards Part 139—*Aerodromes* (MOS 139) and other guidance and advisory material.

3.6. City of Mount Isa Planning Scheme 2020

The City of Mount Isa Planning Scheme commenced on 9 March 2020.

The City of Mount Isa Planning Scheme 2020 incorporates tables of assessment, zones, local plans, overlays, development codes and other associated aspects.

Building height limits are specified in zone codes and local plans. An Airport environs overlay code applies to assessing development within the airport environs overlay.

The following airport environs overlays are provided:

- Airport navigation facilities and buffers;
- Airport development distances and ANEF contours; and
- Obstacle limitation surface contours, airport safety zone and airport runway.

According to the Planning Scheme, the purpose of the Airport environs overlay code is to:

> *(1) Ensure development and associated activities do not adversely affect the existing or future safety, efficiency or operational integrity of Mount Isa Airport.*
>
> *(2) Provide for the most appropriate and compatible development of land surrounding Mount Isa Airport (the Airport) in order to ensure an acceptable level of amenity is achieved and the health and wellbeing of occupants are protected.*
>
> *The purpose of the code will be achieved through the following overall outcomes:*
>
> *(1) Development does not encroach within the Obstacle limitation surface (OLS).*
>
> *(2) Development for a sensitive land use within the vicinity of the Mount Isa Airport is appropriately located to prevent exposure to very high levels of aircraft noise and designed to adequately attenuate expected aircraft noise.*
>
> *(3) Development ensures that pilot vision is not put at risk from light sources, reflection of sunlight or other potential impacts.*

The assessment benchmarks for assessable development and requirements for acceptable development are provided in Table 8.2.1.1 of the Airport environs overlay code and copied in Table 2 (excluding items already addressed in the SPP requirements in Section 3.3. above).

Table 2 Assessment benchmarks for Mount Isa Airport

Development in Operational airspace: Obstacle limitation surface	
Performance Outcomes	Acceptable Outcomes
PO 1 Development does not create a permanent or temporary physical or transient obstruction in a strategic airport's operational airspace.	AO 1.1 Buildings and structures do not encroach into the airport's operational airspace. AO 1.2 Cranes or other equipment used during construction do not encroach into the airport's operational airspace. AO 1.3 Landscaping does not include vegetation that at maturity will encroach into the airport's operational airspace. AO 1.4 Transient activities associated with development such as parachuting, hot air ballooning and hang gliding will not occur within the airport's operational airspace.

4. CONSULTATION

An appropriate and justified level of consultation was undertaken with relevant parties.

The stakeholders consulted include:

- Airservices Australia;
- aerodrome operator – (Trepell Airport - South32);
- CASA; and
- Department of Defence.

Details and results of the consultation activities are provided in Table 3

Table 3 Stakeholder consultation details

Agency/Contact	*Activity/Date*	*Response/ Date*	*Issues Raised During Consultation*	*Action Proposed*
Aerodrome Operator (Trepell Airport)	4 June 2020 Email to Airport Operator Steven Walker (Project Manager South32)	2 July 2020 Email discussion and further teleconference with Geoff Roberts (Director Safety Wise Aviation)	During email consultation the Airport Operator for Trepell Airport was informed about the Project. Further, the Project was referred to the Airport Operator's consultant to review. In an email response and subsequent teleconference with Mr Roberts, discussion was held about the potential impact of the Project on circling areas at Trepell Airport. At the request of Mr Roberts, the report was updated to include further analysis regarding circling areas at Trepell Airport. Mr Roberts and Mr Walker did not have any objections to the proposed Project, providing the recommendations contained herein were adhered to.	No further actions required, refer section 5.13 for circling area analysis
Airservices Australia	4 June 2020 Email to Airport Developments	No response has been received	During email consultation Airservices Australia was informed about the Project. Feedback is yet to be provided. A follow up email was sent on 15 July 2020, and it was advised that the development proposal is still under assessment and the response will be provided according to the outlined timeframe. At the time of finalising this report, no assessment outcome had been received.	GHD will provide response, once received from Airservices Australia
CASA	CASA has advised that it will only review assessments referred to it by a planning authority or agency.			No further actions required
Department of Defence	4 June 2020 Email to Department of Defence	No response has been received	During email consultation Department of Defence was informed about the Project. Feedback is yet to be provided. A follow up email was sent on 14 July 2020, and it was advised that the development proposal is still under	GHD will provide response, once received from

Agency/Contact	*Activity/Date*	*Response/ Date*	*Issues Raised During Consultation*	*Action Proposed*
			assessment and the response will be provided according to the outlined timeframe. At the time of finalising this report, no assessment outcome had been received.	Department of Defence

5. AVIATION IMPACT STATEMENT

The proposed Project site is located in proximity to numerous registered, certified or aeroplane landing areas. (ALA). The information contained herein assesses the Project in relation to the impact on nearby airports.

5.1. Mount Isa Airport

As shown in Figure 3 Mount Isa Airport (YBMA) is located in proximity to the Project.

Mount Isa is a leased Commonwealth airport, operated by Mount Isa Airport Pty Ltd and located approximately 13 km (7 nm) north of the Project site.

A check of Airservices Australia's Aeronautical Information Package (AIP), dated 27 February 2020, shows that airspace procedures are measured from the aerodrome reference point (ARP). The coordinates published in Airservices Australia's Designated Airspace Handbook (DAH) dated 7 November 2019, are as follows:

- ARP coordinates: Latitude 20°39'50"S and Longitude 139°29'19"E.

According to En Route Supplementary Australia (ERSA) facilities information chart (FAC) for YBMA, Mount Isa Airport has an aerodrome elevation of 342 m AHD (1121 ft AMSL).

Mount Isa Airport has one runway:

- Runway 16/34 is a Code 4, sealed, instrument non-precision runway with a length of 2560 m and a width of 45 m.

The details of the aerodrome are shown in Figure 5 (dated 2 March 2017) (source: Airservices Australia, YBMA Aerodrome Chart).

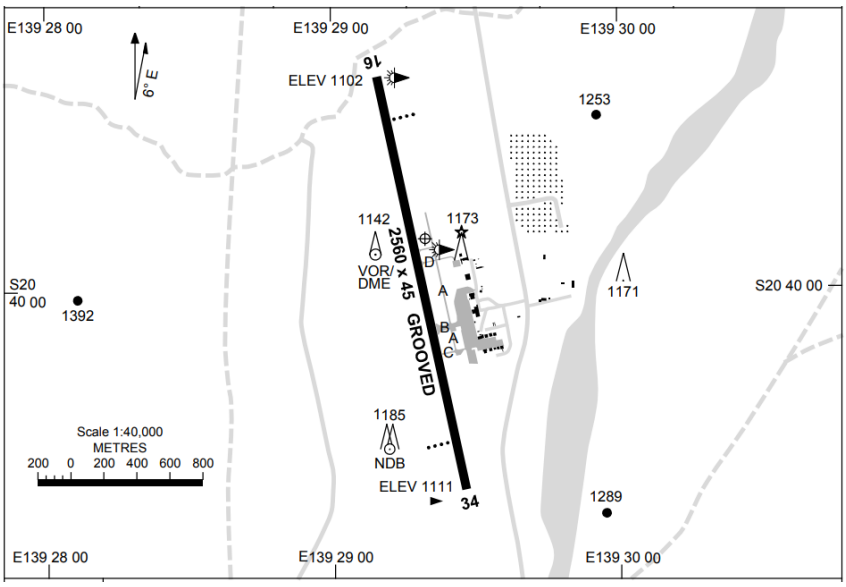

Figure 5 Aerodrome Chart for Mount Isa Airport (YBMA)

5.2. Minimum Safe Altitude - Mount Isa Airport

The minimum safe altitude (MSA) is applicable for the instrument approach procedures at Mount Isa Airport from the airport's ARP. A copy of the MSA published for the airport in AIP DAP (Departure and Approach Procedures) is shown in Figure 6.

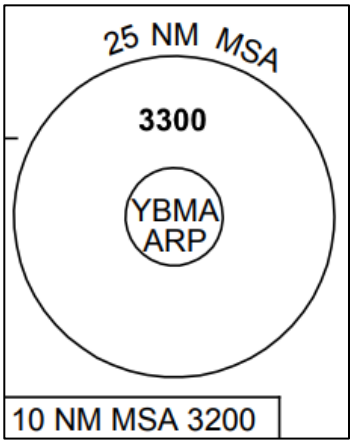

Figure 6 Mount Isa Airport's MSA

The Manual of Standards 173 Standards Applicable to Instrument Flight Procedure Design (MOS 173), requires that a minimum obstacle clearance (MOC) of 1000 ft below the published MSA is maintained.

Obstacles within 15 nm (10 nm MSA + 5 nm buffer) and within 30 nm (25 nm MSA + 5 nm buffer) of Mount Isa Airport's ARP define the height at which an aircraft can fly when within 10 nm and 25 nm.

The Project site is located within the 10 nm MSA of Mount Isa Airport. The MOC of the 10 nm MSA is 2200 ft AMSL.

Based on a maximum height of a transmission tower for the Mount Isa Augmentation being 70 m (refer Table 1), and a maximum ground elevation of approximately 543 m AHD, the maximum height of a transmission tower located within the 10 nm MSA of Mount Isa Airport would be 613 m AHD (2011 ft (AMSL)).

Therefore, a transmission tower at a maximum height of 613 m AHD (2011 ft (AMSL)), would be below the 10 nm MSA by approximately 189 ft (57 m), and would not impact the MSA of Mount Isa Airport.

5.3. Instrument procedures Mount Isa Airport

A check of the AIP via the Airservices Australia website showed that Mount Isa Airport (YBMA) is serviced by instrument non-precision flight procedures as per Table 4 (source: Airservices Australia).

Airservices Australia and GE Aviation (GE) are the designers of the instrument procedures for Mount Isa Airport.

Table 4 Mount Isa Airport (YBMA) aerodrome and procedure charts

Chart name (Procedure Designer)	*Effective date*
AERODROME CHART PAGE 1 (AsA)	2 March 2017 (BMAAD01-150)
APRON CHART (AsA)	12 November 2015 (BMAAP01-145)
NOISE ABATEMENT PROCEDURES (AsA)	8 March 2012 (BMANA01-130)
DME OR GNSS ARRIVAL (AsA)	2 March 2017 (BMADG01-150)
VOR RWY 16 (AsA)	2 March 2017 (BMAV001-150)
NDB-A OR VOR-A (AsA)	2 March 2017 (BMANB01-150)
RNAV-Z (GNSS) RWY 16 (AsA)	2 March 2017 (BMAGN01-150)
RNAV-Z (GNSS) RWY 34 (AsA)	25 May 2017 (BMAGN02-151)
RNAV-U (RNP) RWY 16 (GE)	17 August 2017 (BMAGN03-152)
RNAV-U (RNP) RWY 34 (GE)	17 August 2017 (BMAGN04-152)

5.4. Airline Operations Mount Isa Airport

There are general aviation, chartered and regular public transport (RPT) operations at Mount Isa Airport. RPT operations are conducted by Qantas, Virgin Australia (in codeshare with Alliance) and Regional Express (Rex). Refer to Table 5.

Table 5 Airline Operators at Mount Isa Airport

Airline	*Destination*	*Capacity*	*Frequency*
Qantas	Brisbane	125 seats	14 flights/week
	Townsville via Cloncurry	74 seats	5 flights/week
Virgin/Alliance	Brisbane via Cloncurry	100 seats	5 flights/week
Rex	Townsville via Julia Creek, Richmond and Hughenden	34 Seats	3 flights/week
	Cairns	34 seats	6 flights/week
	Doomadgee	34 seats	2 flights/week

5.5. Mount Isa Airport obstacle limitation surface analysis

The maximum horizontal distance that an OLS may extend for an aerodrome in Australia is 15 km (8.1 nm) from the edge of a runway strip.

The OLS published in the Queensland State Planning Policy, is based on Code 3 instrument, non-precision approach runway for Runway 14/32 in accordance with CASA MOS Part 139.

The western end of the Project is located approximately 13 km south of Mount Isa Airport's ARP, refer to Figure 7 (source: GHD, Google Earth).

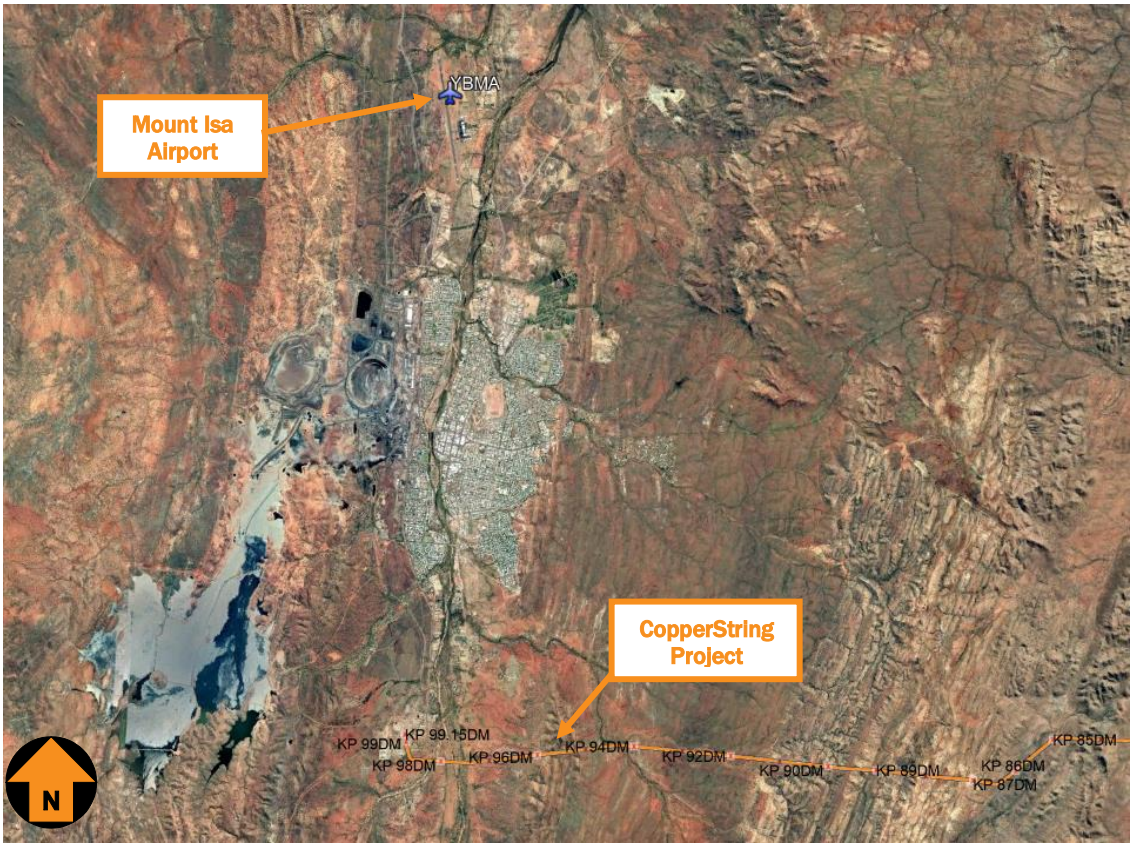

Figure 7 Project in relation to Mount Isa Airport

The Project is not located within Mount Isa Airport's transitional, inner horizontal or conical surfaces. However, the Project is located within the horizontal extent of the approach and take-off surfaces for Runway 16/34. Refer to Figure 8 (source: GHD, QLD State Planning Policy Interactive Mapping System).

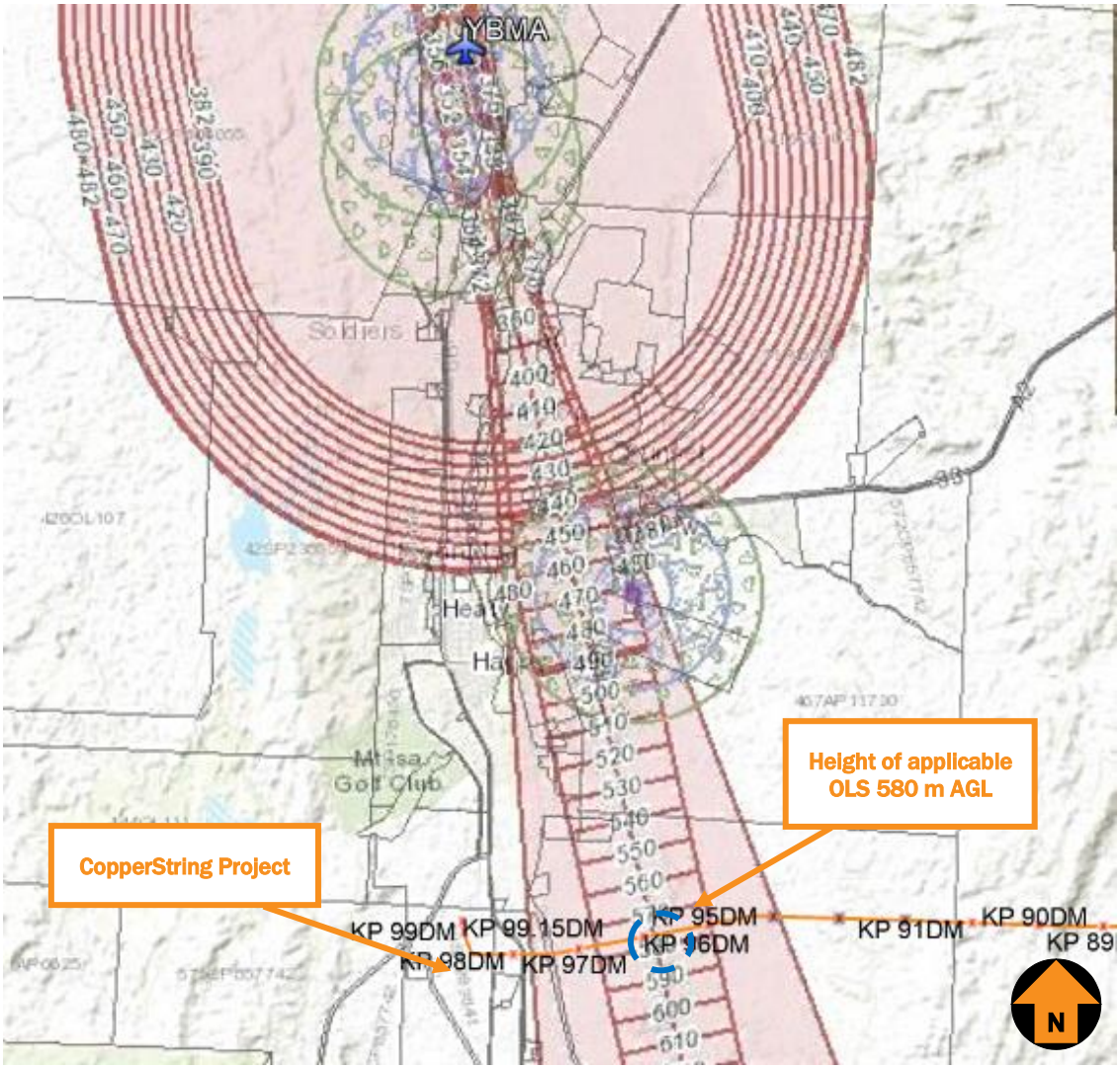

Figure 8 Obstacle Limitation Surface - Mount Isa Airport

Objects located within the approach and take-off surfaces are constrained by a height of 580 m AHD. The ground elevation of the Project at the location where the power line intercepts with these surfaces, ranges from approximately 360 m AHD to 430 m AHD. It provides a clearance for the power line height between approximately 150 m and 220 m.

For the Project to have no impact to aviation safety and the OLS associated with Mount Isa Airport, the transmission line would have to be below an overall height of 580 m AHD. Given the maximum transmission tower height is approximately 75 m AGL and the maximum ground elevation is approximately 430 m AHD within this section. The Project at a maximum overall height at approximately 505 m AHD is below the controlling surface of the OLS and is unlikely to impact on the OLS of Mount Isa Airport.

5.6. Mount Isa Airport visual approaches

The Project site will not impact visual approaches at Mount Isa Airport.

5.7. Mount Isa Airport instrument flight procedures

The Project site will not impact instrument flight procedures at Mount Isa Airport.

5.8. Trepell Airport

Trepell Airport (YTEE) is located in proximity to the Project.

Trepell Airport is a certified Code 3 instrument non-precision approach airport and is owned and operated by South32 Cannington Pty Ltd and is located approximately 1.6 km (0.9 nm) east of the nearest Project site.

The ARP coordinates published in Airservices Australia's DAH, dated 7 November 2019, are as follows:

- Latitude 21°50'06"S and Longitude 140°53'17"E.

According to ERSA FAC for YTEE, Trepell Airport has an aerodrome elevation of 271 m AHD (891 ft AMSL).

Trepell Airport has one runway:

- Runway 14/32 is a Code 3, sealed, instrument non-precision runway with a length of 1800 m and a width of 30 m.

The details of the aerodrome are shown in Figure 9 (source: Airservices Australia, YTEE Aerodrome Chart, dated 25 May 2017).

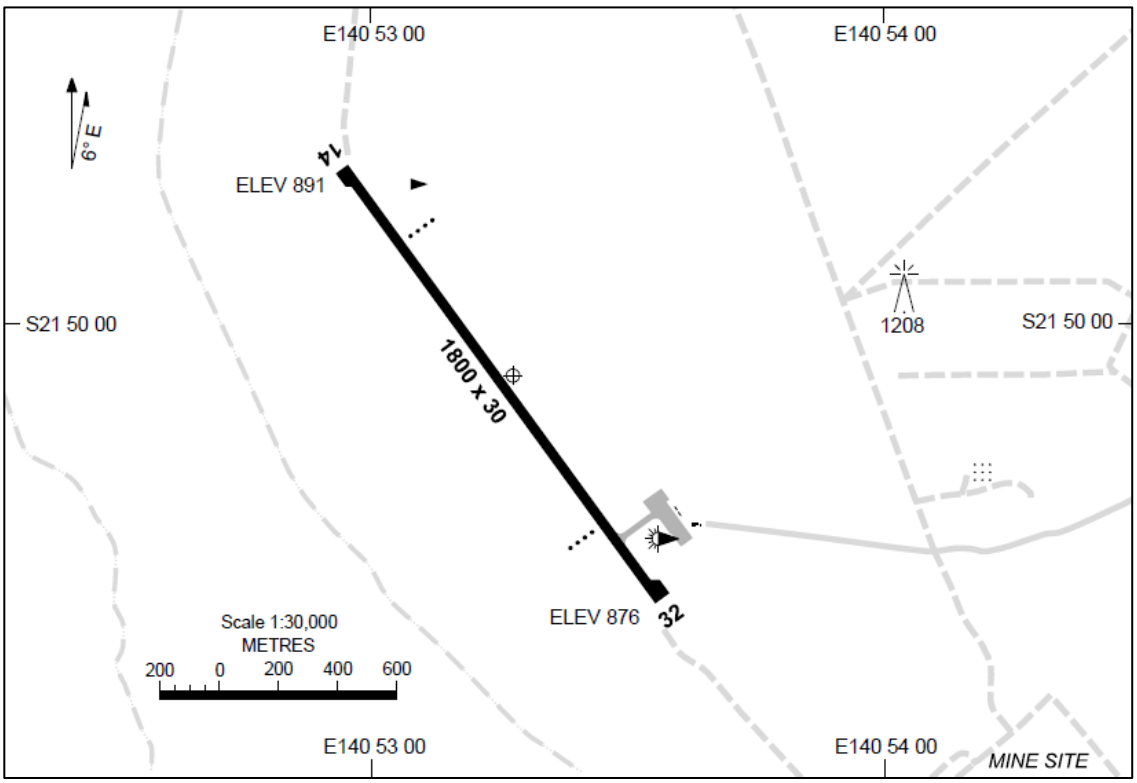

Figure 9 Aerodrome Chart for Trepell Airport (YTEE)

5.9. Airline Operations at Trepell Airport

Operations at Trepell Airport are for private chartered flights only, operated by Alliance. Refer to Table 6.

Table 6 Airline Operations at Trepell Airport

Airline	*Destination/Origin*	*Capacity*	*Frequency*
Alliance	Brisbane	100 seats	4 flights/week
	Townsville	100 seats	2 flights/week
	Cairns via Townsville	100 seats	2 flights/week

5.10. Trepell Airport obstacle limitation surface analysis

There is no publicly available OLS drawing published for Trepell Airport, however for the purposes of this analysis a three-dimensional OLS model was developed by Aviation Projects. The OLS is based on a Code 3 instrument, non-precision approach runway for Runway 14/32 in accordance with CASA MOS Part 139.

The nearest Project site is located approximately 1.6 km (0.8 nm) west of Trepell Airport's ARP, refer to Figure 10 and Figure 11.

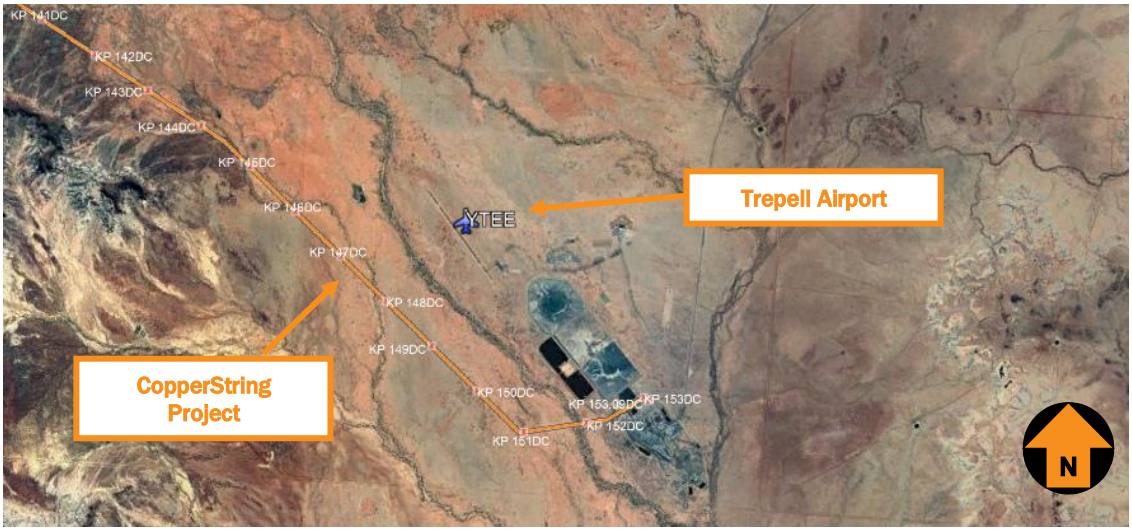

Figure 10 Project in proximity to Trepell Airport

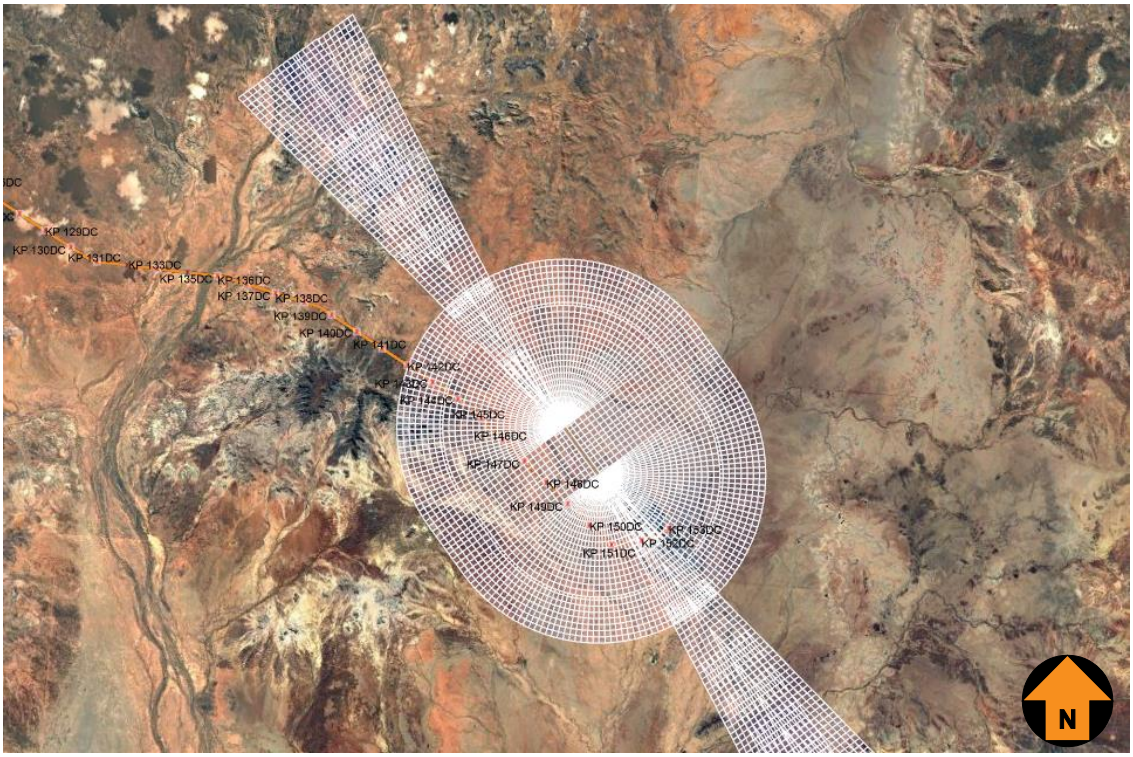

Figure 11 Project with Trepell Airport's OLS overlay

In multiple sections the Project is restricted by the conical, inner horizontal, approach and take-off surfaces, with varying height constraints.

The Project is also constrained by a variance to ground elevation which ranges from approximately 298 m AHD to 258 m AHD, refer to Figure 12 (source: Google Earth).

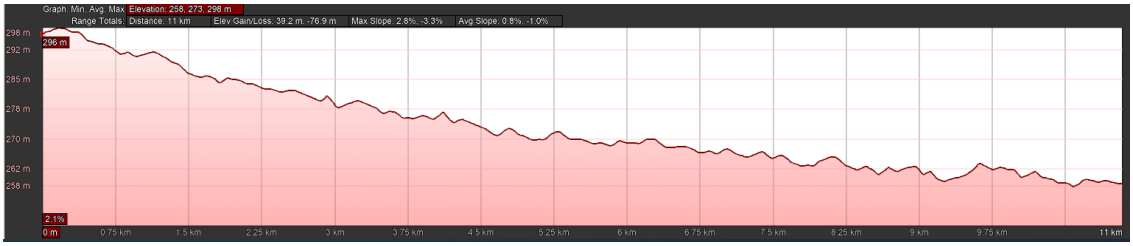

Figure 12 Project ground elevation Trepell Airport

5.10.1. Conical Surface

For a Code 3 instrument non-precision approach runway the conical surface increases in height at a rate of 5%, or 10 m in every 200 m.

Therefore, the conical surface associated with Trepell Airport varies in height from 316.5 m AHD up to a height of 391.5 m AHD.

The ground elevation ranges from approximately 286 m AHD up to an elevation of approximately 297 m AHD.

Figure 13 details the constraint for the conical surface, and the relative ground elevation.

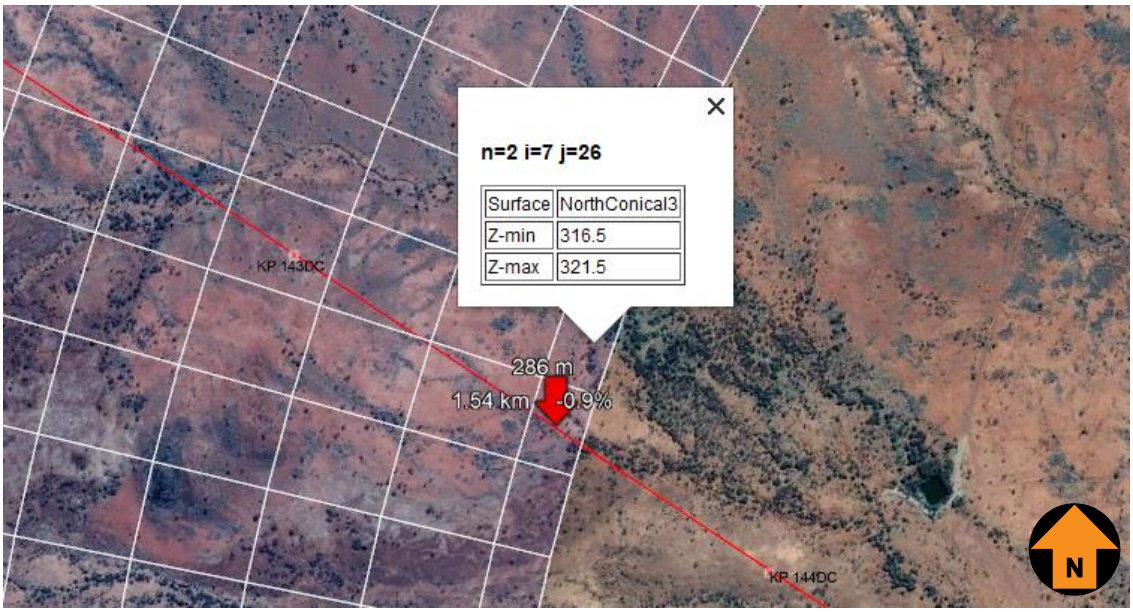

Figure 13 Ground elevation and conical surface at Trepell Airport

For the Project to have no impact on the conical surface of Trepell Airport, the maximum height that the Project could be at the north western edge of the conical surface ranges between approximately 30.5 m above ground surface level and 83.5 m above ground surface level.

5.10.2. Inner Horizontal

The Project is located within the inner horizontal surface associated with Trepell Airport for a distance of approximately 9.3 km. The height of the inner horizontal surface is approximately 316.5 m AHD. The ground elevation ranges from approximately 259 m AHD up to an elevation of approximately 286 m AHD, refer to Figure 14 and Figure 15.

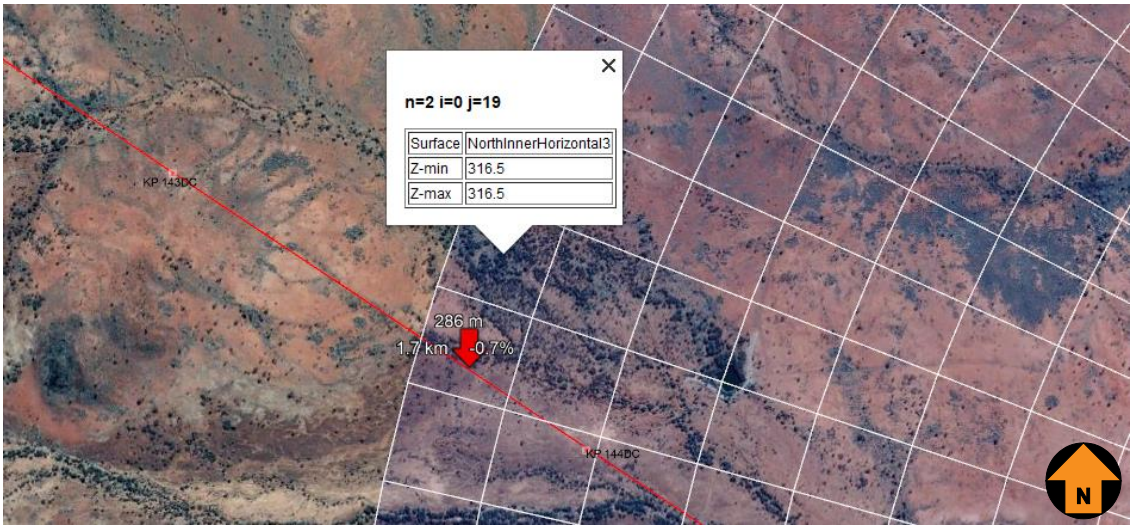

Figure 14 Northern inner horizontal surface at Trepell Airport

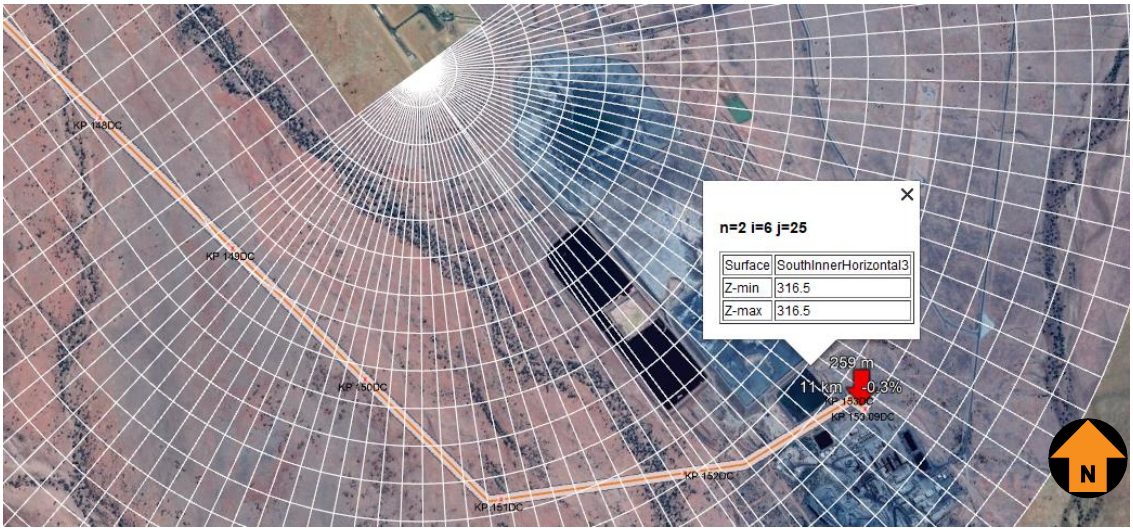

Figure 15 Southern inner horizontal surface at Trepell Airport

For the Project to be below the inner horizontal surface associated with Trepell Airport, the Project will have to be of a maximum height of 30.5 m above ground surface level at the northern section of the inner horizontal surface (where the Project adjoins the conical surface).

The southern end of the inner horizontal surface is overlapped by the approach and take-off surface. Section 7.1.3.6 of MOS Part 139 states:

> *"where two OLS surfaces overlap, the lower surface must be used as the controlling OLS."*

The lower surface at the Project end is the take-off surface, which has a controlling height of 315 m AHD, refer to Figure 17.

Therefore, for the Project to maintain an acceptable level of safety, the maximum height for the Project in this section could be a height of up to 52 m above ground surface level.

5.10.3. Approach surface

The Project is located within the approach surface. However, as the take-off surface is the controlling OLS (which has a limit of 315 m AHD), the maximum height for the Project in this section could be up to a height of 52 m above ground surface level, refer to Figure 16 and Figure 17.

Figure 16 Approach surface at Trepell Airport

5.10.4. Take-off surface

The take-off surface is the controlling constraint for this area, which has varying heights of approximately 315 m AHD and 319 m AHD. For the Project to be below the take-off surface, the maximum height could be up to 52 m above ground surface level.

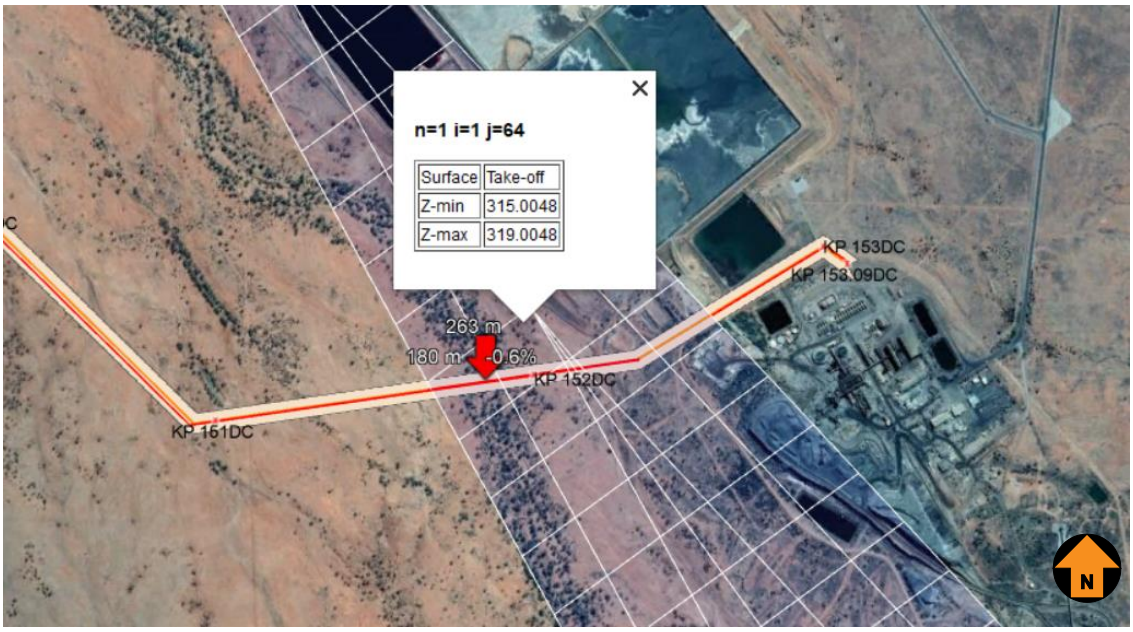

Figure 17 Take-off surface at Trepell Airport

5.10.5. OLS analysis summary

The Project is located within multiple sections of Trepell Airport's OLS, excluding the transitional surface. For the Project to maintain an acceptable level of aviation safety, it must be below the varying constraints associated with each surface of Trepell Airport's OLS including the conical, inner horizontal, approach and take-off surfaces.

The Project should be appropriately marked as outlined in Section 7 and in consultation with the airport operator and CASA, in accordance with MOS Part 139.

5.11. Trepell Airport instrument flight procedures

A check of the AIP via the Airservices Australia website showed that Trepell Airport is serviced by instrument non-precision flight procedures, as detailed in Table 7. Airservices Australia is the designer of the instrument procedures for Trepell Airport.

Table 7 Trepell Airport (YTEE) aerodrome and procedure charts

Chart name (Procedure Designer)	*Effective date*
AERODROME CHART (AsA)	28 February 2019 (TEEAD01-158)
RNAV-Z (GNSS) RWY 14 (AsA)	25 May 2017 (TEEGN01-151)

5.12. Minimum safe altitude - Trepell Airport

The MSA is applicable for the instrument approach procedures at Trepell Airport from the airport's ARP. A copy of the MSA published for the airport in AIP DAP is shown in Figure 18.

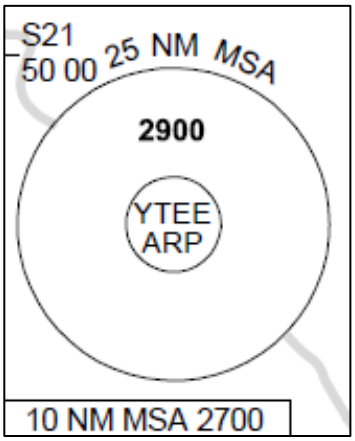

Figure 18 Trepell Airport's MSA

Obstacles within 15 nm (10 nm MSA + 5 nm buffer) and within 30 nm (25 nm MSA + 5 nm buffer) of Trepell Airport's ARP define the height at which an aircraft can fly when within 10 nm and 25 nm.

The Project site is located within the 10 nm MSA of Trepell Airport. The MOC of the 10 nm MSA is 1700 ft AMSL (518 m AHD).

Based on a maximum height of a transmission tower for the Cannington Connection being 50 m (refer Table 1), and a maximum ground elevation of approximately 374 m AHD, the maximum height of a transmission tower located within the 10 nm MSA of Trepell Airport would be 424 m AHD (1391 ft (AMSL)).

Therefore, a transmission tower at a maximum height of 424 m AHD (1391 ft (AMSL)), would be below the 10 nm MSA by approximately 309 ft (94 m), and would not impact the MSA of Trepell Airport.

5.13. Circling areas at Trepell Airport

Aircraft conducting instrument approaches can manoeuvre within a defined area at a nominated minimum height above the highest obstacle in that area. These areas and heights are specified according to five aircraft performance categories A-E.

Trepell Airport supports circling by aircraft performance categories A-C. These areas, defined by circles of a specified radius centred on the threshold of each usable runway and joined by tangents, and applicable minimum obstacle clearance heights are as follows:

- Cat A – 1.68 nm (3111 m) – 300 ft;
- Cat B – 2.66 nm (4926 m) – 400 ft; and
- Cat C – 4.20 nm (7778 m) – 400 ft.

The extent of Cat B and Cat C circling areas in the north western quadrant of the airport's operational airspace, along with the relative location of the transmission line, is shown in Figure 19 (source: Google Earth).

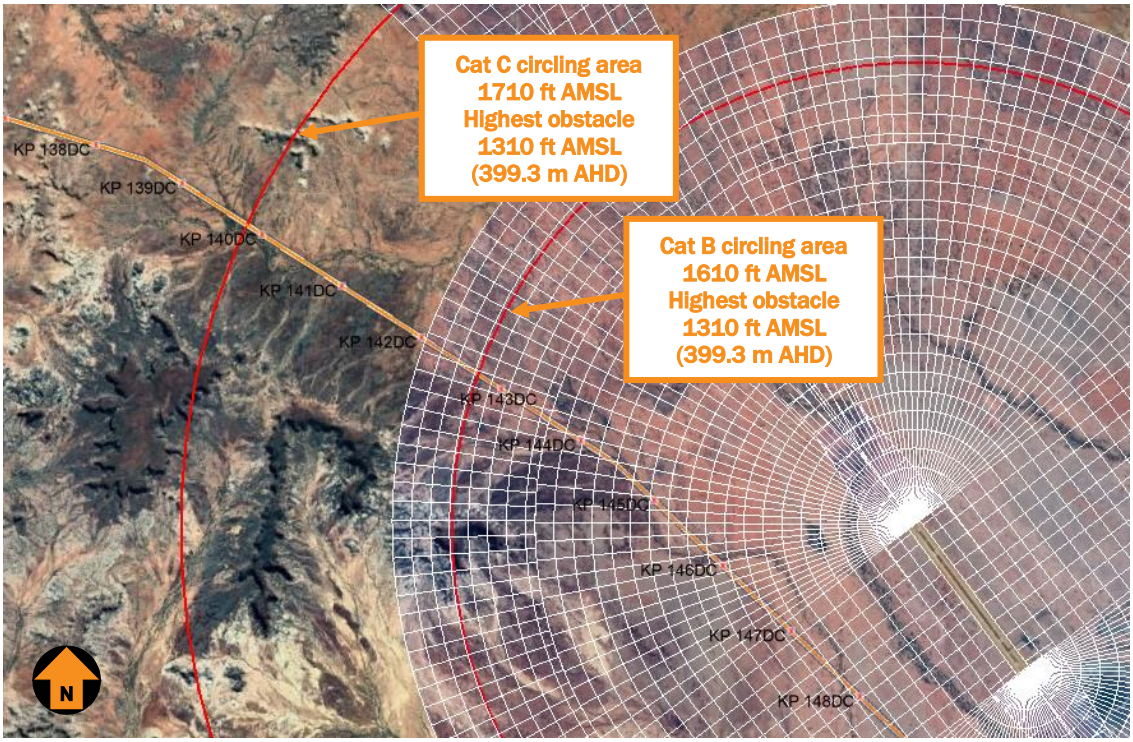

Figure 19 Category B and Category C circling areas - Trepell Airport

The Cat A and Cat B circling areas are contained within the horizontal extent of the OLS, and since the OLS is generally the limiting (lower) surface and is not intended to be penetrated, the Cat A and B circling heights will not be impacted.

The Cat C circling height is 1710 ft AMSL (with accurate reference barometric pressure), so the current highest obstacle in the Cat C circling area is 1310 ft AMSL (or 399.3 m AHD). With a ground elevation of up to approximately 300 m AHD and a maximum pylon height of 75 m along the power transmission corridor in the area between the Cat B circling area and the Cat C circling area, the Cat C circling height will not be impacted by the proposal. Cat D and Cat E circling are not applicable according to the published DAP charts.

5.14. Impact on other aircraft landing areas and airports

In addition to two nearby airports which were assessed in previous sections (Mount Isa Airport and Trepell Airport), there are numerous certified, registered and unregistered aerodromes which are located in proximity to the Project.

Table 8 provides details of an analysis of the Project in relation to other aerodromes in proximity.

Table 8 Aerodromes within proximity of the Project

Aerodrome	*Coordinates*	*Status*	*Distance from Project*	*RWY and length*	*Flights*	*Impact*
ALA 1	20°24'55.87"S 145°56'25.80"E	ALA	1.6 km (0.8 nm)	530 m	N/A	Nil
ALA 2	20°36'21.56"S 145°35'51.47"E	ALA	1.5 km (0.8 nm)	740 m	N/A	Nil
Hughenden Airport (YHUG)	20°48'54.00"S 144°13'31.00"E	Certified	16 km (9 nm)	RWY 12/30 1644 m	34 seats (6 flights/week)	Nil, outside of OLS
Richmond Airport (YRMD)	20°42'4.17"S 143°6'50.45"E	Certified	20 km (10 nm)	RWY 09/27 1524 m	34 seats (6 flights/week)	Nil, outside of OLS
ALA 3	20°47'14.17"S 142°29'14.75"E	ALA	1.7 km (1 nm)	743 m	N/A	Nil
ALA 4	20°48'23.62"S 142°14'53.09"E	ALA	2 km (1.1 nm)	492 m	N/A	Nil

Aerodrome	Coordinates	Status	Distance from Project	RWY and length	Flights	Impact
Julia Creek Airport (YJLC)	20°40'6.00"S 141°43'21.00"E	Certified	15 km (8 nm)	RWY 10/28 2000 m	34 seats (6 flights/week)	Nil, outside of OLS
Cloncurry Airport (YCCY)	20°40'7.00"S 140°30'16.00"E	Certified	9 km (4.8 nm)	RWY 12/30 2000 m	74 seats (5 flights/week)	Based on the current MOS Part 139 standards for a Code 3 instrument non-precision approach runway, the Project is located outside of the conical, inner horizontal and transitional surfaces, and is below the approach and take-off surfaces for Runway 12/30, therefore there is no impact on the OLS for YCCY.
ALA 5	20°45'17.96"S 139°59'48.44"E	ALA	723 m (0.3 nm)	644 m	N/A	Unknown operations at ALA, further consultation required to determine impact
The Monument (YTMO)	21°48'37.91"S 139°55'22.98"E	Certified	9.7 km (5.2 nm)	RWY 14/32 1900 m	100 seats (6 flights/week)	Based on the current MOS Part 139 standards for a Code 3 instrument non-precision approach runway, the Project is located outside of the conical, inner horizontal and transitional surfaces, and is below the approach and take-off surfaces for Runway 14/32, therefore there is no impact on the OLS for YTMO.
Mount Dore (YMDE)	21°40'19.81"S 140°31'11.57"E	ALA	8 km (4.4 nm)	1783 m	N/A	Whilst, the ALA is currently non-operational, ALA owner Chinova Resources requested realignment of the Project. Additionally, Chinova Resources requested an assessment of the impact of the Project on potential future operations. Based on the current MOS Part 139 standards for a Code 2 instrument non-precision approach runway, the Project would be located outside of the conical, inner horizontal and transitional surfaces and below the approach and take-off surfaces of the OLS.

Aerodrome	*Coordinates*	*Status*	*Distance from Project*	*RWY and length*	*Flights*	*Impact*
Osborne Mine (YOSB)	22° 4'49.51"S 140°33'22.75"E	Certified	37 km (21 nm)	2000 m	48 seats- 70 seats (2 flights/week)	Based on the current MOS Part 139 standards for a Code 3 instrument non-precision approach runway, the Project is located outside of the conical, inner horizontal and transitional surfaces, and is below the approach and take-off surfaces for Runway 14/32, therefore there is no impact on the OLS for YOSB.

5.15. Other aerial activities

Across the 1000 km Project site varying levels of general aviation activity including aerial agriculture, aerial mustering and land surveying would be occurring.

In 2010, R D Collins & Assoc assessed the impact of the Project against varying aviation activities.

Section 1.14.3 assessed the Project against powerline survey operations and concluded:

> *CopperString line may pose a wire strike risk to aircraft surveying the line. The likelihood of this occurring is considered as relatively low because:*
>
> - *The air operators are generally local businesses who know the area and the lines they survey; and*
> - *The aircraft crew often consists of a pilot and at least one observer whose responsibilities apart from checking the line is to look for obstacles.*

The items noted and the risk identified in the 2010 report is validated, however not every aircraft will have two operators, and some operators may not be local to the area.

Details of the Project, including location and height information of overhead transmission lines and associated towers should be provided to land owners so that, when asked for hazard information on their property, the land owner may provide the aerial application pilot, land surveyor or pilot conducting low level flying with all relevant information.

The Proponent should also consider marking the overhead transmission lines in areas with low-level flying and high aviation activity in accordance with relevant marking and lighting as detailed in Section 7.

5.16. Military operations

Section 1.14.5 of the R D Collins & Assoc report assessed military operations and concluded as follows:

> *Military operations are well planned and executed. The RAAF survey low jet routes and other routes where low level operations are proposed. Notwithstanding, before construction commences, a detailed description or plan of the proposed route should be forwarded to the RAAF.*

Some low-level military flying may occur within the vicinity of the Project, especially at the eastern end of the Project. The proponent should advise the Department of Defence of the Project including the proposed route, so that Department of Defence operations can be amended accordingly.

Section 1.15 consulted with AOC holders with the summary as:

> *The general consensus of the professional air operators is;*
>
> - *The line may pose a safety risk where it is strung across valleys. The lines are often difficult to see with the background vegetation.*
> - *The lines may pose a safety risk and make working cattle difficult when they are in the vicinity of stock yards.*

- *The nature of the CopperString lines and associated pylons is such that they will not be a universal problem provided all operators know where they are.*

All operators stated that, in addition to advice as to the route of the powerlines, sight balls across valleys and in the vicinity of yards and watering points should mitigate the safety risk of a wire strike.

In the areas with low-level flying – including aerial mustering, aerial agriculture and land surveying, the Project may pose a risk to aviation safety, if there is poor visibility of the Project, or if the Project is strung along valleys. The Proponent should consider marking the overhead transmission lines in areas with low-level flying and high aviation activity in accordance with relevant marking and lighting as detailed in Section 7.

5.17. Air routes and LSALT

MOS Part 173 requires that a minimum obstacle clearance of 1000 ft below the published lowest safe altitude (LSALT) is maintained along each air route.

The Project is located across multiple Grid LSALTs, the grid with the lowest LSALT is identified adjacent to Julia Creek Airport (YJLC) at 640 m AHD (2100 ft AMSL) with a MOC surface of 335 m AHD (1100 ft AMSL).

Figure 20 shows the grid LSALT and the air routes in the vincinity of the Project site (source: AsA, AIP Charts, En Route Chart Low National, 27 February 2020). .

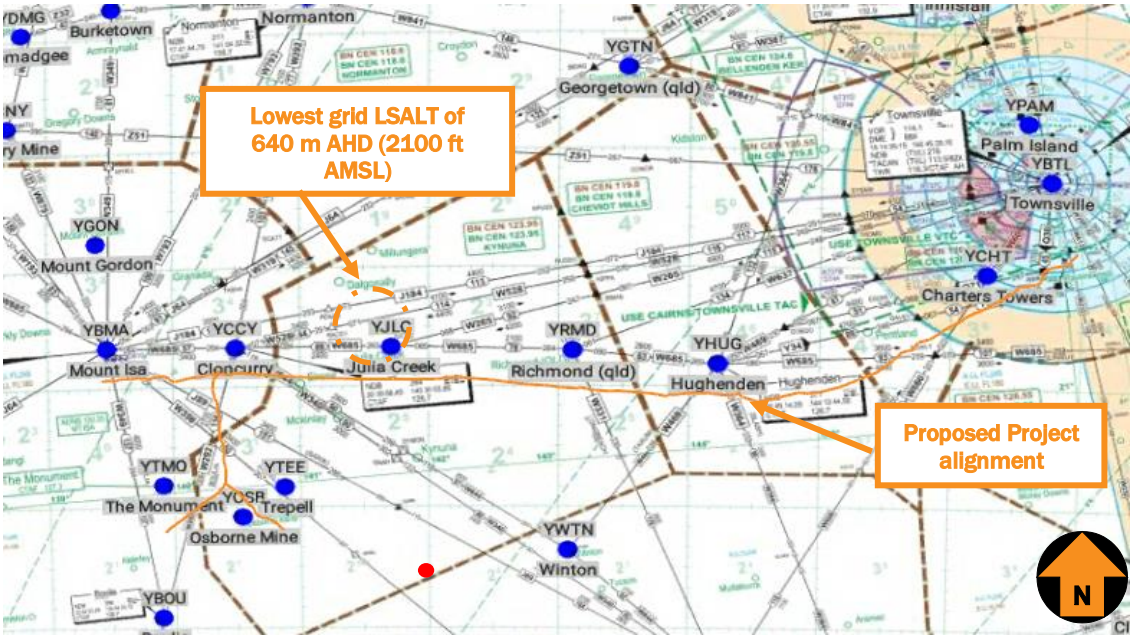

Figure 20 En Route Chart Low National in the vicinity of the Project site

It is unlikely the Project will impact on the Grid LSALTs, subject to ground survey and validation that the Project does not extend vertically to a height greater than the overlying Grid LSALT – 1000 ft.

The Project will not impact LSALTs of the surrounding air routes.

5.18. Airspace

A search on OzRunways, identified the Project is located wholly within Class G airspace, and is not located in any Prohibited, Restricted and Danger areas. The aeronautical data provided by OzRunways is approved under CASA CASR Part 175. There may be some military aviation activity within the area, however the Project is unlikely to have any impact on military aviation activity.

Therefore, the Project will not have an impact on controlled or designated airspace.

5.19. Aviation facilities

A search on OzRunways, which sources its data from Airservices Australia (AIP) and AOPA National Airfield Directory datasets, was conducted to identify any aviation facilities that may be affected by the Project. The closest aviation facilities to the Project site are located at Mount Isa Airport (YBMA) ((VHF omnidirectional radio range (VOR)), distance measuring equipment (DME), and a non-directional (radio) beacon (NDB))

According to National Airports Safeguarding Framework Guideline G *Protecting Aviation Facilities - Communications, Navigation and Surveillance (CNS),* the navigation facilities have specified areas restricted to developments.

The Project site is located approximately 12 km (6 nm) south of Mount Isa Airport and is outside the areas restricted to developments for noted aviation facilities, and therefore will not interfere with these facilities.

5.20. Radar

There are no aviation radars located close to the Project site. The closest radar is Tabletop Mountain Route Surveillance Radar (RSR) located approximately 70 km (38 nm) north from the Project site. Given there are much higher obstacles located north of the Project, the Project will not impact Tabletop Mountain RSR.

With respect to Bureau of Meteorology (BoM) radars, the closest weather radar is the Mount Isa radar located 8 km east of Mount Isa (latitude 20.7114° S, longitude 139.5553° E).

The Project is unlikely to impact the Mount Isa radar facility. However, prior to final and detailed design BoM should be consulted with the findings of this analysis.

6. PLANNING CONSIDERATIONS

The Project as proposed satisfies the following Acceptable Outcomes of the City of Mount Isa Planning Scheme 2020 Airport environs overlay code, refer to Table 9.

Table 9 City of Mount Isa Acceptable Outcomes

Development in Operational airspace: Obstacle limitation surface	
Performance Outcomes	Acceptable Outcomes
PO 1 Development does not create a permanent or temporary physical or transient obstruction in a strategic airport's operational airspace.	AO 1.1 Complies AO 1.2 Complies AO 1.3 Not applicable AO 1.4 Not applicable

7. HAZARD LIGHTING AND MARKING

7.1. Civil Aviation Safety Authority

In considering the need for aviation hazard lighting, a preliminary feasibility analysis of the regulatory context was undertaken.

CASA regulates aviation activities in Australia. Applicable requirements include the *Civil Aviation Act 1988* (CAA), *Civil Aviation Regulations 1988* (CAR), *Civil Aviation Safety Regulations 1998* (CASR), associated Manuals of Standards (MOS) and other guidance material including *Civil Aviation Advisory Publication* (CAAP) and Advisory Circular (AC). The applicable legislations are extracted below:

7.1.1. Manual of Standards Part 139–*Aerodromes*

Chapter 7 of MOS Part 139 sets out the standards applicable to Obstacle Restriction and Limitation.

7.1.1.2 An obstacle is defined as:

(b) any object that penetrates the obstacle limitation surfaces (OLS), a series of surfaces that set the height limits of objects, around an aerodrome.

7.1.1.3 Obstacle data requirements for the design of instrument procedures need to be determined in liaison with flight procedure designers.

7.1.1.4 Non-compliance with standards may result in CASA issuing hazard notification notices as prescribed in CASR Part 139.

Chapter 8 of MOS Part 139 specifies the standards for markings, including standards applicable to Obstacle Marking.

8.10.1 General

8.10.1.1 Fixed objects, temporary and permanent, which extend above the obstacle limitation surfaces but are permitted to remain; or objects which are present on the movement area, are regarded as obstacles, and must be marked. The aerodrome operator must submit details of such obstacles to CASA, for hazard assessment and particular requirements for marking and lighting. This information must be included in the Aerodrome Manual.

8.10.1.2 CASA may permit obstacles to remain unmarked;

(a) when obstacles are sufficiently conspicuous by their shape, size or colour;

(b) when obstacles are shielded by other obstacles already marked; or

(c) when obstacles are lighted by high intensity obstacle lights by day.

Overhead transmission lines and/or supporting poles that are located where they could adversely affect aerial operations should be identified in consultation with local aerial operators and marked in accordance with MOS Part 139 Section 8.10 Obstacle Markings; specifically:

8.10.2.8 Wires or cable obstacles must be marked using three-dimensional coloured objects such as spheres and pyramids, etc; of a size equivalent to a cube with 600 mm sides, spaced 30 m apart.

7.2. AAAA policy

There is no regulatory requirement to mark or light power poles or overhead transmission lines.

According to the AAAA *Powerlines Policy* dated March 2011:

> *Most agricultural land in Australia is crisscrossed with powerlines and aerial application companies and pilots put enormous effort into managing these hazards safely, generally using a risk identification, assessment and management process in line with Australian Standard AS4360/ISO 3[1]000.*
>
> *The agricultural pilot curriculum mandated by CASA includes training for the safe management of powerlines and AAAA has been active in providing ongoing professional development for application pilots that includes a focus on planning, risk management and a knowledge of human factors relevant to managing powerlines in a low-level aviation environment.*
>
> *AAAA runs a specific training course for aerial application pilots entitled 'Wire Risk Management' to address these issues.*

The proponent should follow standards outlined in the AS 3891.2:2018 *Air navigation – Cables and their supporting structures – Marking and safety requirements Part 2: Low level aviation operations.*

8. CONCLUSIONS

As a result of this aeronautical assessment, the following conclusions are made:

1. The proposed Project will be at varying heights between 35m – 75m above ground surface across its 1000 km extent.
2. The Project as proposed:
    a. will not infringe the obstacle clearance heights applicable to any of the instrument procedures at Mount Isa Airport and Trepell Airport;
    b. will not affect the circling areas at Mount Isa Airport or Trepell Airport;
    c. for the Project to maintain an acceptable level of aviation safety, the transmission line must be below the varying constraints associated with each surface of Trepell Airport's OLS including the conical, inner horizontal, approach and take-off surfaces and:
        i. The conical surface associated with Trepell Airport varies in height from 316.5 m AHD up to a height of 391.5 m AHD. For the Project to have no impact on the conical surface of Trepell Airport, the maximum height that the Project could be at the north western edge of the conical surface ranges between approximately 30.5 m above ground surface level and 83.5 m above ground surface level;
        ii. The height of the inner horizontal surface is 316.5 m AHD. For the Project to have no impact on the inner horizontal surface, the maximum height for the Project in this section could be a height of between 30.5 m and 52 m above ground surface level; and
        iii. The approach and take-off surface is the controlling constraint for this area, which has varying heights of 315 m AHD and 319 m AHD. For the Project to have no impact on the approach and take-off surfaces at Trepell Airport, the maximum height of the Project could be up to 52 m above ground surface level.
    d. for the Project to have no impact to aviation safety and the OLS associated with Mount Isa Airport, the transmission line must be below an overall height of 580 m AHD;
    e. will not impact air routes and is outside restricted areas;
    f. will not impact any aviation facilities; and
    g. will not impact any aviation radars and BoM radars.
3. The Project as proposed satisfies the following Acceptable Outcomes of the City of Mount Isa Planning Scheme 2020 Airport environs overlay code:
    a. AO 1.1 - Complies
    b. AO 1.2 - Complies
    c. AO 1.3 - Not applicable
    d. AO 1.4 - Not applicable

4. The proponent should consider where overhead transmission lines and/or supporting poles that are located where they could adversely affect aerial operations (Trepell Airport), are marked in accordance with MOS Part 139 Section 8.10 Obstacle Markings.
5. Cranes used during the construction of the Project, particularly in the vicinity of Mount Isa and Trepell Airports, should be notified to the applicable aerodrome operator for operational assessment and management.

9. RECOMMENDATIONS

As a result of this aeronautical assessment, the following recommendations are made:

1. Details of the Project, including location and height information of overhead transmission lines and associated towers should be provided to emergency operators (including Royal Flying Doctor Service and Queensland Fire and Emergency Service) and land owners so that, when asked for hazard information on their property, the land owner may provide the aerial application pilot, land surveyor or pilot conducting low level flying with all relevant information.
2. The Project as proposed can be supported without adversely affecting aviation safety, if the Project design remains under the varying heights of the OLS for Trepell Airport and Mount Isa Airport.
3. The proponent should take into consideration the heights of controlling surfaces of the Mount Isa Airport's OLS and the Trepell Airport's OLS and circling areas, as discussed in Sections 5.5, 5.10 and 5.13, for the Project final design.
4. The proponent should consider where overhead transmission lines and/or supporting poles that are located where they could adversely affect aerial operations (Trepell Airport), are marked in accordance with MOS Part 139 Section 8.10 Obstacle Markings.
5. The proponent should follow standards outlined in the AS 3891.2:2018 Air navigation – Cables and their supporting structures – Marking and safety requirements Part 2: Low level aviation operations.
6. If approved, details of the Project should be reported to Airservices Australia via this email address: vod@airservicesaustralia.com, and published in ERSA and other relevant aeronautical chart products.
7. Any crane used during construction should be referred to Mount Isa Airport and Trepell Airport for approval, appropriately marked, operated during daylight hours only and notified to pilots via NOTAM.

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