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By email: amanda.jones@energyaustralia.com.au

Our ref: 062001-06

Dear Amanda

Re: Tallawarra B Power Station – Revised AC 139.E-02v1.0 implications to conditions of approval

This correspondence provides advice about the recently revised Advisory Circular (AC) 139.E-02v1.0 *Plume rise assessments*, in consideration of the circumstances surrounding approval for the Tallawarra B power station relating to aviation safety.

1.1. Background

The Tallawarra B Power Station is approved with conditions.

Condition 1.6 requires the submission of a report to the Secretary which demonstrates that operation of an open cycle gas turbine plant will not have an adverse impact on aviation safety. This report was to be prepared in consultation with Shellharbour City Council, and its conclusions and recommendations were to have been agreed to by the CASA prior to submission to the Secretary. The report was to be approved by the Secretary before commencement of construction of an open cycle plant.

Aviation Projects prepared the report *Tallawarra B OCGT Aeronautical Impact Assessment* (v1.1, 13 Feb 2020) (AIA), in consultation with Shellharbour City Council, that was subsequently agreed to by CASA and approved by the Secretary.

The AIA concluded as follows:

> *In light of the foregoing assessment, with plume characteristics as proposed, specifically a critical plume velocity of 6.1 m/s at or below 700 ft AMSL, Aviation Projects has concluded that there will be an acceptable level of aviation safety risk associated with the Tallawarra B OCGT, reduced to as low as reasonably practicable if the mitigations proposed herein are implemented.*

The assessment was based, in part, on guidance provided by the Civil Aviation Safety Authority (CASA) in Advisory Circular (AC) 139-05v3.0 *Plume rise assessments,* dated 03 January 2019.

The assessment methodology in that version of the AC relied on meeting a critical plume velocity at a nominated height as the key determinant of aviation risk.

The AC has recently been re-issued as AC 139.E-02v1.0, and now incorporates a revised assessment methodology. EnergyAustralia has engaged Aviation Projects to review the revised AC and identify current and potential future protection surfaces related to the obstacle limitation surfaces (OLS) and PANS-OPS surfaces for Shellharbour Airport relative to the location of the Tallawarra B power station.

1.2. AC 139.E-02v1.0 assessment methodology

The assessment methodology in the revised Plume rise assessment AC differs from the methodology that informed the AIA, in that it now relies on the use of the MITRE Exhaust Plume Analyzer (EPA) which was originally developed on behalf of the United States Federal Aviation Administration and has now been amended for use by CASA.

The EPA characterises risk in terms of probability of the existence of a level of turbulence at a nominated overlying surface such as obstacle limitation surface (OLS) or Procedures for Air Navigation – Aircraft Operations (PANS-OPS) surface.

1.3. Shellharbour Airport operational and planning context

Shellharbour Airport (YSHL) has two runways – 08/26 and 16/34. They are both nominated as aerodrome reference code 2 in Airservices Australia's Runway Distance Supplement (RDS). Runways 16 and 34 are served by non-precision satellite-based instrument approaches with straight-in minima, so these runways are considered instrument approach runways for the purposes of determining the OLS. Runways 08/26 are considered non-instrument.

A Strategic and Business Plan for the airport, published in or around 2015, suggested retaining at a minimum the infrastructure required for a code 2 aerodrome.

An Airport Master Plan for Shellharbour Airport is currently being procured by Shellharbour Council. The Master Plan is expected to establish future aerodrome infrastructure requirements associated with a desired scale and scope of operations that will influence the required airspace.

1.4. Obstacle limitation surfaces

The obstacle limitation surfaces (OLS) applicable to runway 16/34 according to current standards were provided as Figure 28 in the AIA. The analysis shows that the power station will be located under the conical surface of the OLS, with a lowest height of approximately 67 m AHD (219.8 ft AMSL) over the site.

An extract of the surface model indicating the applicable heights is provided at Figure 1.

Figure 1 Height of OLS over site

According to the revised Advisory Circular (para 2.3.5), if there is an infringement of the conical surface, where the site is below established or potential flight paths, creating a probability of moderate turbulence greater than 1 x 10 -5 per operation, CASA may determine that the proposal will create an unacceptable risk to the safety of aircraft operations.

1.5. PANS-OPS surfaces

Shellharbour Airport is served by non-precision RNP approaches to runways 16 and 34.

The airport also has an NDB-A approach to circling minima, and a GNSS Arrival procedure.

The limiting height for PANS-OPS surfaces over the site is determined by the missed approach for runway 34 RNP at 416.88 m AHD (1367.7 ft AMSL).

Images showing the associated surfaces are provided at Figure 2 and Figure 3.

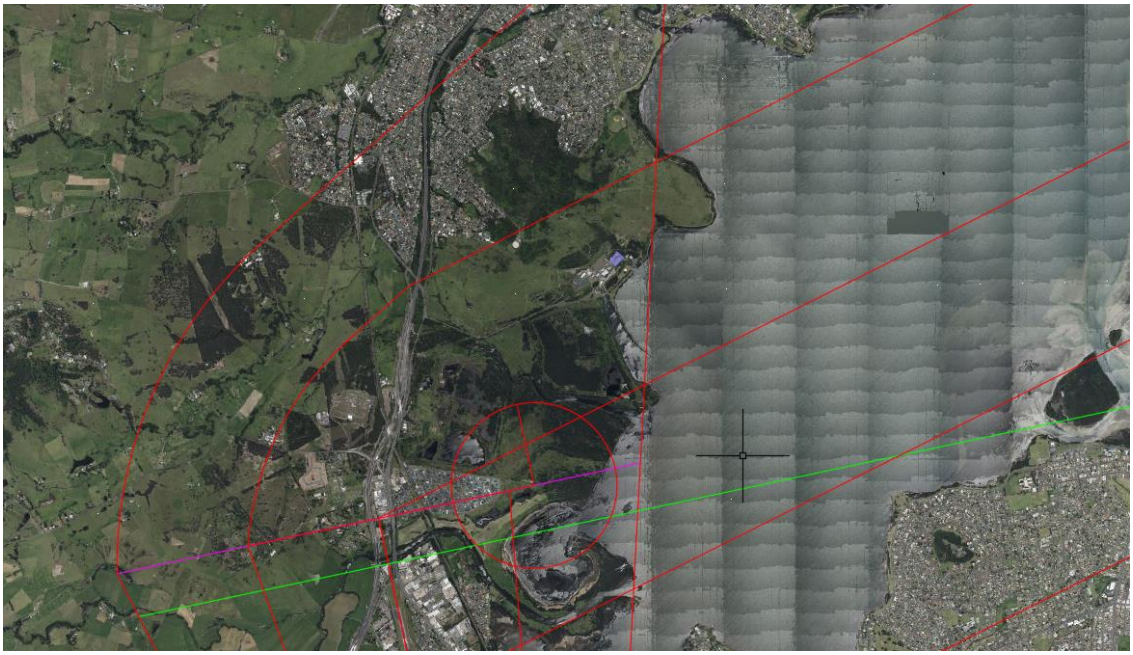


Figure 2 Runway 34 RNP Missed Approach surfaces

Figure 3 Runway 34 RNP Missed Approach surfaces (close up)

According to the revised AC (paragraph 2.3.1) If there is an infringement of the PANS-OPS surfaces creating a probability of moderate turbulence greater than 1 x 10 -5 per operation, CASA will take the position that the proposal will create an unacceptable risk to the safety of aircraft operations.

It goes on to say that if the proposal cannot be altered to avoid this impact, changes to Terminal Instrument Flight Procedures (TIFP) maybe an option. However, stakeholders such as LUPA, aircraft operators and airport operators must accept that any changes to TIFP will affect the regularity and efficiency of operations at the airport.

1.6. Consideration of stacks with engineering modifications

The revised Advisory Circular provides for the circumstances associated with Tallawarra B Power Station at sub-section 2.5. Here, CASA notes that that the EPA cannot be used to asses risk levels directly where the proponent of a project presents a stack design involving engineering modifications aimed at reducing the impact of the plume rise.

At paragraph 2.5.3 it specifically notes as follows:

> *2.5.3 Alternatively, CASA can provide advice about the height above which the average plume velocity should not exceed 6.1m/s (consistent with the BoM parameter for moderate turbulence) and the LUPA can itself arrange, or require the proponent to arrange, the commissioning of a plume study which will assess whether this parameter will be exceeded. It will then be a matter for the LUPA to satisfy itself on the validity of the plume study and CASA will not provide comments on the study.*

The AIA conclusion establishing a maximum plume velocity of 6.1 m/s at 700 ft AMSL, which has been adopted as a condition of approval for the project, and the subsequent preparation of a plume study to confirm that the plume dispersal device proposed to be installed on the exhaust stack will prevent this parameter from being exceeded, is consistent with this guidance.

If you wish to clarify or discuss the contents of this correspondence, please contact me on 0417 631 681.

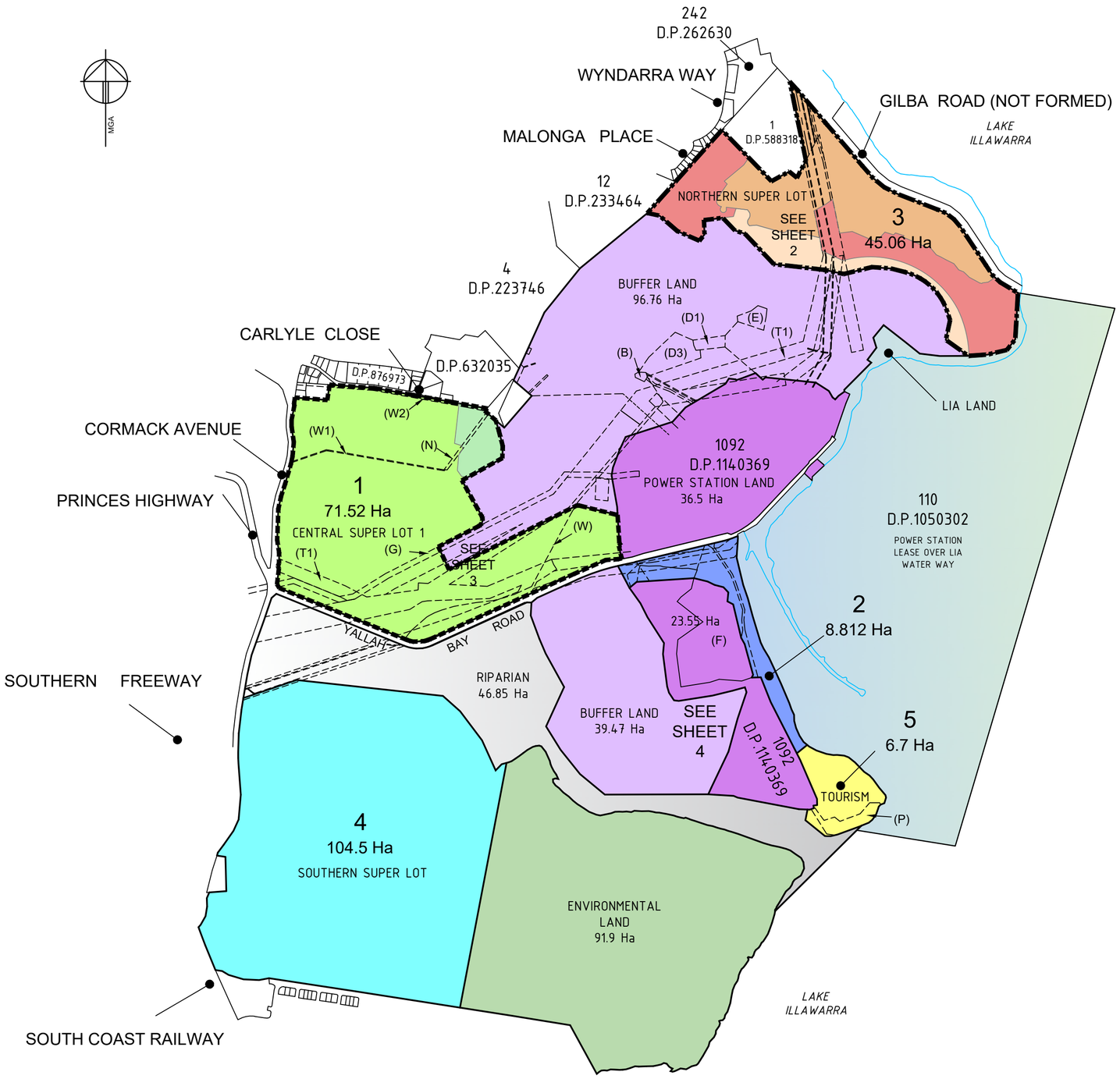
Kind regards

Keith Tonkin

Managing Director

29 March 2023

PRELIMINARY



GENERAL NOTES

- SEE SHEET 2 FOR DETAIL ON LOT 3 (NORTHERN SUPER LOT).
- SEE SHEET 3 FOR DETAIL ON LOT 1 (CENTRAL SUPER LOT 1).
- SEE SHEET 4 FOR DETAIL ON LOT 2 (CENTRAL SUPER LOT 2).
- THIS PLAN SHOWS AREAS AND DIMENSIONS WHICH MAY BE SUBJECT TO CHANGE, FOR EXAMPLE BY COUNCIL APPROVALS, SERVICES APPROVALS OR DEPARTMENT OF LAND AND PROPERTY APPROVALS AND REGISTRATION OF ANY FINAL SUBDIVISION PLAN.
- THIS CONCEPT SALES PLAN HAS BEEN PREPARED FOR BRIDGEHILL (TALLAWARRA) PTY LTD.

LEGEND

- CENTRAL SUPER LOT 1
- CENTRAL SUPER LOT 2
- NORTHERN SUPER LOT
- SOUTHERN SUPER LOT
- TOURISM
- DUCK CREEK RIPARIAN LAND
- ENVIRONMENTAL LAND
- POWER STATION LAND
- POWER STATION BUFFER LAND
- POWER STATION LEASE OVER LIA WATER WAY

0 500m 1000m

LandTeam

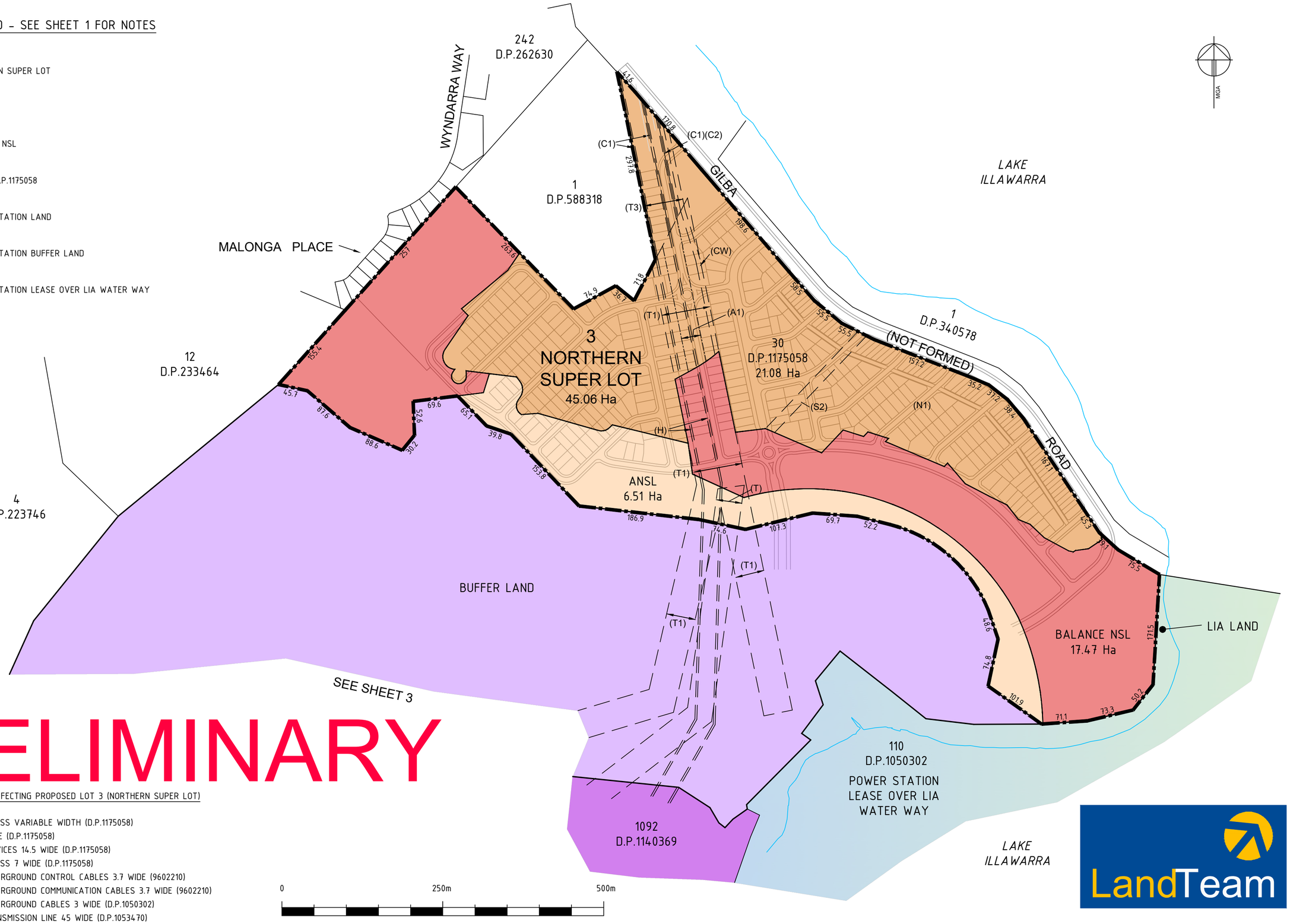
Surveyor: DAVID ANTHONY LOFBERG of LandTeam 42967055 Date of Survey: - Surveyor's Ref: 209393	PLAN OF SUBDIVISION OF LOT 30 & 31 DP1175058, LOT 7 & 8 DP1049520, LOT1 DP1146409, LOT 15 DP1050255, LOT 1 DP551658, LOT102 DP716727, LOT1 DP543285, LOT 1 & 2 DP792664, LOT 11 DP552933, LOT 151 DP628980, LOT 1 & 3 DP109795, LOT 20 DP633211, LOT 10 DP552933	LGA: WOLLONGONG Locality: KOONAWARRA DAPTO & YALLAH Subdivision No: Lengths are in metres. Reduction Ratio 1 : 12500	Registered	

10mm 20mm 30mm 40mm 50mm 60mm 70mm 80mm 90mm 100mm 110mm 120mm 130mm 140mm

Version: 23-01-2020 DAL

LEGEND - SEE SHEET 1 FOR NOTES

- NORTHERN SUPER LOT
- ANSL
- BALANCE NSL
- LOT 30 D.P.1175058
- POWER STATION LAND
- POWER STATION BUFFER LAND
- POWER STATION LEASE OVER LIA WATER WAY



PRELIMINARY

EASEMENTS CURRENTLY AFFECTING PROPOSED LOT 3 (NORTHERN SUPER LOT)

- A1) EASEMENT FOR ACCESS VARIABLE WIDTH (D.P.1175058)
- N1) EASEMENT FOR NOISE (D.P.1175058)
- S2) EASEMENT FOR SERVICES 14.5 WIDE (D.P.1175058)
- CW) EASEMENT FOR ACCESS 7 WIDE (D.P.1175058)
- (C1) EASEMENT FOR UNDERGROUND CONTROL CABLES 3.7 WIDE (9602210)
- (C2) EASEMENT FOR UNDERGROUND COMMUNICATION CABLES 3.7 WIDE (9602210)
- (H) EASEMENT FOR UNDERGROUND CABLES 3 WIDE (D.P.1050302)
- (T1) EASEMENT FOR TRANSMISSION LINE 45 WIDE (D.P.1053470)
- (T3) EASEMENT FOR TRANSMISSION LINE (9602210)
- (T) EASEMENT FOR OVERHEAD POWER LINES 40 WIDE AND VARIABLE (D.P.1135295)

0 250m 500m

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10mm 20mm 30mm 40mm 50mm 60mm 70mm 80mm 90mm 100mm 110mm 120mm 130mm 140mm

Version: 23-01-2020 DAL

EASEMENTS CURRENTLY AFFECTING PROPOSED LOT 1 (CENTRAL SUPER LOT 1)

(T1) EASEMENT FOR TRANSMISSION LINE 45 WIDE (D.P.1053470)
(T4) EASEMENT FOR TRANSMISSION LINE 45 WIDE OVER EXISTING LINE OF POLES (D.P.1146409)
(W) EASEMENT FOR WATER SUPPLY PURPOSES OVER EXISTING LINE OF PIPES (APPROXIMATE POSITION) (D.P.1140369)
(W) RESTRICTION ON THE USE OF LAND NUMBERED 13 IN DP1140369
(X1) EASEMENT FOR OVERHEAD POWER LINES 9 WIDE AND VARIABLE (DP1140369)
(X2) EASEMENT FOR OVERHEAD POWER LINES 30 WIDE AND VARIABLE (DP1140369)
(W2) EASEMENT FOR WATER SUPPLY (J49329)
(L) EASEMENT FOR BATTER (D.P.619181)
(M) RIGHT OF WAY (D.P.716727)
(N) EASEMENT FOR WATER MAIN (V941708)
(W1) EASEMENT FOR WATER SUPPLY PURPOSES (AE54462)
(G) PIPELINE EASEMENT 10 AND 20 WIDE (AJ377540) VIDE (D.P.1122067)

MGA

CARLYLE CLOSE
D.P.876973
D.P.854264
4 D.P.223746
592 D.P.632035
D.P.208657
SEE SHEET 2
BUFFER LAND
ACSL 3.51 Ha
1 CENTRAL SUPER LOT 1 71.52 Ha
CENTRAL SUPER LOT 1 LESS ACSL 68.01 Ha
1092 D.P.1140369
2
CORMACK AVENUE
PRINCES HIGHWAY
SOUTHERN FREEWAY
YALLAH BAY ROAD
RIPARIAN
4 SOUTHERN SUPER LOT
SEE SHEET 4

PRELIMINARY

0 250m 500m

LEGEND - SEE SHEET 1 FOR NOTES

CENTRAL SUPER LOT 1
CENTRAL SUPER LOT 2
SOUTHERN SUPER LOT
DUCK CREEK RIPARIAN LAND
POWER STATION LAND
POWER STATION BUFFER LAND
ACSL

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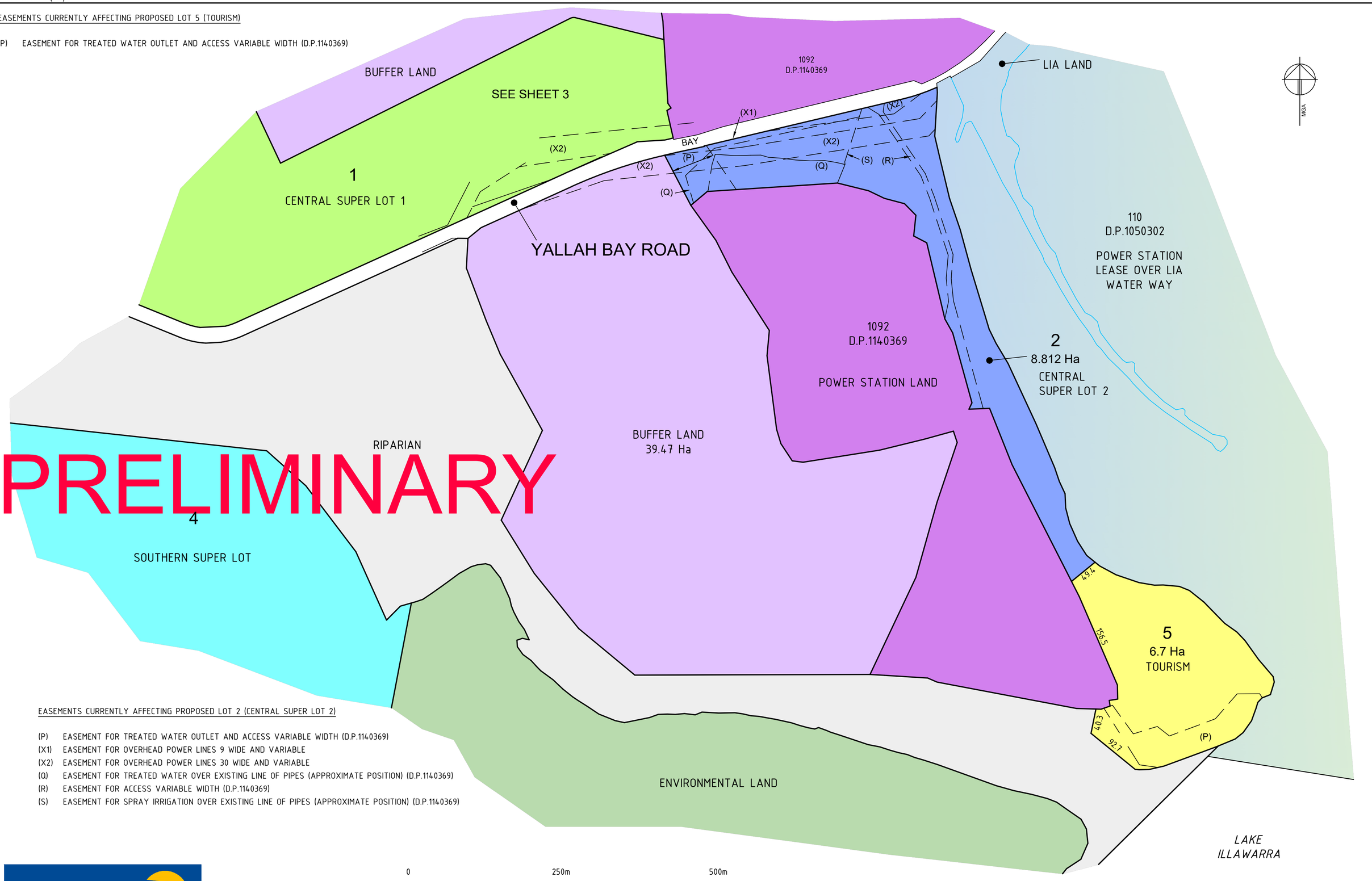
10mm 20mm 30mm 40mm 50mm 60mm 70mm 80mm 90mm 100mm 110mm 120mm 130mm 140mm

Version: 23-01-2020 DAL

EASEMENTS CURRENTLY AFFECTING PROPOSED LOT 5 (TOURISM)

(P) EASEMENT FOR TREATED WATER OUTLET AND ACCESS VARIABLE WIDTH (D.P.1140369)



EASEMENTS CURRENTLY AFFECTING PROPOSED LOT 2 (CENTRAL SUPER LOT 2)

(P) EASEMENT FOR TREATED WATER OUTLET AND ACCESS VARIABLE WIDTH (D.P.1140369)
(X1) EASEMENT FOR OVERHEAD POWER LINES 9 WIDE AND VARIABLE
(X2) EASEMENT FOR OVERHEAD POWER LINES 30 WIDE AND VARIABLE
(Q) EASEMENT FOR TREATED WATER OVER EXISTING LINE OF PIPES (APPROXIMATE POSITION) (D.P.1140369)
(R) EASEMENT FOR ACCESS VARIABLE WIDTH (D.P.1140369)
(S) EASEMENT FOR SPRAY IRRIGATION OVER EXISTING LINE OF PIPES (APPROXIMATE POSITION) (D.P.1140369)

0 250m 500m

LandTeam

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