

Appendix C Geotechnical Investigation Report



GREEN

G E O T E C H N I C S

GEOTECHNICAL INVESTIGATION

FOR

KARERA COMMUNICATIONS PTY LTD

**PROSPECT RESERVOIR, WILLIAM
LAWSON DRIVE, PROSPECT**

**REPORT GG10736.001
23 AUGUST 2022**

Geotechnical Investigation for a proposed new communications tower and equipment hut at Prospect Reservoir, William Lawson Drive, Prospect

Prepared for

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Document Authorisation

Our Ref: GG10736.001

For and on behalf of Green Geotechnics



Matthew Green

Principal Engineering Geologist

Document Control

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Appendix A – Borehole Logs & DCP Test Results

Appendix B – Laboratory Test Results

1. INTRODUCTION

This report presents the results of a geotechnical investigation carried out by Green Geotechnics Pty Limited for a proposed new communications tower and equipment hut to be constructed at Prospect Reservoir adjacent to William Lawson Drive, Prospect, NSW. The investigation was commissioned by Karera Communications Pty Limited by return acceptance of Proposal PROP-2022-0288, dated 15 July 2022.

We understand from the supplied drawings that the development comprises construction of a 60 metre free standing metal lattice communications tower with an adjoining communications hut. The tower and hut are connected by a suspended cable tray.

The equipment hut will typically be supported by a shallow pad foundation and the lattice tower will be supported by a 400mm thick concrete slab with isolated 10 metre deep 900mm diameter piles, with a single pile installed under each of the three legs.

The purpose of the investigation was to:

- assess the subsurface conditions over the site,
- provide a Site Classification to AS2870 for the equipment hut slab,
- provide a Subsoil Classification in accordance with AS117.4 (earthquake)
- provide recommendations regarding the appropriate foundation system for the site including design parameters,
- comment on excavation conditions for the lattice tower and equipment hut, and
- provide an exposure classification in accordance with AS2159 and AS2870.

2. INVESTIGATION PROCEDURE

2.1 Fieldwork Details

The fieldwork was carried out on 16 August 2022 and comprised a detailed site walkover together with the drilling of two (2) boreholes numbered BH1 and BH2. The boreholes were drilled using rotary solid flight augers attached to a utility mounted Christie Engineering drilling rig owned and operated by Green Geotechnics.

The site location is shown in the attached Figure A. The borehole locations, as shown on Figure B, were determined by taped measurements from existing surface features overlain on available schematic drawings of the site. Photographs of the site indicating the borehole locations are shown on Figure C.

The strength of the soils encountered in the boreholes was assessed by undertaking Dynamic Cone Penetrometer (DCP) tests adjacent to each borehole. The strength of the weathered bedrock was assessed by observation of the auger penetration resistance when using a tungsten carbide drilling bit, together with examination of the recovered rock cuttings.

Groundwater observations were made in all boreholes during drilling, on completion of drilling and a short time after completion of drilling. No longer term groundwater monitoring was carried out.

The fieldwork was completed in the full-time presence of our senior field geologist who set out the boreholes, nominated the sampling and testing, and prepared the borehole logs. The logs are attached to this report, together with a glossary of the terms and symbols used in the logs.

For further details of the investigation techniques adopted, reference should be made to the attached explanation notes.

Environmental and contamination testing of the soils was beyond the agreed scope of the works.

2.2 Laboratory Testing

To assess the soils for their aggressiveness and levels of salinity, representative soil samples were tested to determine the following:

- pH,
- Sulphate Content (SO₄),
- Chloride Content (CL), and
- Electrical Conductivity (EC).

The detailed test reports are provided in Appendix B and are discussed in Section 4.5 of this report.

3. RESULTS OF INVESTIGATION

3.1 Site Description

The proposed communications tower and hut are to be installed on the western side of an internal access road within Prospect Reservoir. The access road extends south from William Lawson Drive to a car park to the south, and is located towards the eastern extend of the reservoir, close to the former Prospect Quarry.

At the time of the fieldwork the site comprised a gently sloping grassed area surrounded by mature trees and scrub. The ground surface has a slight fall to the east. The adjoining access road is single width with an asphaltic concrete surface.

Approximately 20 metres east of the access road is a steep batter which leads to the former Prospect Quarry. The batter has been formed at an angle of approximately 2H:1V and extends for around 10-15 metres. At the toe of the embankment is the face of the quarry which has a height of around 30-40 metres and comprises a series of vertical cuts with horizontal benches. The vertical cut faces are comprised of very high strength fractured basalt bedrock.

To the north of the proposed tower are above ground storage tanks, beyond which is a water reservoir. To the west and south are areas of bushland.

3.2 Regional Geology & Subsurface Conditions

The 1:100,000 series geological map of Penrith (Geological Survey of NSW, Geological Series Sheet 9030) indicates that the site is underlain by Jurassic Age bedrock belonging to the Prospect Picrite formation. Bedrock within this formation comprises picrite, dolerite and minor basalt. The deposit is a basin-shaped intrusion into the surrounding shale bedrock.

For the development of a site-specific geotechnical model, the observed subsurface conditions from the boreholes have been grouped into four (4) geotechnical units which are summarised as follows:

Unit 1 – Topsoil:

Topsoil materials were encountered in both boreholes to depths of 0.2 to 0.3 metres and comprised a medium plasticity silty clay with some organics.

Unit 2 – Firm and Firm to Stiff Clays:

Natural firm becoming firm to stiff silty clays were encountered below the topsoil to depths of 0.8 to 0.9 metres. The natural clays were assessed to be medium to high plasticity and moist.

Unit 3 – Stiff and Very Stiff Residual Clays:

Natural stiff becoming very stiff residual clays were encountered below the Unit 2 clays to depths of 1.8 to 2.0 metres. The natural clays were assessed to be low plasticity and moist.

Unit 4 – Weathered Basalt Bedrock:

Weathered basalt bedrock was encountered at depths of 1.8 to 2.0 metres, and was unable to be penetrated below depths of 4.5 to 6.2 metres. The bedrock was assessed to be extremely low to very low strength, increasing in strength with depth.

For this assessment, the bedrock has been split into two units. Unit 4A materials represent the bedrock able to be penetrated with the auger (Class 5 rock), and Unit 4B materials represent the bedrock generally unable or difficult to be penetrate with the auger (i.e. below auger refusal depth). The classification of the bedrock is noted on the borehole logs.

Groundwater seepage was not observed during auger drilling of the boreholes.

4. GEOTECHNICAL RECOMMENDATIONS

4.1 Site Classification to AS2870

The classification has been prepared in accordance with the guidelines set out in the “Residential Slabs and Footings” Code, AS2870 – 2011.

Because there are trees present, abnormal moisture conditions (AMC) prevail at the site. (Refer to Section 1.3.3 of AS2870).

Because of the AMC present, the site is classified a **Problem Site (P)**. The site may however be reclassified **Highly Reactive (H1)**, provided the recommendations provided below in Section 4.2 are adopted and footings are founded in at least firm to stiff natural soils.

Foundation design and construction consistent with this classification shall be adopted as specified in the above referenced standard and in accordance with the following design details.

4.2 Foundation Design

Structural loads from the equipment hut may be founded on the upper firm to stiff natural clays. Any topsoil or soft/firm clays should not be relied upon for foundation support. The lattice tower will be supported by bored pile foundations which will be socketed into the underlying basalt bedrock.

Foundation design parameters for the various units are provided in Table 4.1 below

TABLE 4.1 – Foundation Design Parameters

Material	Maximum Allowable (Serviceability) Values (kPa)			Typical E_{field} MPa	Modulus of subgrade reaction k_s (kPa/m) [^]
	End Bearing Pressure	Shaft Friction in compression [#]	Shaft Friction in tension [*]		
Topsoil / Soft/Firm Clay	-	-	-	-	-
Firm to Stiff Clay	100	-	-	8	1.2×10^4
Stiff Clay	150	-	-	15	1.8×10^4
Very Stiff Clay	300	-	-	30	3.6×10^4
Class 5 Bedrock	700	70	35	75	8.4×10^4
Class 4 Bedrock	1000	100	50	100	1.2×10^5

^{*} Uplift capacity of piles in tension loading should also be checked for inverted cone pull out mechanism.

[#] clean socket of roughness category R2 or better is assumed

[^]The modulus of subgrade (k_s) for a footing acting in the vertical direction is a function of various factors including depth and footing size. The following generalized relationship can be derived by making a few assumptions: $k_s = 120 \times q_a$ kPa/m (where q_a = allowable bearing pressure)

The parameters for Class 4 bedrock provided in Table 4.1 apply to bored pile foundations. They should not be adopted for steel screw piles.

Settlements for piled foundations in bedrock are anticipated to be about 1% of the minimum footing dimension, based on serviceability parameters as per Table 4.1. Settlements for pad footings in soils are anticipated to be up to about 15mm where loading does not exceed the maximum allowable values.

All shallow footings should be poured with minimal delay (i.e. preferably on the same day of excavation) or the base of the footing should be protected by a concrete blinding layer after cleaning of loose spoil and inspection.

The site is considered suitable for the use of conventional bored cast in-situ piles. Based on the observations made during auger drilling, the sidewalls of bored piles are expected to remain stable during drilling. However, pile excavations should not be left open overnight. The possibility of some minor seepage needs to be considered when drilling bored piles and pouring concrete.

The drilling of bored piles to depths of 10 metres is likely to encounter high and possibly very high strength fresh basalt bedrock, and therefore the piles will likely need to be drilled with high capacity purpose built piling rigs equipped with rock drilling augers.

Bored pile footings should be drilled, cleaned, inspected and poured with minimal delay, on the same day. Water should be prevented from ponding in the base of footings as this will tend to soften the foundation material, resulting in further excavation and cleaning being required.

The initial stages of footing excavation/drilling, particularly if bored piles are adopted, should be inspected by a geotechnical engineer/engineering geologist to ascertain that the recommended foundation material has been reached and to check initial assumptions about foundation conditions and possible variations that may occur between borehole locations. The need for further inspections can be assessed following the initial visit.

4.3 Site Classification to AS1170.4 (Earthquake)

The site sub-soil classification has been determined using AS1170.4-2007. The classification is based on the results of the borehole drilling. The depth of soil or completely weathered bedrock recorded in the subsurface profile exceeds 3 metres in the majority of locations, therefore the site is classified as a Shallow Soil Site (C_e). An earthquake hazard factor (Z) of 0.08 applies to sites within the Sydney region.

4.4 Excavation Conditions

Based on the site slope we anticipate any excavations required for construction of the tower slab and equipment hut would be limited in depth to no greater than 1 metre. Based on the results of the testing, bulk excavations to these depths of up to 1 metre are expected to encounter topsoil and natural clayey soils. Excavators without assistance should be capable of excavating the soils to depths of up to 1 metre. Some minor ripping may be required if bands of ironstone are encountered. We do not anticipate the need to use hydraulic rock hammers during the works.

4.5 Exposure Classification to AS2870 & AS2159

The aggressiveness or erosion potential of an environment in building materials, particularly concrete and steel is dependent on the levels of soil pH and the types of salts present, generally sulphates and chlorides. In order to determine the degree of aggressiveness, the test values obtained are compared to Tables 6.4.2 (C) and 6.5.2 (C) in AS2159 – 2009 Piling – Design and Installation and Tables 5.1 and 5.2 of AS2870-2011. In regard to the electrical conductivity, the laboratory test results have been multiplied by the appropriate factor to convert the results to EC_e .

The soils on the site consist of low permeability clays above the groundwater table. Therefore, the soil conditions B are considered appropriate. The test results are summarised in Table 4.2 below.

Table 4.2 – Exposure Classification Summary Table

Sample ID	Location	Depth (m)	pH	EC _e (dS/m)	Sulfate (ppm)	Chloride (ppm)	Exposure Classification AS2159		Exposure Classification AS2870
							Steel Piles	Concrete Piles	
S1	BH1	0.5	6.8	0.2	20	60	Non-Aggressive	Non-Aggressive	A1
S2	BH1	1.5	7.2	0.2	<10	<10	Non-Aggressive	Non-Aggressive	A1
S3	BH2	1.0	7.2	0.3	<10	<10	Non-Aggressive	Non-Aggressive	A1
S4	BH2	3.0	7.2	1.4	70	110	Non-Aggressive	Non-Aggressive	A1

Reference to DLWC (2002) “Site Investigations for Urban Salinity” indicates that EC_e values of 0.2 dS/m to 1.4 dS/m are consistent with the presence of non-saline soils.

5. FURTHER GEOTECHNICAL INPUT

The following summarises the scope of further geotechnical work recommended within this report. For specific details reference should be made to the relevant sections of this report.

- Geotechnical supervision and testing during bulk earthworks,
- Inspection of footing excavations to ascertain that the recommended foundation has been reached and to check initial assumptions regarding foundation conditions and possible variations that may occur.
- We also recommend that Green Geotechnics view the proposed earthworks and structural drawings in order to confirm they are within the guidelines of this report.

Nevertheless, it will be essential during excavation and construction works that progressive geotechnical inspections be commissioned to check initial assumptions about excavation and foundation conditions and possible variations that may occur between inspected and tested locations and to provide further relevant geotechnical advice.

6. GENERAL RECOMMENDATIONS

The recommendations presented in this report include specific issues to be addressed during the construction phase of the project. In the event that any of the construction phase recommendations presented in this report are not implemented, the general recommendations may become inapplicable and Green Geotechnics accept no responsibility whatsoever for the performance of the structure where recommendations are not implemented in full and properly tested, inspected and documented.

Occasionally, the subsurface conditions may be found to be different (or may be interpreted to be different) from those expected. Variation can also occur with groundwater conditions, especially after climatic changes. If such differences appear to exist, we recommend that you immediately contact this office.

This report provides advice on geotechnical aspects for the proposed civil and structural design. As part of the documentation stage of this project, Contract Documents and Specifications may be prepared based on our report. However, there may be design features we are not aware of or have not commented on for a variety of reasons. The designers should satisfy themselves that all the necessary advice has been obtained. If required, we could be commissioned to review the geotechnical aspects of contract documents to confirm the intent of our recommendations has been correctly implemented.

This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose. If there is any change in the proposed development described in this report then all recommendations should be reviewed. Copyright in this report is the property of Green Geotechnics. We have used a degree of care, skill and diligence normally exercised by consulting engineers in similar circumstances and locality. No other warranty expressed or implied is made or intended. Subject to payment of all fees due for the investigation, the client alone shall have a licence to use this report. The report shall not be reproduced except in full.

REPORT INFORMATION

Introduction

These notes have been provided to amplify Green Geotechnics report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

Green Geotechnics reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several limitations, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. The borehole must be flushed, and any water must be extracted from the hole if further water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, GG will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, GG cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, Green Geotechnics will be pleased to assist with investigations or advice to resolve the matter.

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, GG requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

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FIGURES



Subject Site



Project No: GG10736.001

Client: Karera

Date: 23 August 2022




Geotechnical Investigation
Prospect Reservoir, William Lawson
Drive, Prospect
SITE LOCATION PLAN

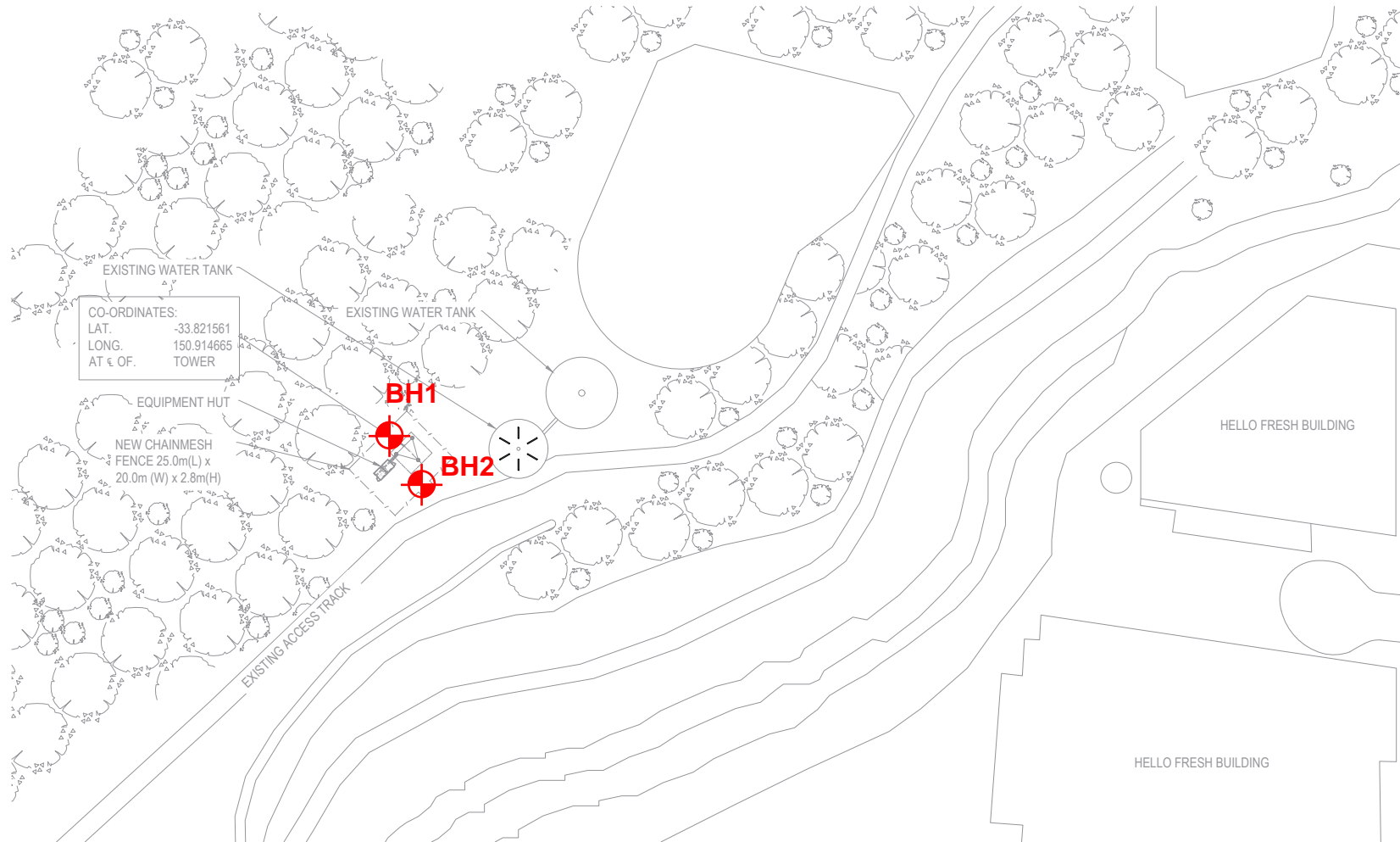
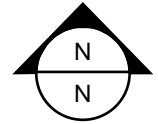
Figure No: GG10736.001A

Drawn By: MG

Scale: Unknown

Legend:

-  = Borehole
-  = DCP
-  = Test Pit



Project No: GG10736.001

Client: Karera

Date: 23 August 2022

Geotechnical Investigation
Prospect Reservoir, William Lawson
Drive, Prospect
TEST LOCATION PLAN

Figure No: GG10736.001B

Drawn By: MG

Scale: Unknown



Position of BH1



Position of BH2



Project No: GG10736.001

Client: Karera

Date: 23 August 2022

Geotechnical Investigation
Prospect Reservoir, William Lawson
Drive, Prospect
SITE PHOTOGRAPHS

Page: 1 of 1

APPENDIX A – BOREHOLE LOGS

GEOTECHNICAL LOG - NON CORED BOREHOLE



Project No: GG10736
 Address: Prospect Reservoir, William Lawson Drive, Prospect
 Client: Karera

Date Logged : 16/08/2022
 Logged By: JK
 Checked By: MG

BOREHOLE NO.: BH 1
 Sheet 1 of 1

W A T E R T A B L E	S A M P L E S	D E P T H (M)	D E S C R I P T I O N (Soil type, colour, grain size, plasticity, minor components, observations)	U S C S Y M B O L	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	M O I S T U R E
			TOPSOIL: Silty CLAY: Dark brown, medium plasticity.	CL		M
			Silty CLAY: Orange brown and red brown, medium to high plasticity.	CI-CH	FIRM	M
	S1 at 0.5m				FIRM TO STIFF	
		1.0	Silty Sandy CLAY: Orange brown, low plasticity, fine grained.	CL	STIFF	M-D
	S2 at 1.5m					
		2.0	Gravelly Clayey SAND: Orange brown, fine to coarse grained (completely weathered basalt). (Class 5 Bedrock)			D
		3.0				
		4.0	Becoming harder to drill (Class 4 Bedrock)			
		5.0	AUGER REFUSAL AT 4.5m ON WEATHERED BASALT (CLASS 4).			

D - Disturbed sample S - Chemical Sample WT - Standing Water Table	U - Undisturbed tube sample SPT - Standard Penetration Test SP - Water Seepage Level	B - Bulk sample	Contractor: Green Geotechnics Equipment: CHRISTIE Hole Diameter (mm): 0° Angle from Vertical (°): 105mm Drill Bit: Spiral TC
NOTES: See explanation sheets for meaning of all descriptive terms and symbols			

GEOTECHNICAL LOG - NON CORED BOREHOLE



GREEN
GEOTECHNICS

Project No: GG10736
Address: Prospect Reservoir, William Lawson Drive, Prospect
Client: Karera

Date Logged : 16/08/2022
Logged By: JK
Checked By: MG

BOREHOLE NO.: BH 2
Sheet 1 of 2

W A T E R T A B L E	S A M P L E S	D E P T H (M)	D E S C R I P T I O N (Soil type, colour, grain size, plasticity, minor components, observations)	U S C S Y M B O L	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	M O I S T U R E
			TOPSOIL: Silty CLAY: Dark brown, medium plasticity.	CI		M
			Silty CLAY: Orange brown and red brown, medium to high plasticity.	CI-CH	FIRM	M
					FIRM TO STIFF	
		1.0	Silty Sandy CLAY: Orange brown, low plasticity, fine to medium grained.	CL	STIFF	M
	S3 at 1.0m				VERY STIFF	
		2.0	Gravelly Clayey SAND: Orange brown, fine to coarse grained (completely weathered basalt). (Class 5 Bedrock)	SC		D
		3.0				
	S4 at 3.0m					
		4.0				
		5.0				
			Gravelly Clayey SAND: Orange brown with dark grey, fine to coarse grained (weathered basalt). (Class 5 Bedrock)	SC		D

D - Disturbed sample	U - Undisturbed tube sample	B - Bulk sample	Contractor: Green Geotechnics Equipment: CHRISTIE Hole Diameter (mm): 0° Angle from Vertical (°): 105mm Drill Bit: Spiral TC
S - Chemical Sample	SPT - Standard Penetration Test		
WT - Standing Water Table	SP - Water Seepage Level		
NOTES: See explanation sheets for meaning of all descriptive terms and symbols			

GEOTECHNICAL LOG - NON CORED BOREHOLE



GREEN
GEOTECHNICS

Project No: GG10736
Address: Prospect Reservoir, William Lawson Drive, Prospect
Client: Karera

Date Logged : 16/08/2022
Logged By: JK
Checked By: MG

BOREHOLE NO.: BH 2

Sheet 2 of 2

W A T E R T A B L E	S A M P L E S	DEPTH (M)	DESCRIPTION (Soil type, colour, grain size, plasticity, minor components, observations)	U S C S Y M B O L	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	M O I S T U R E
			Gravelly Clayey SAND: Orange brown with dark grey, fine to coarse grained (weathered basalt).	SC		D
		7.0	AUGER REFUSAL AT 6.2m ON WEATHERED BASALT (CLASS 4).			
		8.0				
		9.0				
		10.0				
		11.0				

D - Disturbed sample

U - Undisturbed tube sample

B - Bulk sample

S - Chemical Sample

SPT - Standard Penetration Test

WT - Standing Water Table

SP - Water Seepage Level

Contractor: Green Geotechnics

Equipment: CHRISTIE

Hole Diameter (mm): 0°

Angle from Vertical (°): 105mm

Drill Bit: Spiral TC

NOTES: See explanation sheets for meaning of all descriptive terms and symbols

Dynamic Cone Penetrometer Test Report



GREEN
GEOTECHNICS

Project Number: GG10736

Site Address: Prospect Reservoir, William Lawson Drive, Prospect

Test Date: 16/08/2022

Page: 1 of 1

Test Method: **AS1289.6.3.2**

Technician: JK

Test No	BH1	BH2				
Starting Level	Surface Level	Surface Level				
Depth (m)	Penetration Resistance (blows / 150mm)					
0.00 - 0.15	1	*				
0.15 - 0.30	2	1				
0.30 - 0.45	3	2				
0.45 - 0.60	2	2				
0.60 - 0.75	3	3				
0.75 - 0.90	3	4				
0.90 - 1.05	6	6				
1.05 - 1.20	8	8				
1.20 - 1.35	11	12				
1.35 - 1.50	9	18				
1.50 - 1.65	8	22				
1.65 - 1.80	9	Refusal				
1.80 - 1.95	22					
1.95 - 2.10	Refusal					
2.10 - 2.25						
2.25 - 2.40						
2.40 - 2.55						
2.55 - 2.70						
2.70 - 2.85						
2.85 - 3.00						

Remarks: * Pre drilled prior to testing

SAMPLING & IN-SITU TESTING

Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock. Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure. Undisturbed samples are taken by pushing a thin walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength and are necessary for laboratory determination of shear strength and compressibility.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator.

Large Diameter Augers

Boreholes can be drilled using a large diameter auger, typically up to 300 mm or larger in diameter mounted on a standard drilling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration.

Diamond Core Rock Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter (NMLC). The borehole is advanced using a water or mud flush to lubricate the bit and removed cuttings.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1. The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable, and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:
$$4,6,7$$
$$N=13$$
- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as: 15, 30/40 mm.

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

SOIL DESCRIPTIONS

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle Size (mm)
Boulder >200	Boulder >200
Cobble 63 - 200	Cobble 63 - 200
Gravel 2.36 - 63	Gravel 2.36 - 63
Sand 0.075 - 2.36	Sand 0.075 - 2.36
Silt 0.002 - 0.075	Silt 0.002 - 0.075
Clay <0.002	Clay <0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle Size (mm)
Coarse Gravel	20 – 63
Medium Gravel	6 – 20
Fine Sand	2.36 – 6
Coarse Sand	0.6 – 2.36
Medium Sand	0.2 – 0.6
Fine Sand	0.075 – 0.2

The proportions of secondary constituents of soils are described as:

Term	Proportion
And	Specify
Adjective	20 - 35%
Slightly	12 - 20%
With some	5 - 12%
With a trace of	0 - 5%

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained Shear Strength (kPa)
Very soft	VS	<12
Soft	S	12 - 25
Firm	F	25 - 50
Stiff	ST	50 - 100
Very stiff	VST	100 - 200
Hard	H	200

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (DCP). The relative density terms are given below:

Relative Density	Abbreviation	SPT N Value	CPT qc value (MPa)
Very loose	VL	<4	<2
Loose	L	4 - 10	2 - 5
Medium Dense	MD	10-30	5-15
Dense	D	30-50	15-25
Very Dense	VD	>50	>25

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Transported soils - formed somewhere else and transported by nature to the site; or
- Filling - moved by man.

Transported soils may be further subdivided into:

- Alluvium - river deposits
- Lacustrine - lake deposits
- Aeolian - wind deposits
- Littoral - beach deposits
- Estuarine - tidal river deposits
- Talus - scree or coarse colluvium
- Slopewash or Colluvium - transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.

ROCK DESCRIPTIONS

Rock Strength

The Rock strength is defined by the Point Load Strength Index ($IS_{(50)}$) and refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects. The test procedure is described by Australian Standard 4133.4.1 - 1993. The terms used to describe rock strength are as follows:

Term	Abbreviation	Point Load Index $IS_{(50)}$ MPa	Approximate Unconfined Compressive Strength MPa*
Extremely low	EL	<0.03	<0.6
Very low	VL	0.03 - 0.1	0.6 - 2
Low	L	0.1 - 0.3	2 - 6
Medium	M	0.3 - 1.0	6 - 20
High	H	1 - 3	20 - 60
Very high	VH	3 - 10	60 - 200

* Assumes a ration of 20:1 for UCS to $IS_{(50)}$

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Extremely weathered	EW	Rock substance has soil properties, i.e. it can be remoulded and classified as a soil but the texture of the original rock is still evident.
Highly weathered	HW	Limonite staining or bleaching affects whole of rock substance and other signs of decomposition are evident. Porosity and strength may be altered as a result of iron leaching or deposition. Colour and strength of original fresh rock is not recognisable.
Moderately weathered	MW	Staining and discolouration of rock substance has taken Place.
Slightly weathered	SW	Rock substance is slightly discoloured but shows little or no change of strength from fresh rock.
Fresh stained	FS	Rock substance unaffected by weathering but staining visible along defects.
Fresh	FR	No signs of decomposition or staining.

Degree of Fracturing

The following classification applies to the spacing of natural fractures in core samples (bedding plane partings, joints and other defects, excluding drilling breaks

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with some fragments
Fractured Core	Core lengths of 40-200 mm with some shorter and longer sections
Slightly Fractured	Core lengths of 200-1000 mm with some shorter and loner sections
Unbroken	Unbroken Core lengths mostly > 1000 mm

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	2 m

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$RQD \% = \frac{\text{cumulative length of 'sound' core sections} \geq 100 \text{ mm long}}{\text{total drilled length of section being assessed}}$$

'sound' rock is assessed to be rock of low strength or better. The RQD applies only to natural fractures. If the core is broken by drilling/handling, then the broken pieces are fitted back together and are not included in the calculation of RQD.

ABBREVIATIONS

Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core Drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

Z	Water seep
V	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
S	Chemical sample
U50	Undisturbed tube sample (50mm)
W	Water sample
PP	Pocket Penetrometer (kPa)
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

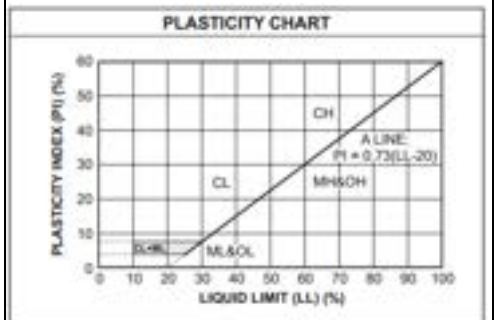
fg	fragmented
bnd	band
qtz	quartz

UNIFIED SOIL CLASSIFICATION TABLE

Field Identification Procedures (Excluding particles larger than 75um and basing fractions on estimated weights)				Group Symbols	Typical Names	Information Required for Describing Soils	Laboratory Classification Criteria			
Coarse-grained soils More than half of the material is larger than 75um sieve size ^b	Gravels More than half of the coarse fraction is larger than a 4mm sieve	Clean gravels (little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes	GW	Well graded gravels, gravel-sand mixtures, little or no fines	<p>Give typical name: indicative approximate percentages of sand and gravel; maximum size; angularity; surface condition, and hardness of the coarse grains; local of geologic name and other pertinent descriptive information; and symbols in parentheses</p> <p>For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics</p> <p>Example: <i>Silty Sand</i>, gravelly; about 20% hard, angular gravel particles 12mm maximum size; rounded and subangular sand grains, coarse to fine, about 15% non-plastic fines low dry strength; well compacted and moist in place; alluvial sand; (<i>SM</i>)</p>	<p>$C_u = \frac{D_{60}}{D_{10}}$ Greater than 4</p> <p>$C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3</p> <p>Not meeting all gradation requirements for GW</p> <p>Atterberg limits below "A" line or <i>PI</i> less than 4</p> <p>Atterberg limits above "A" line with <i>PI</i> greater than 7</p> <p>$C_u = \frac{D_{60}}{D_{10}}$ Greater than 6</p> <p>$C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3</p> <p>Not meeting all gradation requirements for SW</p> <p>Atterberg limits below "A" line or <i>PI</i> less than 5</p> <p>Atterberg limits above "A" line with <i>PI</i> greater than 7</p>			
			Predominantly one size or range of sizes with some intermediate sizes missing	GP	Poorly graded gravels, grave-sand mixtures, little or no fines					
		Gravels with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures see <i>ML</i> below)	GM	Silty gravels, poorly graded gravel-sand-silt mixtures					
			Plastic fines (for identification procedures see <i>CL</i> below)	GC	Clayey gravels, poorly graded gravel-sand-clay mixtures					
	Sands More than half of the coarse fraction is smaller than a 4mm sieve	Clean sands (little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes	SW	Well graded sands, gravelly sands, little or no fines					
			Predominantly one size or range of sizes with some intermediate sizes missing	SP	Poorly graded sands, gravelly sands, little or no fines					
		Sands with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures see <i>ML</i> below)	SM	Silty sands, poorly graded sand-silt mixtures					
			Plastic fines (for identification procedures see <i>CL</i> below)	SC	Clayey sands, poorly graded sand-clay mixtures					
	Fine-grained soils More than half of the material is smaller than 75um sieve size	Identification Procedures of Fractions Smaller than 380 um Sieve Size								
		Silt and clays liquid limit less than 50	Dry Strength (crushing characteristics)	Dilatancy (reaction to shaking)	Toughness (consistency near plastic limit)					
None to slight			Quick to slow	None	<i>ML</i>	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with silt plasticity	<p>Give typical name: indicative degree and character of plasticity, amount and maximum size of coarse grains; colour in wet condition, odour if any, local or geologic name, and other pertinent descriptive information, and symbol in parentheses</p> <p>For undisturbed soils add information on structure, stratification, consistency in undisturbed and remoulded states, moisture and drainage conditions</p> <p>Example: <i>Clayey Silt</i>, brown; slightly plastic; small percentage of fine sand; numerous vertical root holes; firm and dry in place; loess; (<i>ML</i>)</p>			
Medium to high			None to very slow	Medium	<i>CL</i>	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays				
Slight to medium			Slow	Slight	<i>OL</i>	Organic silts and organic silt-clays of low plasticity				
Silt and clays liquid limit greater than 50		Slight to medium	Slow to none	Slight to medium	<i>MH</i>	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, clastic silts				
Silt and clays liquid limit greater than 50		High to very high	None	High	<i>CH</i>	Inorganic clays of high plasticity, fat clays				
		Medium to high	None to very slow	Slight to medium	<i>OH</i>	Organic clays of medium to high plasticity				
		Highly Organic Soils	Readily identified by colour, odour, spongy feel and frequently by fibrous texture		<i>Pt</i>	Peat and other highly organic soils				

Use grain size curve in identifying the fractions as given under field identification

Determine percentages of gravel and sand from grain size curve
Depending on percentage of fines (fraction smaller than 75um sieve size)
coarse grained soils are classified as follows
Less than 5% GW, GP, SW, SP
More than 12% GM, GC, SM, SC
5 to 12% Borderline cases requiring use of dual symbol



Plasticity Chart
For laboratory classification of fine-grained soils

- Note:
- 1 Soils possessing characteristics of two groups are designated by combinations of group symbols (eg. GW-GC, well graded gravel-sand mixture with clay fines)
 - 2 Soils with liquid limits of the order of 35 to 50 may be visually classified as being of medium plasticity

APPENDIX B

LABORATORY TEST RESULTS

CERTIFICATE OF ANALYSIS

Work Order : **ES2229078**
Client : **GREEN GEOTECHNICS PTY LTD**
Contact : MR MATTHEW GREEN
Address : PO BOX 3244
 ROUSE HILL 2155
Telephone : ----
Project : GG10736
Order number : ----
C-O-C number : ----
Sampler : JK
Site : ----
Quote number : EN/222
No. of samples received : 4
No. of samples analysed : 4

Page : 1 of 2
Laboratory : Environmental Division Sydney
Contact : Customer Services ES
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 16-Aug-2022 07:16
Date Analysis Commenced : 17-Aug-2022
Issue Date : 22-Aug-2022 12:23



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW



General Comments

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

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

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

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

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

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

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

Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

				Sample ID	GG10736/S1	GG10736/S2	GG10736/S3	GG10736/S4	----
				Sampling date / time	16-Aug-2022 00:00	16-Aug-2022 00:00	16-Aug-2022 00:00	16-Aug-2022 00:00	----
Compound	CAS Number	LOR	Unit		ES2229078-001	ES2229078-002	ES2229078-003	ES2229078-004	-----
				Result	Result	Result	Result	Result	----
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit		6.8	7.2	7.7	7.2	----
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm		29	24	30	120	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		22.1	14.2	15.9	7.7	----
ED040S : Soluble Sulfate by ICPAES									
Sulfate as SO4 2-	14808-79-8	10	mg/kg		20	<10	<10	70	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	10	mg/kg		60	<10	<10	110	----

Appendix D Consultation material

Ms Emily McSkimming
Heritage 21
20-28 MADDUX ST
ALEXANDRIA NSW 2015

By email: emily@heritage21.com.au

Dear Ms McSkimming

APPLICATION UNDER SECTION 60 OF THE HERITAGE ACT 1977
Prospect Reservoir and surrounding area
STATE HERITAGE REGISTER Nº 01370

Address: Reservoir Road, PROSPECT NSW 2148
Proposal: The Endeavour Energy proposal includes the relocation and installation of a communications facility comprising:
A 60m free-standing heavy duty lattice tower made from galvanised steel with matte finish including, self-supporting concrete footings.

Section 60 application no: HMS ID 1632, received 25/10/2022

As delegate of the Heritage Council of NSW (the Heritage Council), I have considered the above Section 60 application. Pursuant to section 63 of the *Heritage Act 1977*, approval is granted subject to the following conditions:

APPROVED DEVELOPMENT

1. All work shall comply with the information contained within:
 - a) Architectural drawings, prepared by Endeavour Energy as listed below:

Dwg No	Dwg Title	Date	Rev
Project Name: Prospect Reservoir Communications Tower - 52856			
Sheet 1 of 7	Drawing Title and Location Plan	14/12/2022	A
Sheet 2 of 7	Overall Site Plan	14/12/2022	A
Sheet 3 of 7	Overall Sectional View 1	14/12/2022	A
Sheet 4 of 7	Overall Sectional View 2	14/12/2022	A
Sheet 5 of 7	Detailed Site Plan	14/12/2022	A
Sheet 6 of 7	Detailed Site Plan - Elevations	14/12/2022	A
Sheet 7 of 7	Site Plan – Cut and fill	14/12/2022	A

Project Name: Pole Mounted Substation Site Plan – Cut and fill Huntington Comms Tower Relocation - 527137			
Sheet 1 of 3	Pole - Site Plan	19/10/2022	A
Sheet 2 of 3	Pole - Cabling diagrams	19/10/2022	A
Sheet 3 of 3	Pole - Plan and Elevation fill	19/10/2022	A

- b) Report: *Statement of Heritage Impact*, prepared by Heritage 21, dated 1 January 2023
- c) Report: *Visual Impact Assessment*, prepared by EMM Consulting, dated 31 January 2023
- d) Report: *Vegetation Management Plan*, prepared by Gingra Ecological Surveys, dated 1 January 2023

EXCEPT AS AMENDED by the conditions of this approval:

SITE PROTECTION

- 2. Significant built and landscape elements are to be protected from potential damage during site preparation and during construction. Protection systems must ensure significant fabric, including landscape elements, is not damaged or removed. Individual tree protection requirements shall be determined through consultation between the Project Manager and the Project Arborist prior to installation.

Reason: To ensure significant fabric including vegetation is protected during construction.

VEGETATION MANAGEMENT PLAN IMPLEMENTATION

- 3. The implementation of the recommendations at Section 5 of the Vegetation Management Plan listed in Schedule 1 are to be implemented to the satisfaction of the Lead Heritage Adviser at Sydney Water.

Reason: To mitigate the visual impact of the proposed tower on the cultural landscape.

PROJECT ARBORIST

- 4. A suitably qualified Project Arborist (AQF - Level 5) must be nominated for this project. The Project Arborist must provide input into tree protection measures, provide a detailed schedule of pruning, provide heritage information to be imparted to all arborists and tradespeople during site inductions, and oversee the works to minimise impacts to heritage values. During the site establishment stage the Project Arborist must provide a detailed assessment of the pruning requirements for work to significant trees.

Reason: So that appropriate advice is provided to support best practice conservation and ensure works are undertaken in accordance with this approval.

ARBORIST

- 5. All work to, or affecting, trees belonging to the significant Cumberland Woodland Community shall be carried out by suitably qualified tradespersons with practical experience in conservation and restoration of similar heritage structures, materials and construction methods.

Reason: So that the management of the significant landscape follows best heritage practice.

UNEXPECTED FINDS

- 6. The Applicant must ensure that if substantial intact archaeological deposits and/or State significant relics are discovered, work must cease in the affected area(s) and the Heritage Council of NSW must be notified. Additional assessment and approval may be required prior to works continuing in the affected area(s) based on the nature of the discovery.

Reason: All significant fabric within a State Heritage Register curtilage should be managed according to its significance. This is a standard condition to identify to the applicant how to

proceed if historical archaeological relics, or other unexpected buried discoveries such as works are identified during the approved project.

ABORIGINAL OBJECTS

7. Should any Aboriginal objects be uncovered by the work which is not covered by a valid Aboriginal Heritage Impact Permit, excavation or disturbance of the area is to stop immediately and Heritage NSW is to be informed in accordance with the *National Parks and Wildlife Act 1974*. Works affecting Aboriginal objects on the site must not continue until Heritage NSW has been informed and the appropriate approvals are in place. Aboriginal objects must be managed in accordance with the *National Parks and Wildlife Act 1974*.

Reason: This is a standard condition to identify to the applicant how to proceed if Aboriginal objects are unexpectedly identified during works.

COMPLIANCE

8. If requested, the applicant and any nominated heritage consultant may be required to participate in audits of Heritage Council of NSW approvals to confirm compliance with conditions of consent.

Reason: To ensure that the proposed works are completed as approved.

DURATION OF APPROVAL

9. This approval will lapse five years from the date of the consent unless the building works associated with the approval have physically commenced.

Reason: To ensure the timely completion of works

Advice

Section 148 of the *Heritage Act 1977* (the Act), allows people authorised by the Minister to enter and inspect, for the purposes of the Act, with respect to buildings, works, relics, moveable objects, places or items that is or contains an item of environmental heritage. Reasonable notice must be given for the inspection.

Right of Appeal

If you are dissatisfied with this determination appeal may be made to the Minister for Heritage under section 70 of the Act.

It should be noted that an approval under the Heritage Act is additional to that which may be required from other Local Government and State Government Authorities in order to undertake works.

Stamped documents

Any stamped documents (e.g. approved plans) for this application are available for the Applicant to download from the Heritage Management System at <https://hms.heritage.nsw.gov.au> under 'My Completed Applications.'

If you have any questions about this correspondence, please contact James Quoye, Senior Assessments Officer, at Heritage NSW on 9873 8612 or James.Quoye@environment.nsw.gov.au.

Yours sincerely

Michael Ellis
Manager Assessments
Heritage NSW
Department of Planning and Environment
As Delegate of the Heritage Council of NSW
21 February 2023

cc: Cumberland City Council: council@cumberland.nsw.gov.au

Sydney Water, Philip Bennett: philip.bennett@sydneywater.com.au

RELOCATION OF COMMUNICATIONS TOWER

PROPOSAL FACTSHEET

NOVEMBER 2022

Endeavor Energy proposes to relocate its main communications tower from Huntingdon to Prospect (the proposal).

About Endeavor Energy

Endeavour Energy is a network electricity distributor servicing over 2.5 million people living and working across Sydney's Greater West, the Blue Mountains, the Southern Highlands, Illawarra and the South Coast of New South Wales (NSW).

About the proposal

You are receiving this letter as the proposal is located adjacent or nearby to the land associated with this address, and therefore Endeavor Energy would like to notify you in regard to this proposal.

In the event any electricity supply outages are required to facilitate the safe construction of the proposal, any impacted landowners will be notified in advanced of any planned electricity supply outages. Any planned electricity outages will be as short as possible.

Timeframes

The indicative proposal timeframe includes the commencement and completion of construction within the period the last quarter of 2022/first quarter 2023. Please note, the approximate construction timeframe and duration is subject to refinement and change, depending on a range of factors, including the assessment and approval process.

Planning and assessment process

In accordance with Part 5 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act), Endeavour Energy has prepared a draft Review of Environmental Factors (REF) for the proposal. The REF outlines the proposal description and justification (including benefits and objectives), an overview of the relevant legislative framework, consultation completed during the assessment phase, consideration of alternatives, the environmental impact assessment and mitigation measures to be applied during construction and operation of the proposal. A copy of this draft REF is available if required.

Community consultation

Community input and feedback are important as part of all phases of the project, including the preparation and assessment of the REF. To request further information and to provide feedback on the proposal, during the environmental assessment phase, please do not hesitate to email engageee@emmconsulting.com.au or to the contact details provided below. Clearly mark your correspondence as 'relocation of Prospect communications tower'.

Endeavour Energy will consider any submissions and once the REF is finalised, it will be determined by Endeavour Energy as the determining authority under Part 5 of the EP&A Act.

From: [Verity Blair](#)
To: ["council@blacktown.nsw.gov.au"](mailto:council@blacktown.nsw.gov.au)
Subject: Notification of Endeavour Energy Tower, Prospect
Date: Wednesday, 12 October 2022 3:17:00 PM
Attachments: [E220571_EE_BlacktownCityCouncilletter_Prospect.pdf](#)
[image001.png](#)
[image002.png](#)
[image003.png](#)
[9659 Prospect Reservoir Prospect - Huntingwood Tower Relocation - SOHI - D1.pdf](#)

Please see notification of tower attached for your information.

Kind Regards,

Verity Blair

Associate Director

Market Leader – Infrastructure and Construction



T 02 9493 9500

M 0449 288 543

in Connect with us

SYDNEY | Ground floor, 20 Chandos Street, St Leonards NSW 2065



From: [Verity Blair](#)
To: ["council@cumberland.nsw.gov.au"](mailto:council@cumberland.nsw.gov.au)
Subject: Notification of Endeavour Energy Tower, Prospect
Date: Wednesday, 12 October 2022 3:18:00 PM
Attachments: [E220571_EE_CumberlandCouncilletter_Prospect.pdf](#)
[image001.png](#)
[image002.png](#)
[image003.png](#)
[9659 Prospect Reservoir Prospect - Huntingwood Tower Relocation - SOHI - D1.pdf](#)

Please see notification of tower attached for your information.

Kind Regards,

Verity Blair

Associate Director

Market Leader – Infrastructure and Construction



T 02 9493 9500

M 0449 288 543

in Connect with us

SYDNEY | Ground floor, 20 Chandos Street, St Leonards NSW 2065



From: [Verity Blair](#)
To: ["mail@fairfieldcity.nsw.gov.au"](mailto:mail@fairfieldcity.nsw.gov.au)
Subject: Notification of Endeavour Energy Tower, Prospect
Date: Wednesday, 12 October 2022 3:22:00 PM
Attachments: [E220571_EE_FairfieldCityCouncilletter_Prospect.pdf](#)
[image001.png](#)
[image002.png](#)
[image003.png](#)
[9659 Prospect Reservoir Prospect - Huntingwood Tower Relocation - SOHI - D1.pdf](#)

Please see notification of tower attached for your information.

Kind Regards,

Verity Blair

Associate Director

Market Leader – Infrastructure and Construction



T 02 9493 9500

M 0449 288 543

in Connect with us

SYDNEY | Ground floor, 20 Chandos Street, St Leonards NSW 2065



10 November 2022



Via email: wslhd-bmdhexec@health.nsw.gov.au

To whom it may concern,

PROPOSAL TO RELOCATE ENDEAVOUR ENERGY'S COMMUNICATIONS TOWER FROM HUNTINGWOOD TO PROSPECT

In March 2023, the main office for Endeavour Energy (EE) will relocate from its current location at Huntingwood to new premises at Parramatta. EE have a communications tower within the Huntingwood site and it is a critical component of EE's wide area network (WAN). The tower provides connectivity and redundancy for several depots, including both EE's Information Technology and Operational Technology data centres as well as for Supervisory Control and Data Acquisition (SCADA) sites which are vital to keep EE's power grid active and managed. As a result of this move, the existing EE communications tower will no longer be accessible and there is a need for a new communications tower.

The proposed new site is located adjacent to Sydney Water's Prospect Reservoir on William Lawson Drive and within Lot 304 DP 1122291. This site was deemed as a suitable location for this purpose in terms of microwave links and line of sight and coverage, which can provide connectivity to 98 SCADA field assets and one substation that are currently directly connected to the Huntingwood site.

Key features of the proposal include:

- a 60 m free-standing heavy duty lattice tower with self-supporting concrete footings;
- an external ladder, approximately 57 m in height;
- a new equipment shelter (6 m by 3 m) on concrete footing foundations;
- a new 600 mm cable tray support system from the tower to the equipment hut and support posts;
- a compound area 15 m by 15 m around the tower and associated infrastructure, including a 2.8 m high security fence with 4.8 m wide double access gate;
- a new pole with substation and overhead lines; and
- power supply works and underground cabling.

No tree removal is required as part of the proposal, however minor tree trimming will be required to access the site and for maintenance.

Figures are provided below showing the regional location of the proposal and the general site layout.

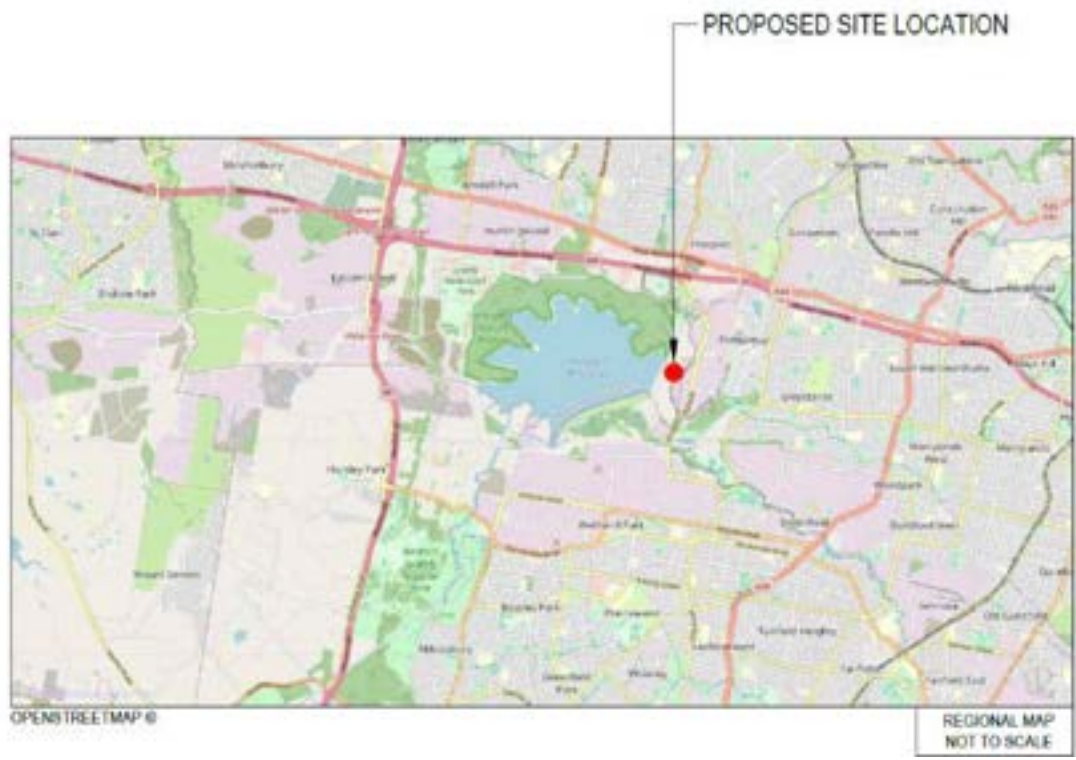


Figure 1 Regional setting of the project

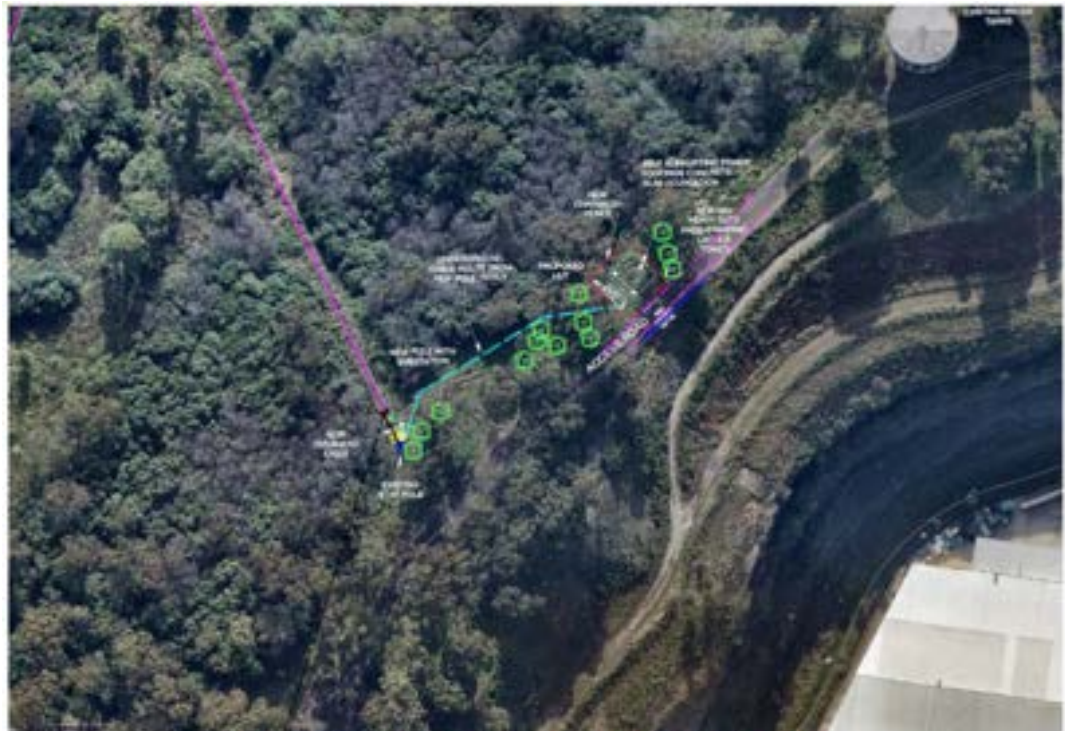


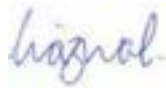
Figure 2 Site layout

In accordance with Part 5 of the NSW *Environmental Planning and Assessment Act 1979*, Endeavour Energy has prepared a draft Review of Environmental Factors (REF) for the proposal. The REF outlines the proposal description and justification (including benefits and objectives), an overview of the relevant legislative framework, consultation completed during the assessment phase, consideration of alternatives, the environmental impact assessment and mitigation measures to be applied during construction and operation of the proposal. A copy of the draft REF can be provided upon request.

If you wish to comment on the proposal, please do not hesitate to contact me at engageee@emmconsulting.com.au. Clearly mark your correspondence as the 'Prospect Tower'. If possible, please provide any correspondence by 16 November 2022.

Should you require any further information in relation to this proposal or wish to arrange a meeting to discuss this proposal further, please contact me on 0423 362 556.

Yours faithfully,



Lia Zwolinski (on behalf of Roweena D'Souza of Endeavor Energy)
Environmental Scientist
EMM Consulting

10 November 2022



Via email: ric.abcp@defence.gov.au

To whom it may concern,

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- an external ladder, approximately 57 m in height;
- a new equipment shelter (6 m by 3 m) on concrete footing foundations;
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- a compound area 15 m by 15 m around the tower and associated infrastructure, including a 2.8 m high security fence with 4.8 m wide double access gate;
- a new pole with substation and overhead lines; and
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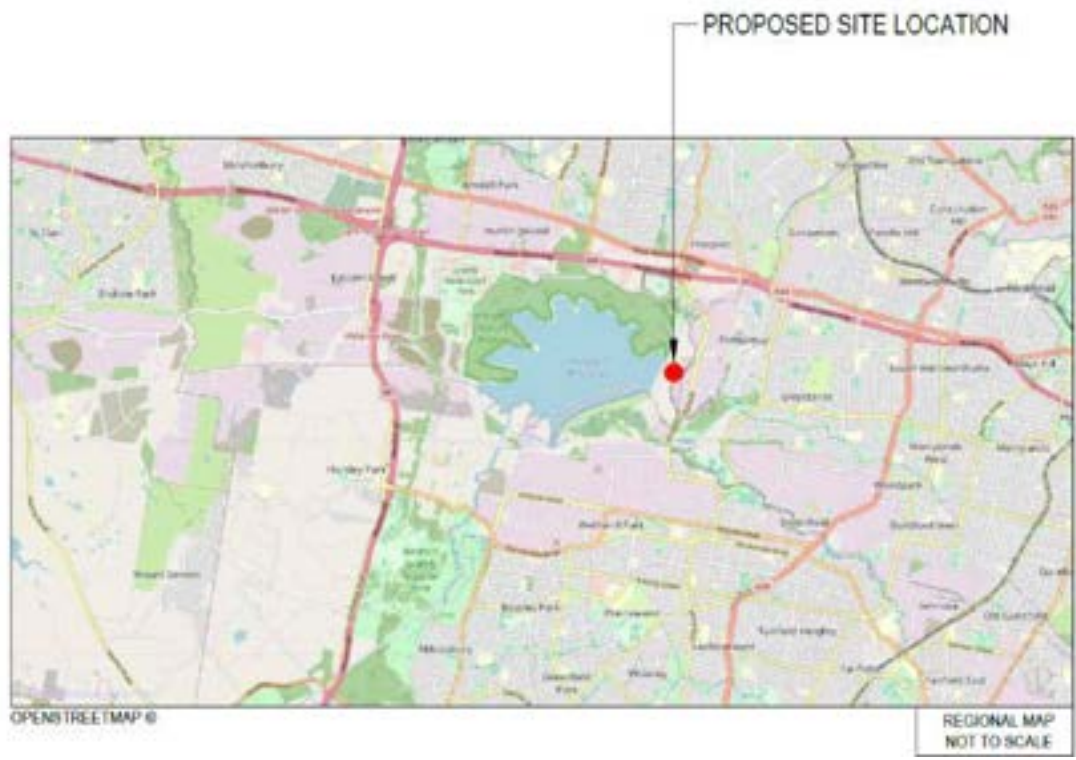
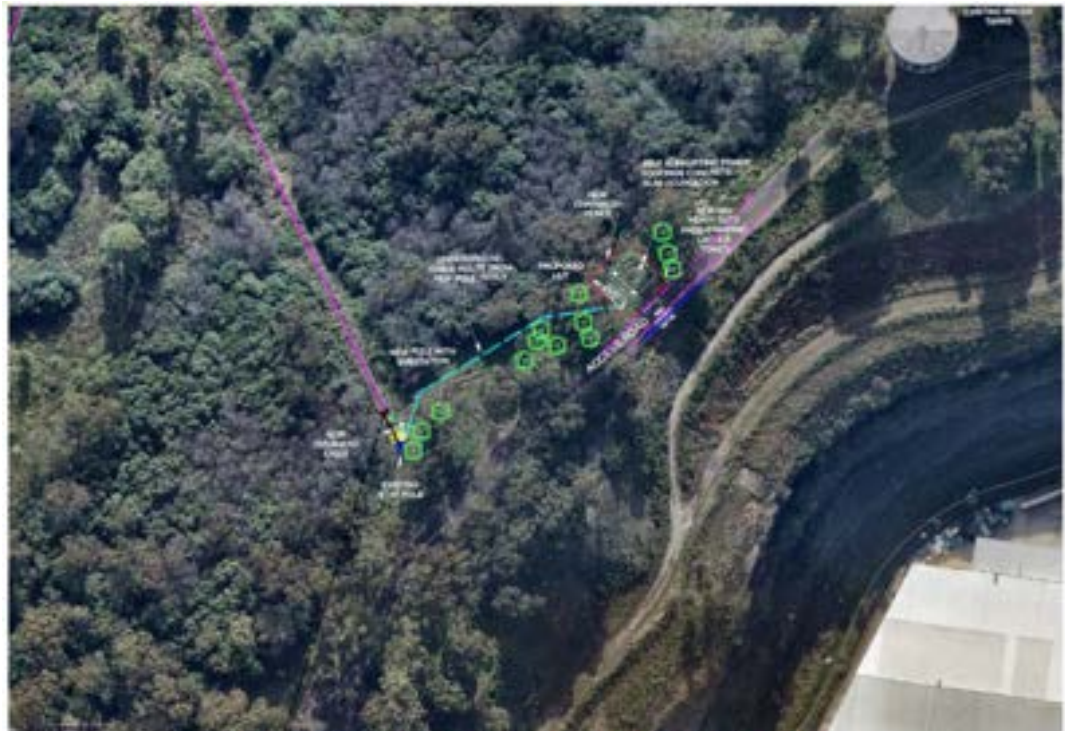


Figure 1 Regional setting of the project



CONCEPT DRAWING FOR INSTALLATION OF NEW TOWER AND EQUIPMENT HUT SCALE 1:1000

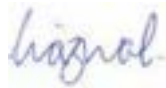
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Should you require any further information in relation to this proposal or wish to arrange a meeting to discuss this proposal further, please contact me on 0423 362 556.

Yours faithfully,



Lia Zwolinski (on behalf of Roweena D'Souza of Endeavor Energy)
Environmental Scientist
EMM Consulting

10 November 2022



Via email: wslhd-westmead-ipoadminmail@health.nsw.gov.au

To whom it may concern,

PROPOSAL TO RELOCATE ENDEAVOUR ENERGY'S COMMUNICATIONS TOWER FROM HUNTINGWOOD TO PROSPECT

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- a compound area 15 m by 15 m around the tower and associated infrastructure, including a 2.8 m high security fence with 4.8 m wide double access gate;
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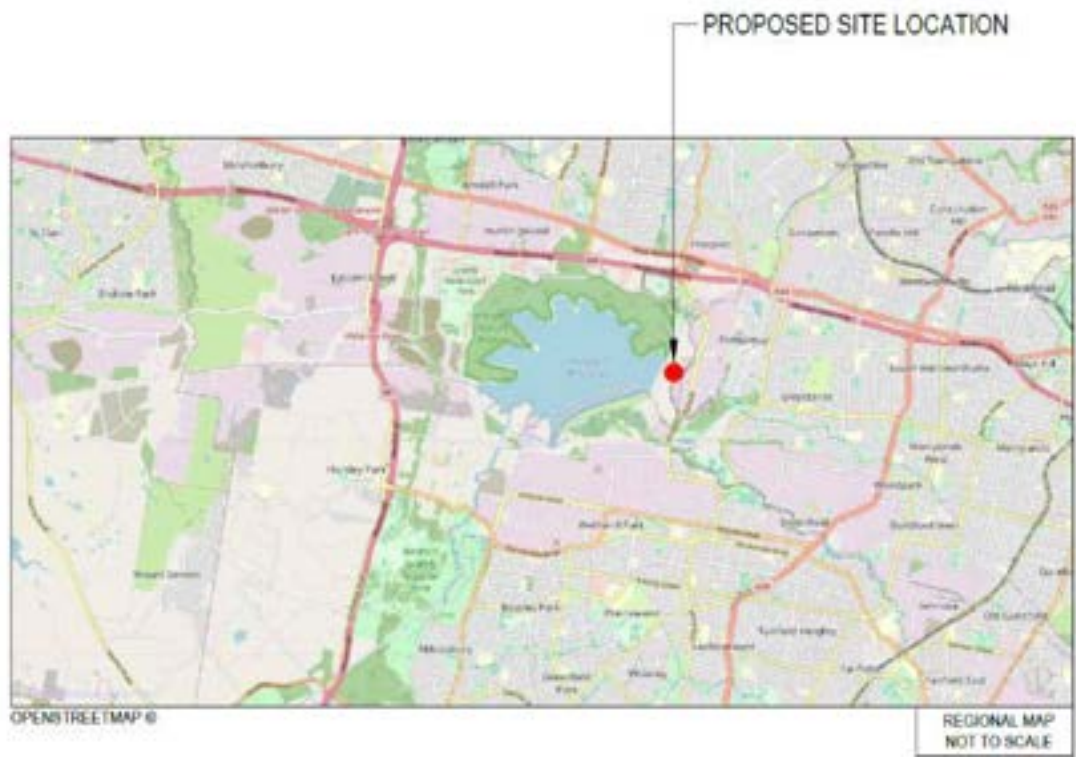
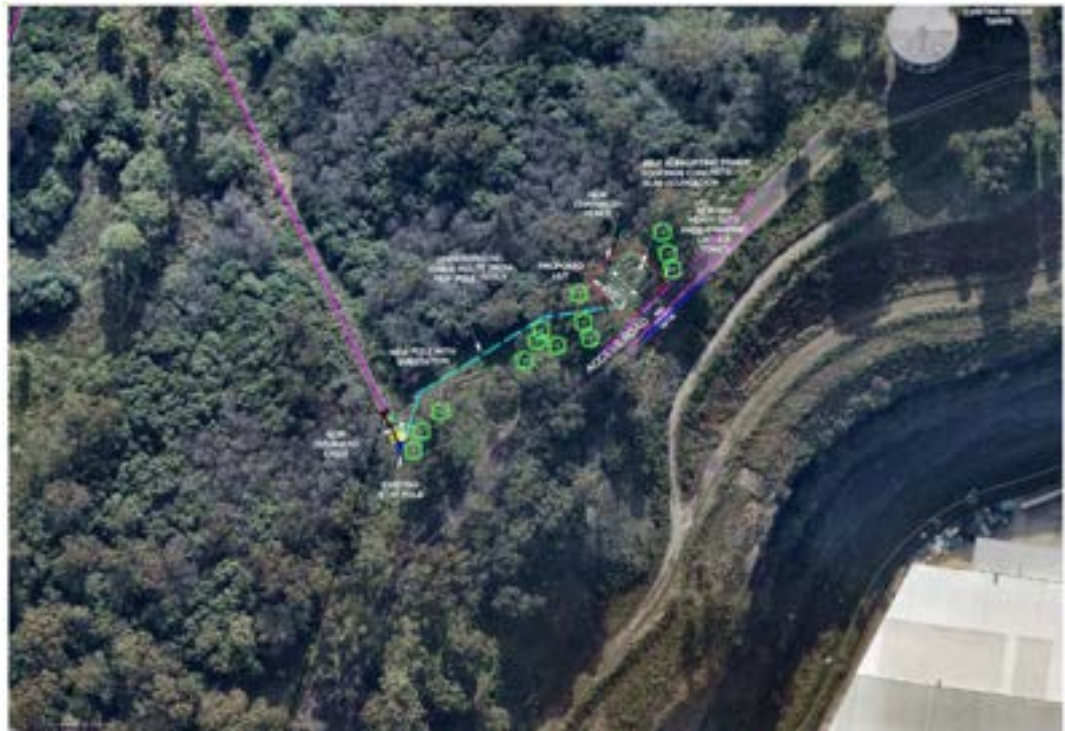


Figure 1 Regional setting of the project



CONCEPT DRAWING FOR INSTALLATION OF NEW TOWER AND EQUIPMENT HUT SCALE 1:1000

Figure 2 Site layout

In accordance with Part 5 of the NSW *Environmental Planning and Assessment Act 1979*, Endeavour Energy has prepared a draft Review of Environmental Factors (REF) for the proposal. The REF outlines the proposal description and justification (including benefits and objectives), an overview of the relevant legislative framework, consultation completed during the assessment phase, consideration of alternatives, the environmental impact assessment and mitigation measures to be applied during construction and operation of the proposal. A copy of the draft REF can be provided upon request.

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Should you require any further information in relation to this proposal or wish to arrange a meeting to discuss this proposal further, please contact me on 0423 362 556.

Yours faithfully,



Lia Zwolinski (on behalf of Roweena D'Souza of Endeavor Energy)
Environmental Scientist
EMM Consulting

Roweena Dsouza

From: Alder, David <David.Alder@casa.gov.au>
Sent: Friday, 11 November 2022 10:02 AM
To: Roweena Dsouza
Cc: Alan Collins
Subject: RE: Prospect Tower - CASA notification Is it a Controlled Activity [SEC=OFFICIAL]

OFFICIAL

F21/21097-37

Roweena

CASA does not object to the proposed tower.

The proposed tower plus antenna will be 170m Above Australian Height Datum (AHD) or approximately 62m high above ground level.

As described in the email chain below, Bankstown Aerodrome has advised “We do not feel it is a controlled activity given it is outside of our Airspace. We would however suggest an obstacle light only because of the location close to the inbound lane of entry.”

The tower is on a hill and is essentially coincidental with the turning point on the Bankstown Inbound VFR (Visual Flight Rules) route.



Therefore, CASA recommends that the tower should be lit with a medium intensity steady red obstacle light at the top of the structure. More information, including a description of medium intensity obstacle lights, can be found in the CASA Manual of Standards (MOS) Part 139 Aerodromes under Chapter 9 Division 4.

<https://www.legislation.gov.au/Details/F2020C00797>

(Incidentally, the US FAA AC 70/7460-1L ‘Obstruction Marking and Lighting’ advises that structures that exceed 61m AGL should be marked and/or lighted).

The CASA Advisory Circular AC 139. E-01v1.0 “Reporting of tall structures”.

<https://www.casa.gov.au/sites/default/files/2021-12/advisory-circular-139e-01-reporting-of-tall-structures.pdf> includes a link to the Airservices Tall Structure Vertical Obstacle Form. Alternatively, Airservices could be contacted by Email: vod@airservicesaustralia.com (for reporting when the tower is constructed).

Regards

David Alder

Aerodrome Engineer
Aerodrome Developments and Airspace Protection
Air Navigation, Airspace and Aerodromes Branch
p: 02 6217 1342 **m:** 0455 051 611
16 Furzer Street, Phillip ACT 2606
GPO Box 2005, Canberra ACT 2601
www.casa.gov.au



From: Alan Collins <alan.collins@SMAirports.com.au>
Sent: Thursday, 10 November 2022 12:54 PM
To: Alder, David <David.Alder@casa.gov.au>
Cc: Despotovic, Slavica <Slavica.Despotovic@casa.gov.au>
Subject: RE: Prospect Tower - CASA notification Is it a Controlled Activity [SEC=OFFICIAL]

Hi David,

We do not feel it is a controlled activity given it is outside of our Airspace.

We would however suggest an obstacle light only because of the location close to the inbound lane of entry.

Regards

Alan Collins

Aviation Compliance Manager



Email: alan.collins@SMAirports.com.au
Mobile: 0404 476 441
16A Airport Ave Bankstown Aerodrome NSW 2200
www.sydneymetroairports.com.au



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IMPORTANT: This e-mail, including any attachments, may contain personal, confidential or privileged information. If you are not the intended recipient, or if you have received this e-mail in error, please contact the sender immediately and delete all copies of this e-mail and attachments. If you are not the intended recipient, you must not use, reproduce, disseminate or disclose any part of this e-mail or attachments.



From: Alder, David <David.Alder@casa.gov.au>
Sent: Thursday, 10 November 2022 12:30 PM
To: Alan Collins <alan.collins@SMAirports.com.au>
Cc: Despotovic, Slavica <slavica.despotovic@casa.gov.au>

Subject: FW: Prospect Tower - CASA notification Is it a Controlled Activity [SEC=OFFICIAL]

Importance: High

OFFICIAL

Alan

To light or not to light? That is the question.



It would appear from an old OLS diagram I found in our system that it is just within the Outer Horizontal Surface. And at 170m AHD Is it a controlled activity?

If it is not a Controlled Activity, then it doesn't need to be referred to CASA (under 100m AGL).

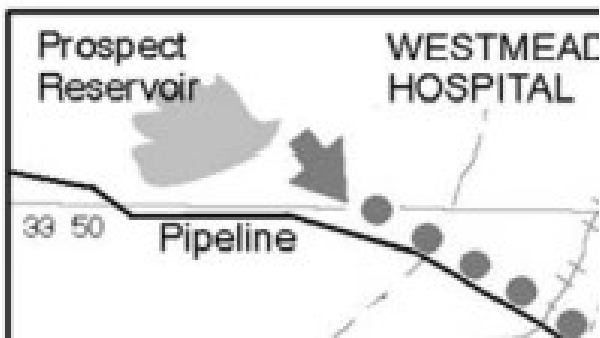
Whereas the two guyed masts to the north (on VTC below), appear to be 2 -3 m taller and unlit and probably just outside the Outer Horizontal Surface. Would it be incongruent if the new tower was lit and the guyed masts were unlit?



It is also close to the inbound VFR route. Would an obstacle light be a safety enhancement from an inbound night VFR perspective?

(From ERSA: "LANE OF ENTRY D539A and D539B a. Flights to YSBK from the North: Track FM Brooklyn Road Bridge to South Dural Tanks, and then the NE shore of Prospect Reservoir to join the Bankstown circuit.")

Also, would it be a safety enhancement for helicopters?



Thanks

David Alder

Aerodrome Engineer
Aerodrome Developments and Airspace Protection
Air Navigation, Airspace and Aerodromes Branch
p: 02 6217 1342 m: 0455 051 611
16 Furzer Street, Phillip ACT 2606
GPO Box 2005, Canberra ACT 2601
www.casa.gov.au



From: Roweena Dsouza <Roweena.Dsouza@endeavourenergy.com.au>
Sent: Wednesday, 9 November 2022 3:05 PM
To: Alder, David <David.Alder@casa.gov.au>
Subject: Prospect Tower - CASA notification
Importance: High

Hi David,

How are you?

I was given your contact by Allan Collins at Sydney Metro airport and I would like to seek your advice on the proposed Endeavour Energy 60m lattice tower and ancillary infrastructure near the Prospect Reservoir (William Lawson Drive, Prospect NSW 2148). The AHD at the tower is approx. 108m. The proposed tower is outside the OLS of Western Sydney Airport and Bankstown Airport.

Endeavour Energy currently have a similar tower at Huntingwood (51 Huntingwood Drive, Huntingwood NSW 2148), which Endeavour will no longer have access to due to the sale of Endeavour Energy's Huntingwood office/location and hence the need for a new communications tower. A suitable location has now been identified in the Sydney Water Reservoir Prospect property which is in close vicinity of Huntingwood site as well as being at a similar elevation. The communication tower is a critical component of our wide area network (WAN), which provides connectivity and redundancy for several depots, including both our IT and operations data centres and 100's of SCADA sites which are vital to keep Endeavour Energy power grid active and managed. The proposal at Prospect reservoir is the only suitable option (i.e. In Micro wave links line of sight & coverage point of view) which will be able to provide connectivity to 98 SCADA field assets and 1 electricity substation that are presently directly connected to the Huntingwood site.

The *State Environmental Planning Policy (Transport and Infrastructure) 2021 (NSW)* provides that the proposal may be carried out without development consent. Accordingly, an environmental (Review of Environmental Factors) is being prepared and the determination of the proposal will be undertaken in accordance with Part 5 of the *Environmental Planning and Assessment Act 1979 (NSW)* (EP&A Act) and in accordance with clause 171 of the *Environmental Planning and Assessment Regulation 2021 (NSW)*. Under Part 5 of the EP&A Act, Endeavour Energy is both the proponent and the determining authority for the proposal.

I have attached the design proposal for the proposal for your review. The proposal is time sensitive and we would really appreciate if you can review and advise us of any requirements.

The proposal is time sensitive and I would appreciate a response at your earliest convenience.

Please reach out if you need any further clarifications.

Kind regards

Roweena D'Souza
Environmental Specialist
M 0447 919 365

51 Huntingwood Drive
Huntingwood NSW 2148

endeavourenergy.com.au



Endeavour Energy acknowledges the traditional owners of country where we work and recognises their continuing connection to the land, waters and community. We pay our respects to the people, the cultures, and to the elders both past, present and emerging.

IMPORTANT:

This email may contain confidential or legally privileged information and may be protected by copyright. It remains the property of the Civil Aviation Safety Authority and is meant only for use by the intended recipient. If you have received it in error, please notify the sender immediately by reply email and delete all copies, together with any attachments.

Roweena Dsouza

From: Planning and Safeguarding <planning@wsaco.com.au>
Sent: Monday, 14 November 2022 10:10 AM
To: Roweena Dsouza
Subject: [SEC=OFFICIAL] Proposed Endeavour Energy Comms Tower

OFFICIAL

Hi Roweena,

I appreciate our discussion this morning.

As discussed, the site is located outside the Obstacle Limitation Surface for Western Sydney International (Nancy-Bird Walton) Airport.

Kind Regards,

Deanne Frankel
Planning Manager
Airport Planning and Design

+61 499 640 174
dfrankel@wsaco.com.au
PO Box 397 Liverpool NSW 1871



OFFICIAL

From: Deanne Frankel <dfrankel@wsaco.com.au>
Sent: Monday, 14 November 2022 10:05 AM
To: Planning and Safeguarding <planning@wsaco.com.au>
Subject: FW: [SEC=OFFICIAL] FW: Proposed Endeavour Energy Comms Tower

OFFICIAL

OFFICIAL

From: Roweena Dsouza <Roweena.Dsouza@endeavourenergy.com.au>
Sent: Thursday, 10 November 2022 10:15 AM
To: Deanne Frankel <dfrankel@wsaco.com.au>
Subject: RE: [SEC=OFFICIAL] FW: Proposed Endeavour Energy Comms Tower

Hi Deanne,

I appreciate your time looking into this for us and look forward to receiving your feedback.

Regards
Roweena

From: Deanne Frankel <dfrankel@wsaco.com.au>
Sent: Thursday, 10 November 2022 9:57 AM
To: Roweena Dsouza <Roweena.Dsouza@endeavourenergy.com.au>
Subject: [SEC=OFFICIAL] FW: Proposed Endeavour Energy Comms Tower
Importance: High

OFFICIAL

Hi Roweena,

Jett has forwarded your email to me for your review.

I will review and provide comments early next week.

Kind Regards,

Deanne Frankel
Planning Manager
Airport Planning and Design

+61 499 640 174
dfrankel@wsaco.com.au
PO Box 397 Liverpool NSW 1871



OFFICIAL

From: Jett Blake <jblake@wsaco.com.au>
Sent: Wednesday, 9 November 2022 5:19 PM
To: Deanne Frankel <dfrankel@wsaco.com.au>
Subject: FW: Proposed Endeavour Energy Comms Tower
Importance: High

Hi Deanne,

Roweena reached out to me, as my number had been passed onto her by another Endeavour Energy team member. Passing this one over to you.

Kind Regards

Jett Blake

From: Roweena Dsouza <Roweena.Dsouza@endeavourenergy.com.au>
Sent: Wednesday, 9 November 2022 4:57 PM
To: Jett Blake <jblake@wsaco.com.au>
Subject: Proposed Endeavour Energy Comms Tower
Importance: High

Hi Jett,

Thank you for your time today.

As discussed, I would like to seek WSAs advice on the proposed Endeavour Energy 60m lattice tower and ancillary infrastructure near the Prospect Reservoir (William Lawson Drive, Prospect NSW 2148). The AHD at the tower is approx. 108m. The proposed tower is outside the protected airspace of Western Sydney Airport.

Endeavour Energy currently have a similar tower at Huntingwood (51 Huntingwood Drive, Huntingwood NSW 2148), which Endeavour will no longer have access to due to the sale of Endeavour Energy's Huntingwood office/location and hence the need for a new communications tower. A suitable location has now been identified in the Sydney Water Reservoir Prospect property which is in close vicinity of Huntingwood site as well as being at a similar elevation. The communication tower is a critical component of our wide area network (WAN), which provides connectivity and redundancy for several depots, including both our IT and operations data centres and 100's of SCADA sites which are vital to keep Endeavour Energy power grid active and managed. The proposal at Prospect reservoir is the only suitable option (i.e. In Micro wave links line of sight & coverage point of view) which will be able to provide connectivity to 98 SCADA field assets and 1 electricity substation that are presently directly connected to the Huntingwood site.

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I have attached the design proposal for the proposal for your review. The proposal is time sensitive and I would appreciate if you can review and advise us of any requirements at your earliest.

Kind regards

Roweena D'Souza
Environmental Specialist
M 0447 919 365

51 Huntingwood Drive
Huntingwood NSW 2148

endeavourenergy.com.au



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Roweena Dsouza

From: James Quoyle <James.Quoyle@environment.nsw.gov.au>
Sent: Thursday, 19 January 2023 10:51 AM
To: Roweena Dsouza
Cc: Michael Ellis
Subject: RE: Comms Tower at Prospect (HMS1632)

Hi Roweena

Thank you for meeting with HNSW today.

The demonstration of the data and modelling to verify the accuracy of the visual impact from key significant areas across the site and from the top of Prospect Hill to the east provided a fuller understanding of the terrain and was effective.

Also, the proposed mitigation measure to reduce the visual impact by improving and rehabilitating the vegetation in this area of the site has benefit and this needs to be part of the application and in a form that may be included in Schedule 1 – APPROVED DOCUMENTS.

Based on your presentation, HNSW are of the opinion that the proposed tower in that location is not likely to materially affect the aesthetic values of the item. Therefore, the application will not be exhibited by HNSW and the approval will be completed under delegation.

What is required:

- Updated VIA
- Updated SoHI
- Updated architectural drawings (extracted from the REF)
- Details of the vegetation rehabilitation plan.

I will initiate a task request in HMS and this will stop the clock to enable you the time to consult with Sydney Water and prepare a vegetation rehabilitation plan. Could you provide an estimate of the time required to finalise this component?

Regards James

James Quoyle (he/him)
Senior Assessments Officer
Heritage NSW
Department of Planning and Environment

T 9873 8612 E james.quoyle@environment.nsw.gov.au

dpie.nsw.gov.au heritage.nsw.gov.au

4 Parramatta Square 12 Darcy Street Parramatta
Locked Bag 5020 Parramatta 2124

Working days Monday to Thursday



I acknowledge the traditional custodians of the land and pay respects to Elders past and present. I also acknowledge all the Aboriginal and Torres Strait Islander staff working with NSW Government at this time.

Please consider the environment before printing this email.

From: Roweena Dsouza <Roweena.Dsouza@endeavourenergy.com.au>
Sent: Wednesday, 18 January 2023 4:14 PM
To: James Quoyle <James.Quoyle@environment.nsw.gov.au>
Subject: RE: Comms Tower at Prospect (HMS1632)

Hi James,

We are preparing a detailed response to answer your queries. In light of time, I would like to have a quick call with you today to explain what I'm proposing and schedule a meeting to demonstrate visibility of the tower from all the viewpoints that have been suggested. This would really help your understanding of our proposal.

Please call me or let me know your thoughts.

Thanks
Row

From: James Quoyle <James.Quoyle@environment.nsw.gov.au>
Sent: Monday, 16 January 2023 11:26 AM
To: Roweena Dsouza <Roweena.Dsouza@endeavourenergy.com.au>
Subject: RE: Comms Tower at Prospect (HMS1632)

Hi Roweena
Would you have some time today to go through the submission and address any immediate queries?
Regards
James

From: Roweena Dsouza <Roweena.Dsouza@endeavourenergy.com.au>
Sent: Wednesday, 11 January 2023 3:56 PM
To: James Quoyle <James.Quoyle@environment.nsw.gov.au>
Subject: RE: Comms Tower at Prospect (HMS1632)

Hi James,

Sorry about that. I have resent the submission and if you have any issue downloading it, let me know. The combined file size is huge, but if there are particular documents you require, I can extract them from the submission and send them separately which would be easier to review.

In addition, as this project is at a critical stage for Endeavour Energy, I would appreciate if you have 10-15 minutes tomorrow so I can go through the submission with you and address any immediate queries that you may have?

Look forward to hearing from you.

Regards

Roweena D'Souza | Environmental Specialist

M 0447 919 365
51 Huntingwood Drive, Huntingwood NSW 2148.

Dharug Country



**Endeavour
Energy**

**POWER
together**



Endeavour Energy respectfully acknowledges the Traditional Custodians on whose lands we live, work, and operate and their Elders past, present and emerging.

From: James Quoyle <James.Quoyle@environment.nsw.gov.au>
Sent: Wednesday, 11 January 2023 3:26 PM
To: Roweena Dsouza <Roweena.Dsouza@endeavourenergy.com.au>
Subject: RE: Comms Tower at Prospect (HMS1632)

Hello Roweena

Could you resend this document – I thought I had downloaded it but cannot retrieve it - and I did not save my password because I didn't think I would need it.

Sorry for the inconvenience.

Regards

James

James Quoyle (he/him)

Senior Assessments Officer

Heritage NSW

Department of Planning and Environment

T 9873 8612 E james.quoyle@environment.nsw.gov.au

dpie.nsw.gov.au heritage.nsw.gov.au

4 Parramatta Square 12 Darcy Street Parramatta
Locked Bag 5020 Parramatta 2124

Working days Monday to Thursday



I acknowledge the traditional custodians of the land and pay respects to Elders past and present. I also acknowledge all the Aboriginal and Torres Strait Islander staff working with NSW Government at this time.

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From: Roweena Dsouza <Roweena.Dsouza@endeavourenergy.com.au>
Sent: Monday, 9 January 2023 10:38 AM
To: James Quoyle <James.Quoyle@environment.nsw.gov.au>
Subject: Comms Tower at Prospect (HMS1632)

Your files are ready for pickup

The following file(s) have been sent to you from
Roweena.Dsouza@endeavourenergy.com.au:

EE Letter to HNSW _22122022.pdf 62.75 MB

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The secure message expires on 23/1/23 10:38:09 AM

If the link above does not open, please copy and paste the following URL into your browser:
<https://mft.endeavourenergy.com.au/register?token=c386b9e2-68b7-4044-8a9d-b61b983c306a>

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authority states them to be the views of the NSW Office of Environment, Energy and Science.

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Roweena Dsouza

From: James Quoyle <James.Quoyle@environment.nsw.gov.au>
Sent: Monday, 12 December 2022 5:37 PM
To: Roweena Dsouza; Michael Ellis
Cc: Emily@Heritage21; Verity Blair; Colin Brown; John Lucich; Hooman Goodarznia; Troy Kidd; philip.bennett@sydneywater.com.au; POLLOCK, CHRISTIAN; Simon Lawton
Subject: , and RE: Prospect Reservoir - Endeavour Tower - Discussion with Heritage NSW

Hello Roweena

Thank you for your email, HNSW look forward to working with you to arrive at the best heritage outcome for this site. We are generally available to go through your updates to determine any additional information you will require. However, our availability for a quick discussion later next week is very limited after Tuesday, and prior to that we are both very busy finishing off as much as we can prior to the shutdown. Please make your request early to avoid disappointment.

A question I did not raise at our meeting but would like a response: As you know there is another application under consideration for a proposed monopole not far from your proposed site – while assessing the impact I was struck by the comment by the applicant:

'The high ground elevation of the proposed site and the topography of the surrounding area, provide an opportunity for us to propose a 35m slender monopole instead of a taller lattice tower to ensure the views towards the ridgeline are protected'

1. Is a monopole a viable option for what you require?
2. When will I receive a copy of the REF?
3. Could you confirm the LGA for the site is Cumberland City Council. Have you informed them of your proposal?

James Quoyle (he/him)
Senior Assessments Officer
Heritage NSW
Department of Planning and Environment

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dpie.nsw.gov.au heritage.nsw.gov.au

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Working days Monday to Thursday



I acknowledge the traditional custodians of the land and pay respects to Elders past and present. I also acknowledge all the Aboriginal and Torres Strait Islander staff working with NSW Government at this time.

Please consider the environment before printing this email.

From: Roweena Dsouza <Roweena.Dsouza@endeavourenergy.com.au>
Sent: Monday, 12 December 2022 5:21 PM
To: James Quoyle <James.Quoyle@environment.nsw.gov.au>; Michael Ellis <michael.ellis@environment.nsw.gov.au>
Cc: Emily@Heritage21 <emily@heritage21.com.au>; Verity Blair <vblair@emmconsulting.com.au>; Colin Brown <Colin.Brown@endeavourenergy.com.au>; John Lucich <John.Lucich@endeavourenergy.com.au>; Hooman Goodarznia <Hooman.Goodarznia@endeavourenergy.com.au>; Troy Kidd <Troy.Kidd@endeavourenergy.com.au>; philip.bennett@sydneywater.com.au; POLLOCK, CHRISTIAN <CHRISTIAN.POLLOCK@sydneywater.com.au>; Simon Lawton <SIMON.LAWTON@endeavourenergy.com.au>
Subject: RE: Prospect Reservoir - Endeavour Tower - Discussion with Heritage NSW

Hi James and Michael,

Thank you for meeting with us on 5th Dec to discuss our submission for the proposed communication tower at Prospect. We thank you for your feedback and we are working towards updating the submission to the Heritage Council.

I've summarised the key action items, meeting notes and our proposed solution that you are seeking to be addressed in Endeavour's updated submission:

- 1) Heritage Council requires more detail on the various site options considered and assessed by EE against the technical assessment criteria. EE advised that they have exhausted all options for a practicable technical solution for an alternate communications facility to that at Huntingwood and presented the site selection process including options analysis with Sydney Water.
Action: EE will present an updated option analysis for each assessed site. This includes revisiting the Site 3 option adjacent the carpark near the picnic area (as suggested by Sydney Water at the meeting) and providing better visuals for each site (to include elevation) within the curtilage.
- 2) Heritage Council questioned the validity of the photomontages.
Action: EE to confirm the accuracy of the photomontages to Heritage Council.
- 3) Heritage Council advised the application will trigger advertisement per s61 of the Heritage Act. Heritage Council will need to publish the application and associated documents for 21 days if its advertised after the Christmas break or for longer than 21 days, to account for Christmas shutdown, if its advertised prior to Christmas. Heritage Council require 60 days, from advertisement to complete a review of the application. The advertisement will also include notifying the LALC.
Action:
 1. EE notes the advertising timeframe and is agreeable to this.
 2. EE to provide detailed drawings showing the proposed tower in relation to the existing site infrastructure and setting (including the Sydney Water tanks) using survey data. A plan showing any cut and fill required for the tower site will also be provided.
 3. EE to submit updated SOHI, with updated VIA, option analysis to include the site 3 option near the picnic area at the elevated carpark and updated design drawings.
- 4) EE advised that they are in discussions with NSW Telco Authority offering the latter to co-locate on the EE structure. NSW TA are keen to co-locate but have their reservations as they need confidence of EE obtaining Heritage approval and confirmation on tower build by April 2023. Co-location of NSW TA on EE tower would reduce the infrastructure footprint at the site.
Action: All to note

Please let me know if I have missed anything or if you have any comments or require more information on the points above.

We are aiming at finalising our updated submission and drawings early next week. Prior to submitting the updated SOHI to the Heritage Council, we would appreciate an opportunity to go through our updates to determine any

additional information you will require and would like to know if you have any availability for a quick discussion later next week?

Looking forward to hearing from you.

Regards

Roweena D'Souza | Environmental Specialist

M 0447 919 365
51 Huntingwood Drive, Huntingwood NSW 2148.

Dharug Country

endeavourenergy.com.au |    



Endeavour Energy respectfully acknowledges the Traditional Custodians on whose lands we live, work, and operate and their Elders past, present and emerging.

-----Original Appointment-----

From: Emily@Heritage21 <emily@heritage21.com.au>

Sent: Tuesday, 29 November 2022 12:57 PM

To: Emily@Heritage21; james.quoyle@environment.nsw.gov.au; michael.ellis@environment.nsw.gov.au; Roweena Dsouza; yblair@emmconsulting.com.au

Subject: Prospect Reservoir - Endeavour Tower - Discussion with Heritage NSW

When: Monday, 5 December 2022 1:00 PM-2:00 PM (UTC+10:00) Canberra, Melbourne, Sydney.

Where:

Microsoft Teams meeting

Join on your computer or mobile app

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Meeting ID: 479 724 401 542

Passcode: f3RPuA

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Appendix E VIA

Visual Impact Assessment

Review of Environmental Factors

60 m Communications Tower in Prospect Reservoir




3/02/23

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Document Approval

To the best of the knowledge of the below signatories, this REF has been prepared to be neither false nor misleading and is in accordance with The Code of practice for Authorised Network Operators approved under section 171 of the Environmental Planning and Assessment Regulation 2021.

Prepared by	Verity Blair and Tadd Andersen, EMM Consulting
Signed	
Date	21/12/ 2022, 24/01/23
Title	Associate Director, EMM Consulting Pty Ltd
Reviewed by	Dave Kelly, EMM Consulting
Signed	
Date	24/1/2023
Title	Associate Director, EMM Consulting Pty Ltd
Approved By	Peter Oxnam
Signed	
Date	07/2/2023
Title	Environmental Services Manager, Endeavour Energy

Document Control

Revision	Prepared by and Company Name	Date	Reviewed by and Company Name	Comments
V1	Verity Blair EMM Consulting Pty Ltd	16 December 2022	Roweena D'Souza Endeavour Energy	Review comments to be addressed
V2	Verity Blair EMM Consulting Pty Ltd	21 December 2022	Peter Oxnam Endeavour Energy	Approved
V3	Tadd Anderson EMM Consulting Pty Ltd	24 January 2023	Roweena D'Souza Endeavour Energy	Final review
V4	Lia Zwolinski EMM Consulting Pty Ltd	31 January 2023	Peter Oxnam Endeavor Energy	Final approval

1 Introduction

1.1 Background

Endeavour Energy (EE) is an electricity distribution system operator servicing over 2.5 million people living and working across Sydney's Greater West, the Blue Mountains, the Southern Highlands, Illawarra and the South Coast of New South Wales (NSW).

In March 2023 the main EE office in Sydney will move from its current location at Huntingwood to a new premises in Parramatta. EE have a communications tower within the Huntingwood site and it is a critical component of EE's wide area network (WAN). The tower provides connectivity and redundancy for several depots, including both EE's Information Technology and Operational Technology data centres as well as for Supervisory Control and Data Acquisition (SCADA) sites which are vital to keep EE's power grid active and managed. As a result of this move, the existing EE communications tower will no longer be accessible and there is a need for a new communications tower.

EE have considered various options for a practicable solution and the site adjacent to the Sydney Water tanks at Prospect Reservoir was deemed as a suitable location for this purpose in terms of microwave links, line of sight and coverage which can provide connectivity to 98 SCADA field assets and one substation that are currently directly connected to the Huntingwood site.

Key features of this proposal include installation of:

- a 60m free-standing heavy duty lattice tower with self-supporting concrete footings;
- an external ladder, approximately 57m in height;
- a new equipment shelter (6m by 3m) on concrete footing foundations;
- a new 600mm cable tray support system from the tower to the equipment hut and support posts;
- a compound area 15m by 15m around the tower and associated infrastructure, including a 2.8 m high security fence with 4.8m wide double access gate;
- a new 17m pole with substation and overhead lines; and
- power supply works and underground cabling.

No trees are required to be removed as part of this proposal.

The site is located on the southern side of Reservoir Road and is part of the larger Prospect Reservoir site. The site is located within the curtilage of two items on the NSW State Heritage Register:

- Prospect Reservoir and surrounding area (item no. 01370); and
- Prospect Reservoir Valve House (item no. 01371).

It is also located within proximity to Veteran Hall – House remains (item no. 01351).

The closest residences to the site are located in the suburb of Pemulwuy, which is approximately 1 km east of the site and across Prospect Highway. An industrial area is located immediately east of the site along the Prospect Highway. The industrial area extends north along the Prospect Highway until its junction with the Western Motorway. George Maunder lookout is located approximately 600 m south-west of the site, in addition to the picnic area of Walder Park and Prospect Park.

As the proposal is located on land that is within the curtilage of two items on the NSW State Heritage Register, section 60 of the NSW *Heritage Act 1977* is triggered and approval from Heritage Council of NSW (HNSW) is required. EE submitted a Statement of Heritage Impact (SOHI) to HNSW in October 2022 and an updated version in November 2022 and on 31 January 2023.

1.2 Purpose of this report

This Visual Impact Assessment (VIA) has been prepared by EMM on behalf of EE. The purpose of this report is to provide an assessment of the visual impact of the proposed tower on key heritage-listed items in response to the clarifications sought by HNSW, as provided below, in addition to the potential visual impact to nearby recreational and residential areas.

The reservoir is identified as being of state significance as aesthetically significant as a picturesque site (SoS). The proposed erection of a 60m high electrical tower at a high point within the picturesque landscape will impact these values.

- *The impact on the picturesque landscape identified in the SoS is not adequately addressed and requires more consideration, details and with options explored.*
- *A Visual Impact Assessment (VIA) of the proposed development is required. The views are to be located on a plan to indicate the location from which they were taken and why that location is significant.*
- *Include a photomontage of the proposed development as seen from significant locations.*

1.3 Applicable environmental planning instruments and guidelines

The proposal requires assessment and approval under Division 5.1, section 5.5 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

Clause 171(2) of the NSW Environmental Planning and Assessment Regulation 2021 requires consideration of environmental factors, including:

- d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality
- e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations

This report also considers the Guidelines for Division 5.1 assessments (DPE June 2022). These guidelines support the assessment of environmental effects noted in Clause 171(2) of the EP&A Regulation.

2 Methodology

The following is an overview of the methodology adopted for the visual assessment.

2.1 Existing visual environment

2.1.1 Desktop analysis

A review of key planning requirements, policies and guidance was undertaken in relation to the visual environment within the heritage curtilage. The review identified elements outlined in legislation, policy and planning documents relevant to the visual character of the area. Existing environment data and project information was gathered and reviewed, including:

- project design information and site photographs;
- topography, land use, and vegetation maps;
- Google Earth and Google Street View; and
- LiDAR (light detection and ranging) data.

Using this data, a preliminary assessment of the visual environment was undertaken to inform the site inspection.

2.1.2 Site Inspection

Site inspections were undertaken by an environmental specialist from EMM consulting on 12 August and 13 November 2022 and 23 January 2023. The purpose of the inspections was to:

- identify visual receiver locations;
- inspect the site and appreciate views to/from sensitive heritage items, nearby publicly accessible land and residential areas that may have potential views towards the tower;
- inspect publicly accessible locations identified during the desktop analysis as likely to provide views of the proposal, including roads, footpaths, infrastructure, etc; and
- take photographs for preparation of photomontages.

2.1.3 Definition of existing visual environment

An assessment of existing visual conditions was undertaken to establish the key views, topography, vegetation and other visual features relevant to the proposal. Refer to Section 4 for an assessment of the existing visual environment.

2.1.4 Viewpoint selection

Visual receivers were considered in terms of the views they are likely to have of the proposal tower from within and outside the heritage curtilage and residential areas, including consideration of any key vantage points, such as recreational picnic areas and lookouts.

Refer to Section 5 for viewpoint locations.

2.2 Impact assessment

2.2.1 Visual effects

The evaluation of potential impacts on the visual environment is based on the sensitivity of the viewpoint (and the visual receiver it represents) to change, and the magnitude of change that is likely to occur. The sensitivity of each viewpoint is considered to be dependent on:

- the importance of the view, its existing scenic qualities and the presence of other existing man-made elements in the view; and
- the type of visual receiver and their likely interest in the view.

The assessment considers the likely impacts of the project. To measure the visual sensitivity and the visual effect of the site, specific locations known as 'viewpoints' are chosen as representative views. In this instance, the viewpoints have been chosen to demonstrate any visual impacts on heritage, residential and recreational land uses and road users. The effect on a view depends on factors such as the extent of visibility, degree of obstruction of existing features, degree of contrast with the existing view, angle of view, duration of view and distance from the project. The steps that were undertaken to assess the visual effects of the project included:

- identifying and mapping viewpoint locations close to key heritage items and residential areas; and
- undertaking an assessment of visual effects, comprising:
 - sensitivity of visual receivers to proposed change and value attached to views; and
 - magnitude of visual effect, based on: size or scale of change; geographical extent of effects, and duration and reversibility of effects.

An assessment was undertaken of the overall level of significance of the visual effects from the project in relation to the existing view.

2.3 Assumptions

This VIA was originally prepared in response to comments from Heritage NSW and therefore assesses the visual effects the proposal will have on heritage listed items including Prospect Reservoir and curtilage, the Valve House and former Veterans Hall (refer Figure 7) as agreed with Heritage NSW. The original VIA provided to Heritage NSW is contained within Appendix D of the REF.

It is assumed that the visual sensitivity is high within the heritage curtilage, given the proximity of heritage items to the proposed tower. This high visual sensitivity triggers the need for this VIA in order to determine the level of visual impact of the proposed tower.

Further, it is noted that impacts associated with the construction of the proposed tower and associated infrastructure have not been as assessed as they are considered temporary in nature.

The VIA has since been updated to also consider potential visual impacts to the closest residential area within the suburb of Pemulwuy (refer VP7 and VP8 of Figure 7).

2.3.1 Photography

Photographs were taken from the eight viewpoints shown in Figure 7. Photomontages were prepared using WindPro, a program designed to accurately generate photomontages using digital terrain data, 3D models of the proposed tower and site photographs. In order to validate the photomontages, a program called Neara was used to create a similar looking tower and assess the location of the tower from the three viewpoints using LIDAR data.

3 Project Description

3.1 Location of the study area

The proposal site is located off William Lawson Drive, Prospect on the southern side of Reservoir Road and is part of the larger Prospect Reservoir site (refer figures 1 and 2). The site is located on part of Prospect Hill in the vicinity of existing water tanks to its northeast and within Lot 304 Deposited Plan (DP) 1122291. It is noted that the larger Prospect Hill site takes in a larger area, including the former quarry and second summit to the east. For the purposes of this report, the site location is referred to as Prospect Hill and is defined as the western summit of the wider Prospect Hill site. Prospect Reservoir and surrounds is located across Cumberland, Fairfield and Blacktown Local Government Areas (LGAs), while the proposal site is located solely within Blacktown LGA (refer Figure 3). The proposal site is located at the top of Prospect Hill, on the second highest summit known as Water Tower Hill, which is located within the curtilage of the Prospect Reservoir. Water Tower Hill is not accessible to the public and access to the tower would be via an existing gated access track.



Figure 1: Aerial view of the Prospect reservoir site highlighted in yellow (source: sixmaps).

Sensitive visual receivers in the area include recreational users accessing the picnic, open space and lookout areas and Sydney Water staff working in the Sydney Water offices. There is only a relatively small area of the reservoir and surrounds, in the south-east corner, that is accessible to the public, due to access restrictions for Prospect Nature Reserve and some Sydney Water land. The closest residences are located in the suburb of Pemulwuy, approximately 1 km east of the site and across the Prospect Highway.



Figure 2: Location of proposal within Blacktown LGA wherein LGA extent is shown by a black border (source: Blacktown City Council)

3.2 Site layout components

Key components that will need to be constructed and installed are listed below:

- a 60 m free-standing heavy duty lattice tower with self-supporting concrete footings (constructed in matt galvanised steel to reduce reflectivity);
- an external ladder, approximately 57 m in height;
- a new equipment shelter (6 m by 3 m) on concrete footing foundations;
- a new 600 mm cable tray support system from the tower to the equipment hut and support posts;
- a compound area 15 m by 15 m around the tower and associated infrastructure, including a 2.8 m high security fence with 4.8 m wide double access gate;

- a new pole with substation and overhead lines; and
- power supply works and underground cabling.

The overall site plan in Figure 3 shows the location of the tower in relation to the existing water towers and quarry edge, while Figures 5 and 6 show detailed elevations of the tower and associated infrastructure.



Figure 3 - Overall Site Plan

4 Existing Visual Landscape

The area surrounding Prospect Reservoir is characterised by a number of land uses including Eastern Creek Raceway and Western Sydney Dragway to the north and Raging Waters theme park to the west. A former quarry now developed as an industrial park adjoins the east while Austral bricks and other various industrial development is located to the south (refer Figure 4). In addition, there are a number of guyed masts, towers and electricity pylons in the surrounding area.

It is noted that there are no permanent residential dwellings in close proximity to the site for the proposed tower, with the closest residences located in the suburb of Pemulwuy.



Figure 4 - Overview of the key land uses in the vicinity of the proposal

Prospect Nature Reserve occupies the northern and western area immediately surrounding Prospect Reservoir. It is noted that this nature reserve is not publicly accessible and views into the site from the local road network and adjoining land are very limited given Prospect Nature Reserve and other existing vegetation that surrounds the reservoir. There are no views to the proposed tower location from publicly accessible area on the northern, western and south western edges of Prospect Reservoir.

Land within the Prospect Reservoir heritage curtilage is characterised by open grassed areas, with scattered picnic spots, stands of mature vegetation (primarily Cumberland Plain Woodland) and a number of State heritage-listed buildings associated with the reservoir including the Prospect Reservoir Valve House. There are also a few single-storey modern buildings that house Sydney Water site offices. The visual catchment of Prospect Reservoir is limited primarily to views from publicly accessible areas, including William Lawson Drive, picnic areas in the south-east corner of the Reservoir and picnic areas/lookouts on Prospect Hill.

The site for the proposed tower is a gently sloping grassed area surrounded by mature vegetation, predominantly comprised of Eucalyptus species, which are between 15 m and 25 m in height. There are a number of picnic areas and car parks at various levels on Prospect Hill and around the edge of the reservoir. George Maunders lookout affords views over the reservoir itself. It is noted that there are two large water tanks/reservoirs at the top of Prospect Hill, which are around 20 m in height. Views of these tanks from within

Prospect Reservoir curtilage are very limited given the topography of the site and the mature vegetation along the ridgeline and further down Prospect Hill.

Views to the western side of Prospect Hill comprise a vegetated slope, with power lines visible. Views to the south of Prospect Hill are steeper, with vegetation above the wall of a disused quarry.

While the reservoir and northern vegetated areas provide a 'naturalistic' landscape with remnant bushland, it sits within an urban context and this is demonstrated by visual elements including the rides and infrastructure of Raging Waters theme park and other communications towers that make up part of the general urban landscape.

There is one public lookout (George Maunder Lookout) located within the curtilage of Prospect Reservoir. Views from this lookout are predominantly over the reservoir towards the west and south-west whereas the proposed tower is towards the northeast of this lookout. In addition, the undulating landform character and tree cover surrounding the proposed tower, effectively screen views of the proposed tower, thereby preserving the scenic quality of views from the lookout.

In order to identify the visual character of the area, a number of photos were taken from various viewpoints (refer Figure 7) within the State Heritage item curtilage and from two highpoints on Prospect Hill Lookout, adjacent to the industrial park, looking towards the proposed tower location. The photos demonstrate that this location is characterised by open, grassy fields that are lined with trees that obscure distant views. These photos are provided in Attachment B.

5 Visual impact assessment

The proposed tower is located towards the high point within the landscape to maximise line of site and coverage. Given that the tower is 60 m in height, there is a potential for a visual impact on the surrounding area, including key heritage items within the heritage curtilage (including recreational areas within the curtilage, such as George Maunder Lookout and picnic areas at Prospect Park and Walder Park) and residences in the suburb of Pemulwuy.

In order to address the effect of the proposed tower on the relevant heritage-listed items and residences within the suburb of Pemulwuy an assessment of the visual effects the proposed tower will have has been undertaken.

The predominant views of the tower will be from the adjoining industrial site to the northeast, with limited vegetation between the tower and the cliff edge above the industrial estate. Notwithstanding, the character of the industrial area, with large scale warehouses, means that the visual impacts from this viewpoint will not be significant or out of character.

The sections provided in figures 5 and 6 below (also included in Attachment A) show how the topography of the land and existing mature vegetation screen views of the tower when viewed from William Lawson Drive and the edge of the reservoir.

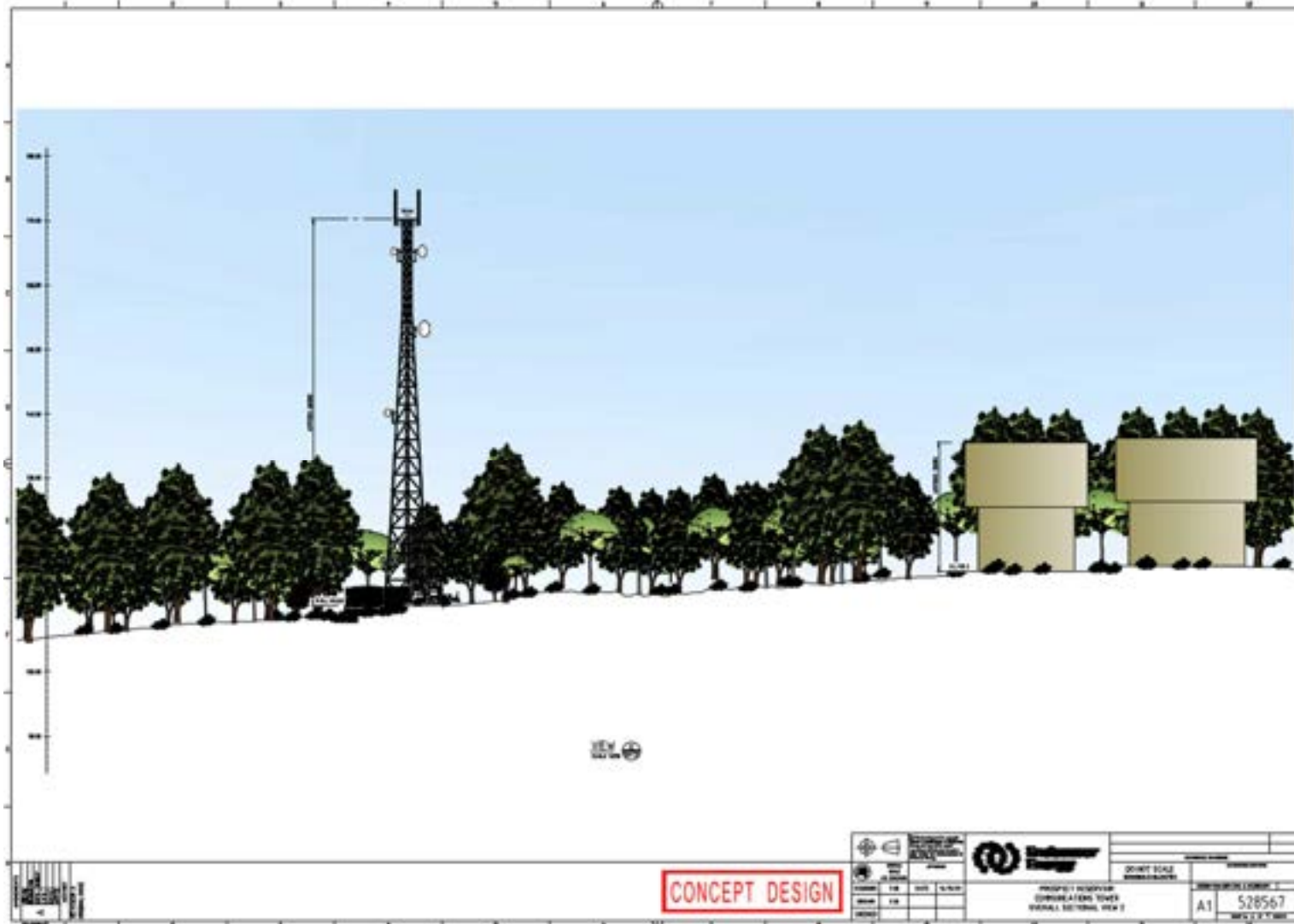


Figure 5 - Section showing proposed tower and existing water towers (refer Figure 3 for section location)

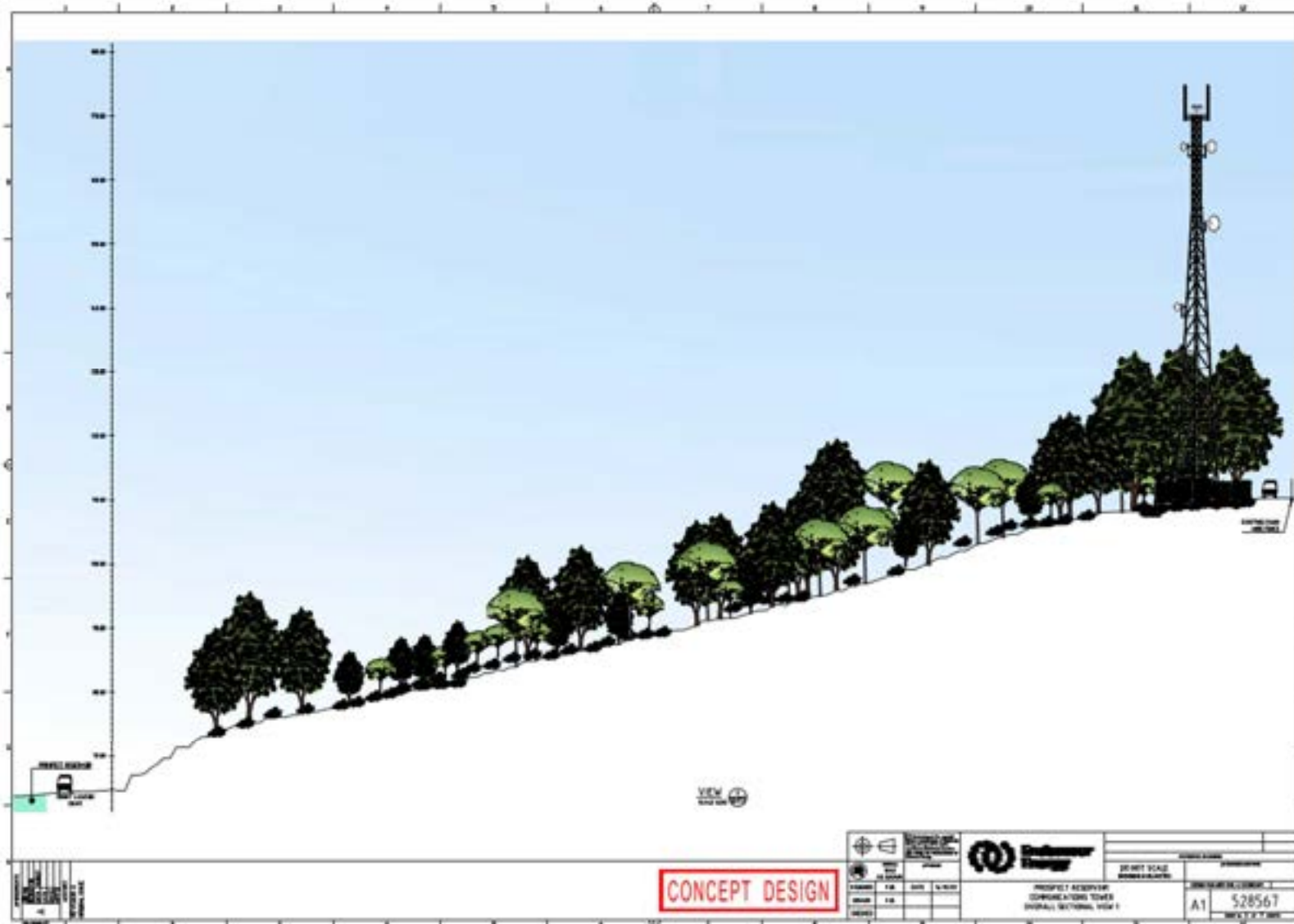


Figure 6 - Section showing proposed tower and William Lawson Drive (refer Figure 3 for section location)

In order to assess the visual impact on key heritage items within the curtilage of Prospect Reservoir, Endeavour Energy met with Heritage NSW on 19th January 2023 (meeting notes in Attachment C) and presented the Neara model and key viewpoints. This VIA captures all the viewpoints discussed at the meeting with the following exception/deviations:

- 1) The areas west of the reservoir were heavily vegetated with limited access. Based on site inspections, there were no locations with views to Prospect Hill and the proposed tower along the western and northern sides of the reservoir. Therefore, there were no viewpoints chosen in these areas.
- 2) Prospect Lookout – during the meeting the viewpoint discussed was within the north western end towards Clunie Ross Street on land to which the Plan of Management, Cumberland Council March 2019 applies. During the site visit to capture photos for the photomontage at this point, it was noticed that the dense vegetation, industrial area and the steep slope on the western side of a ‘pathway’ from Clunie Ross St to the high point screened most of the views past the ridgeline. It was only at a specific point on the hilltop that had some view towards the proposed tower and this point is captured as Viewpoint 7 in this report.

Eight photomontages were prepared to demonstrate the visibility of the tower. These were based on selected viewpoints in discussion with HNSW, which are locations chosen to represent the view of a development from that area. The VIA has been updated to further consider impacts from a publicly accessible viewpoint with the inclusion of VP8 (refer Figure 7).

Five viewpoints illustrate views from within the heritage curtilage. These are views from locations with public views or from heritage items. The remaining three viewpoints were from further afield in the surrounding community. These were chosen due to their significance as a lookout location and accessibility to people. Figure 7 indicates the locations of the viewpoints.

The photomontages were prepared using WindPro, a specific visual impact modelling program and a 3D model of the proposed tower. In order to validate the photomontages, a program called Neara was used to create a similar looking tower and assess the location of the tower from three viewpoints using LIDAR data. Both the original photomontages and Neara validations are shown as part of the analysis for viewpoints 1-8 below.

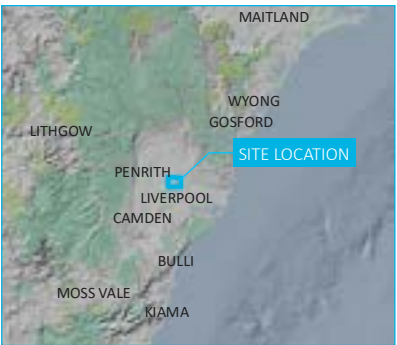
As a tower structure is not available in Neara, a pole that represents the tower, and with dimensions similar to that of the proposed tower was used:

- pole base: 650 cm
- pole top: 150
- pole height: 60 m
- pole material (the aesthetic look): steel

For the LiDAR accuracy specs below are the contract accuracy requirements for the full network scan.

	Vertical accuracy 95% confidence	Horizontal accuracy 95% confidence
LiDAR surveys	+/- 0.15 m	+/- 0.20 m

	Relative accuracy 95% confidence
LiDAR surveys	+/- 0.05 m



- KEY**
- Proposed Tower Location
 - ⊕ Viewpoint
 - ▭ Prospect Reservoir and surrounding area as listed on the SHR (no. 01370)
 - ▭ Prospect Reservoir Valve House as listed on the SHR (no. 01371)
 - ▭ Veteran Hall – House Remains as listed on the SHR (no. 01351)
 - Major road
 - Minor road
 - Named watercourse
 - ▭ Named waterbody
- INSET**
- ▭ NPWS Reserve

Viewpoint locations

Endeavor Energy
Prospect Tower
Figure 7



\\lemmsvr1\EMM\2022\E220571 - Endeavour Energy Environment Support\GIS\02 - Maps\G007 - Viewpoints\Locations_20230203_02.mxd 3/02/2023

Source: EMM (2023); ABS (2021); DFSI (2017, 2020); GA (2011); Metromap (2023)

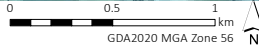




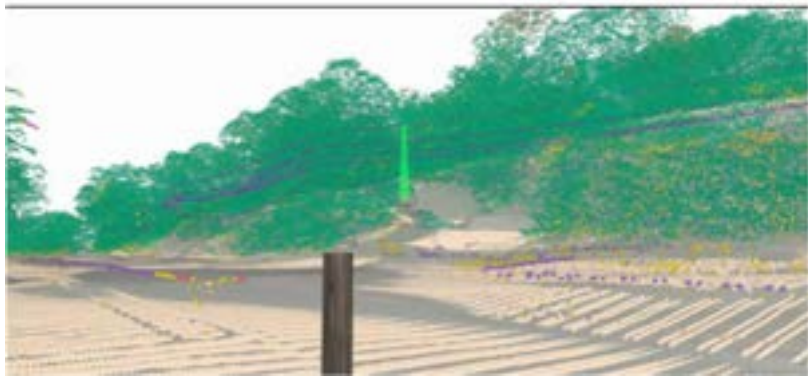
Table 1 – Viewpoint 1 Photomontage



Criteria	Comments
Location	Located just outside the heritage curtilage on William Lawson Drive. It is approximately 400 m from the proposed tower and located just outside the heritage curtilage. This view south-east towards the proposed tower is representative of views to site users driving to the reservoir edge and picnic areas along William Lawson Drive.
Description of existing view	The existing view is characterised by open grassed areas on either side of William Lawson Drive, with mature vegetation on the slopes of Prospect Hill enhancing the natural quality of the view. The view is important as it forms part of the main public access to Prospect Reservoir however the presence of power-lines, chain wire fencing and Sydney water offices and vehicles (parked on the road edge) diminish the 'natural' quality of the view. Given this, it is considered that this view has a low to medium value.
Anticipated change to view	The upper portion of the tower is visible from viewpoint 1, with existing vegetation and the slope of the land screening views to the lower part of the tower and associated infrastructure. While the view is scenic in nature, the proposed tower will not significantly impact any specific heritage items. The anticipated change to viewpoint 1 would be negligible. While part of the proposed tower would be visible on the treed ridgeline, it does not impact any heritage items (the reservoir is not visible from this point, nor any of the other key heritage items), the proposed tower would be a distant feature and the natural quality of the landscape is already impacted by man-made infrastructure.
Validation of photomontage using Neara.	
Significance of impact	Given the location of viewpoint 1 outside the heritage curtilage and the interruption of the natural landscape by existing man-made infrastructure, it is not considered that this viewpoint is particularly sensitive to change.

Mitigation measures	<p>The landscape plan (Figure 9) proposes planting native, fast growing trees with potential to bear hollows in the future along the William Lawson Drive proposed planting area. This would assist with quicker screening and also in the long term contribute to wildlife corridors and provide habitat for native fauna.</p> <p>The plan also identifies a Bush Regeneration area in the vicinity of the proposed tower to remove exotic shrubs which are competing with the native tree species. This would assist in growth of the native trees improving overall vegetation quality and in further screening.</p>
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Table 2 - Viewpoint 2 Photomontage

	
Criteria	Comments
Location	This photomontage is taken from just outside the gate near the existing submerged tower within the reservoir, at the base of the road up Prospect Hill looking north-east towards the proposed tower. The red arrow indicates the location of the top of the tower.
Description of existing view	This viewpoint is publicly accessible and while there are elements of modern infrastructure, such as power lines and road signs, the view incorporates heritage elements such as the former residential dwelling, post-and-rail fencing and palm trees along the road edge. The mature vegetation on the slopes of Prospect Hill lends a natural quality to the view.
Anticipated change to view	The anticipated change to this view is negligible as the topography of the land and existing vegetation mean that any views of the tower from this viewpoint are obscured.
Validation of photomontage using Neara.	
Tower highlighted (for reference only) in green to indicate location	


Tower is obscured by the vegetation and topography	
Significance of impact	The significance of change in this location, resulting from the proposed tower, is considered to be negligible, as views of the tower are screened by the vegetation and topography.
Mitigation measures	None required.

Table 3 - Viewpoint 3 Photomontage



Criteria	Comments
Location	This photomontage is taken from William Lawson Drive in the vicinity of the Prospect Reservoir Valve House looking north-east towards the proposal. The red arrow indicates the location of the top of the tower.
Description of existing view	This view is important as receivers see the heritage-listed Valve House in the foreground, with the vegetated Prospect Hill in the background. Views to the opposite site of William Lawson Drive are quite natural in character, comprising the open grassed slope below the reservoir. It is considered that this view is of high value aesthetically given the unusual and detailed design of the Valve House with the vegetated backdrop of Prospect Hill.



Anticipated change to view	The anticipated change to this view is negligible as the topography of the land and existing vegetation mean that any views of the tower from this viewpoint are obscured.
Validation of photomontage using Nearsa.	
Tower highlighted in green (for readers reference only) to indicate location	
Tower is obscured by the vegetation and topography	
Significance of impacts	The significance of change in this location, resulting from the proposed tower, is considered to be negligible, as views of the tower are screened by the vegetation and topography.
Mitigation measures	None required.

Table 4 – Viewpoint 4 Photomontage



Criteria	Comments
Location	<p>This view is from the picnic area at Walder Park. It is a popular area for picnicking and recreation use with the public. Prospect Dam rises to the west of this view. Views to the tower location are to the northeast, up the existing hill and past the Valve House.</p> <p>The red arrow indicates the location of the top of the tower.</p>
Description of existing view	<p>This viewpoint is publicly accessible. The view incorporates heritage elements such as the Valve House, former residential dwelling, post-and-rail fencing and palm trees along the road edge. The mature vegetation on the slopes of Prospect Hill lends a natural quality to the view.</p>
Anticipated change to view	<p>The anticipated change to this view is negligible as the topography of the land and existing vegetation mean that any views of the tower from this viewpoint are obscured.</p>
Significance of impact	<p>The significance of change in this location, resulting from the proposed tower, is considered to be negligible, as views of the tower are screened by the vegetation and topography.</p>
Mitigation measures	<p>None required.</p>

Table 5 – Viewpoint 5 Photomontage



Criteria	Comments
Location	This view is from the George Maunder Lookout, which is located 350 m south of the tower location. There is significant, mature tree canopy within the picnic area and the parking lot.
Description of existing view	<p>This area is publicly accessible, and even though this viewpoint is relatively close to the tower, the view focus is towards the west and south (as demonstrated in the image below) whereas the proposed tower is towards the north.</p> <p>The mature vegetation on the slopes of Prospect Hill lends a natural quality to the view. These trees along with trees in the parking area screen much of the view toward the tower.</p>



Photograph from Viewpoint 6 showing the dominant views to west (Reservoir) from the picnic area.

Anticipated change to view	The anticipated change to this view is negligible as the topography of the land and existing vegetation mean that any views of the tower from this viewpoint are obscured.
Significance of impact	The significance of the change to views from this location is low due to the existing tree canopy, and the main direction of views is away from the tower.
Mitigation measures	Although the significance of impact is low, Endeavour Energy propose to carry out tree planting within the gated area to further reduce the visual impact.


Table 6 – Viewpoint 6 Photomontage



Criteria	Comments
Location	<p>This view is from Reservoir Road, approximately 1.4 km north of the tower location. Very few views of the tower are available near this location due to large expanses of bushland and roadside vegetation.</p> <p>The red arrow indicates the top of the tower.</p>
Description of existing view	<p>The tower is south of this viewing location. Bushland trees and roadside planting screen views of the tower site. Since this is a public road, viewing times would be short and fairly distant.</p>
Anticipated change to view	<p>The anticipated change to this view is negligible due to the trees that screen views toward the tower site, and the short time-frame any viewer would have to absorb the change.</p>
Significance of impact	<p>The significance of the change to views from this location is negligible due to the existing tree canopy and short duration of views.</p>
Mitigation measures	<p>None required.</p>

Table 7 – Viewpoint 7 Photomontage



Criteria	Comments
Location	<p>This view is from the highest point on Prospect Lookout, approximately 1.45 km northeast of the tower location. This site is known as an important Aboriginal site and is part of the Prospect Hill Plan of Management (Cumberland Council March 2019). It offers panoramic views across the landscape predominantly to the east and south (refer to image below).</p>  <p>Views from Viewpoint 7 looking toward Parramatta and Sydney</p> <p>Access to this summit is from the Clunies Ross Street, although the gates have been closed since 2017. This location is situated atop a ridge that runs north-south, screening views of the tower from further east. The vegetation is characterised by a row of planted trees adjacent to boundary lines, scattered shrubs, weeds obscuring the views to the west and south-west and</p>

	<p>makes the western slope inaccessible. There is extensive pasture grassland on the north-eastern slope which is accessible.</p>
<p>Description of existing view</p>	<p>The tower is southwest of this viewing location. The view towards the tower is across planted vegetation, an industrial development that sits in an old quarry site and electrical infrastructure.</p>
<p>Anticipated change to view</p>	<p>The tower is predicted to be visible from this specific location where the photograph was taken. Moving away from this immediate location, views to the tower location are obscured by trees, vegetation, electricity poles, overhead mains, industrial buildings between the viewpoint and the proposed tower that screen the view. As indicated in the photomontage, the water tower is visible over the trees as is the tower from this viewpoint, however, it is only the elevated nature of this viewpoint that allow views to the tower. The land drops away steeply from this point and views quickly become obscured in the immediate vicinity of this location.</p> <p>The Plan of Management also identifies that the views to the west is impacted by the industrial area and existing infrastructures and hence has measures to:</p> <p><i>retain and add to existing trees on Prospect Hill, consistent with the Prospect Hill Conservation Management Plan, thereby forming large stands of trees to provide a visual buffer to built form when viewed from the top of Prospect Hill.</i></p> <p>Construct unobtrusive viewing areas at Prospect Hill, and south of the hill looking south-east using low maintenance materials:</p> <p><i>Plant scattered trees and shrubs on the western boundary to screen industrial areas.</i></p> <p>These measures would further obscure the tower from potential visual impact.</p>
<p>Significance of impact</p>	<p>The significance of the change to views from this location is low due to the existing vegetation and industrial nature of the view towards the tower. This view is only available from the hilltop that is only accessible by foot. While the site is an important Aboriginal site, the key views are to the east and south, away from the tower location. Existing trees screen views to the tower location away from the location of this viewpoint.</p>
<p>Mitigation measures</p>	<p>None required.</p>

Table 8 – Viewpoint 8 Photomontage



Criteria	Comments
Location	This view is from Marrong Reserve (Pemulwuy Lookout), approximately 1.3 km northeast of the tower location. The lookout is situated atop a ridge that runs north-south, screening views of the tower from further east.
Description of existing view	The tower is southwest of this viewing location. The view toward the tower is across an industrial development that sits in an old quarry site.
Anticipated change to view	The tower is predicted to be visible from this location. There is little vegetation between the viewpoint and the proposed tower to screen the view. As indicated in the photomontage, the water tower is visible over the trees as is the tower.
Significance of impact	The significance of the change to views from this location is low due to the existing industrial nature of the view toward the tower. This view is only available from the hilltop that is only accessible by foot.
Mitigation measures	None required.

5.1 Mitigation measures

A range of visual impact mitigation methods are available to reduce the impact of a development. As a general rule, mitigation should aim first at reducing the visible changes to the landscape. Secondly, mitigation should screen new infrastructure introduced by the project to present a landscape that is as similar to the existing landscape as possible.

In order to reduce any visual impacts, it is proposed that the tower will be constructed using matt steel, to decrease reflectivity.

Endeavour Energy, in consultation with Sydney Water, will consider the option to undertake revegetation works to support the aesthetics of the visual landscape ensuring access and maintenance requirements met. Endeavour Energy have had a Vegetation Management Plan (VMP) prepared to assess and make recommendations for areas proposed as 'revegetation areas'. Figure 8 (taken from the VMP) indicates locations proposed for infill planting and bush regeneration. This will extend the remnant bushland vegetation further around the reservoir and in doing so, create a visual screen that is consistent with the existing landscape character.

A second recommendation indicated on the landscape plan (refer Figure 8), is the continuation of the street tree planting along William Lawson Drive. This extends the roadside tree planting and will screen views of the tower as vehicles travel south on William Lawson Drive.



Figure 8: Vegetation Management Plan

6 Conclusion

This VIA has been undertaken to understand effect of the proposed tower on the visual amenity of the heritage listed items (Prospect Reservoir, including the Valve House and remains of the Veterans Hall) and respective curtilage, in addition to surrounding residential, recreational land uses and road users, as shown in Figure 7. The proposal is located towards a high point on Prospect Hill, approximately 75 m southwest from the existing Sydney Water tanks. The site is surrounded by mature vegetation to its west, a picnic area to the south, an industrial area to the east and Sydney Water tanks to the north.

Five viewpoints (viewpoints 1 to 5) were chosen to assess the visual impact of the proposal on key heritage items and receivers within the heritage curtilage area. Visual receivers in the area include recreational users accessing the picnic areas, open space and lookout areas and Sydney Water staff working in the Sydney Water offices. Three viewpoints were chosen to assess the impacts onto road users, publicly accessible areas in Pemulwuy and a recognised important Aboriginal site which may have a line of sight onto the heritage curtilage area, including viewpoints 6, 7 and 8.

As a result of the photomontages completed for each viewpoint, the following outcomes were identified:

- Viewpoint 1 – Given the location of viewpoint 1 outside the heritage curtilage and the interruption of the natural landscape by existing man-made infrastructure, it is not considered that this viewpoint is particularly sensitive to change.
- Viewpoint 2 - The significance of change in this location, resulting from the proposed tower, is considered to be negligible, as views of the tower are screened by the vegetation and topography.
- Viewpoint 3 - The significance of change in this location, resulting from the proposed tower, is considered negligible, as views of the tower are screened by the vegetation and topography.
- Viewpoint 4 – The significance of change in this location, resulting from the proposed tower, is considered to be negligible, as views of the tower are screened by the vegetation and topography.
- Viewpoint 5 – The significance of the change to views from this location is low due to the existing tree canopy, and the main direction of views is away from the tower.
- Viewpoint 6 – The significance of the change to views from this location is negligible due to the existing tree canopy and short duration of views.
- Viewpoint 7 – the significance of the change to views from this location is low due to the existing trees screening views and the industrial nature of the view toward the tower.
- Viewpoint 8 – the significance of the change to views from this location is low due to the existing industrial nature of the view toward the tower.

Overall, it is considered that the visual impact on Prospect Reservoir, key heritage items, road users and nearby industrial and residential land uses will be low to negligible.

Attachment A – Design Drawings

Attachment B – Photos of existing landscape

Photos depicting visual character of proposal site

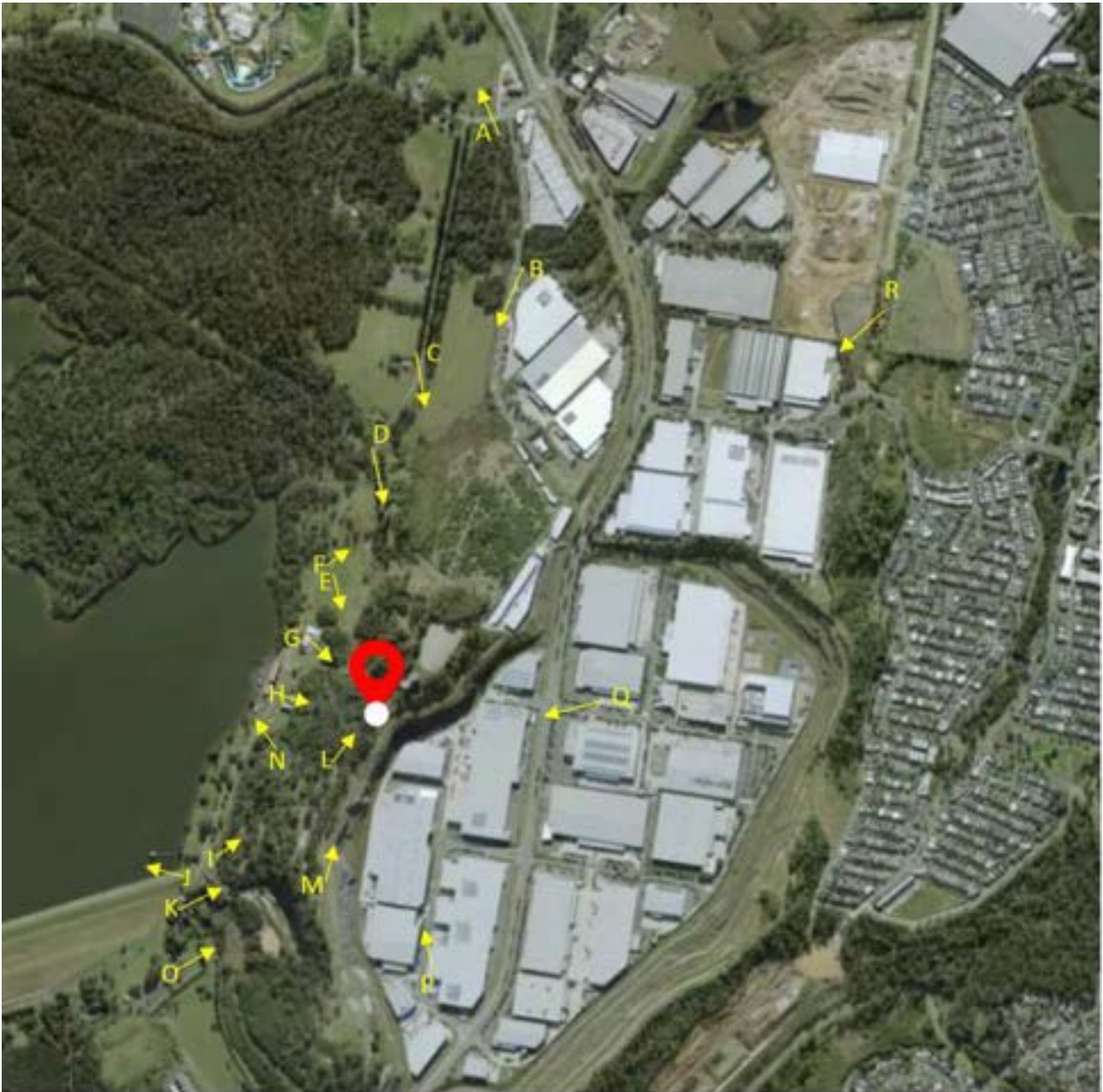


Photo A –
guyed masts
on corner
Prospect
Highway and
Reservoir
Road.



Photo B –
View towards
site from
industrial park
at Picrite
Close.



Photo C –
Towards the site from house on William Lawson Drive (tower will be predominantly obscured by vegetation).



Photo D –
View towards proposed tower from start of access track (not accessible by public). View of tower obscured by vegetation.



Photo E – view to proposed tower from William Lawson Drive. Tower will be partially obscured by vegetation.



Photo F – view towards existing power lines from William Lawson Drive.



Photo G – view to proposed tower from Water NSW offices.



Photo H – view to proposed tower from heritage information area on William Lawson Drive. View will be predominantly obscured by existing vegetation.



Photo I – View from gateway adjacent submerged tower and in close proximity to Prospect Reservoir Valve House, looking up road to picnic areas and George Maunder Lookout on Prospect Hill.



Photo J – View from Reservoir wall

to existing communications towers and electricity pylons in the surrounding area.



Photo K – view to proposed tower from heritage listed Prospect Reservoir Valve House. Tower will be obscured by former quarry wall and existing vegetation.



Photo L –
View to
proposed
tower from
Maunder
picnic area.
Tower will be
predominantly
obscured by
existing
vegetation.



Photo M –
view to
proposed
tower from top
of former
quarry wall
(not publicly
accessible).



Photo N – view to existing guyed towers next to Raging Waters theme park and existing electricity pylons.



Photo O – view to proposed tower from lower car park. Views to the tower will be partially obscured by vegetation and former quarry wall.



Photo P – view towards proposed tower from Dolerite Way in former quarry industrial park. Tower will be partially obscured by existing industrial buildings.



Photo Q – View to proposed tower from Belleview Circuit in former quarry industrial park.



Photo R –
View to the
proposed
tower from
Prospect
Lookout.



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POWER
together

Appendix F AHIMS Search

Nadia Eisenlohr

Date: 22 December 2022

Level 9/109 St Georges Terrace
Perth Western Australia 6000

Attention: Nadia Eisenlohr

Email: neisenlohr@emmconsulting.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -33.8238, 150.9105 - Lat, Long To : -33.8194, 150.9182, conducted by Nadia Eisenlohr on 22 December 2022.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the [NSW Government Gazette \(https://www.legislation.nsw.gov.au/gazette\)](https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request


Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not to be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Appendix G Biodiversity Database Searches

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Entities in selected area [North: -33.76 West: 150.86 East: 150.96 South: -33.86] returned a total of 23,806 records of 1,447 species.

Report generated on 22/12/2022 1:56 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Amphibia	Myobatrachidae	3134	<i>Crinia signifera</i>		Common Eastern Froglet	P		126	
Animalia	Amphibia	Myobatrachidae	3117	<i>Pseudophryne bibronii</i>		Bibron's Toadlet	P		4	
Animalia	Amphibia	Myobatrachidae	3158	<i>Uperoleia laevigata</i>		Smooth Toadlet	P		6	
Animalia	Amphibia	Limnodynastidae	3058	<i>Limnodynastes dumerilii</i>		Eastern Banjo Frog	P		1	
Animalia	Amphibia	Limnodynastidae	3061	<i>Limnodynastes peronii</i>		Brown-striped Frog	P		141	
Animalia	Amphibia	Limnodynastidae	3063	<i>Limnodynastes tasmaniensis</i>		Spotted Grass Frog	P		16	
Animalia	Amphibia	Hylidae	3166	<i>Litoria aurea</i>		Green and Golden Bell Frog	E1,P	V	12	
Animalia	Amphibia	Hylidae	3171	<i>Litoria caerulea</i>		Green Tree Frog	P		5	
Animalia	Amphibia	Hylidae	3180	<i>Litoria dentata</i>		Bleating Tree Frog	P		4	
Animalia	Amphibia	Hylidae	3182	<i>Litoria ewingii</i>		Brown Tree Frog	P		4	
Animalia	Amphibia	Hylidae	3183	<i>Litoria fallax</i>		Eastern Dwarf Tree Frog	P		41	
Animalia	Amphibia	Hylidae	3204	<i>Litoria peronii</i>		Peron's Tree Frog	P		96	
Animalia	Amphibia	Hylidae	3206	<i>Litoria phyllochroa</i>		Leaf-green Tree Frog	P		3	
Animalia	Amphibia	Hylidae	3214	<i>Litoria tyleri</i>		Tyler's Tree Frog	P		1	
Animalia	Amphibia	Hylidae	3215	<i>Litoria verreauxii</i>		Verreaux's Frog	P		18	
Animalia	Reptilia	Chelidae	2017	<i>Chelodina longicollis</i>		Eastern Snake-necked Turtle	P		72	
Animalia	Reptilia	Chelidae	2951	<i>Emydura macquarii macquarii</i>		Macquarie River Turtle	P		1	
Animalia	Reptilia	Chelidae	9057	<i>Emydura sp.</i>		Unidentified Emydura	P		2	
Animalia	Reptilia	Diplodactylidae	2077	<i>Diplodactylus vittatus</i>		Wood Gecko	P		4	
Animalia	Reptilia	Pygopodidae	2174	<i>Pygopus lepidopodus</i>		Common Scaly-foot	P		2	
Animalia	Reptilia	Scincidae	2331	<i>Cryptoblepharus virgatus</i>		Cream-striped Shinning-skink	P		20	
Animalia	Reptilia	Scincidae	2375	<i>Ctenotus robustus</i>		Robust Ctenotus	P		6	
Animalia	Reptilia	Scincidae	2386	<i>Ctenotus taeniolatus</i>		Copper-tailed Skink	P		1	
Animalia	Reptilia	Scincidae	2557	<i>Eulamprus quoyii</i>		Eastern Water-skink	P		19	
Animalia	Reptilia	Scincidae	2450	<i>Lampropholis delicata</i>		Dark-flecked Garden Sunskink	P		44	
Animalia	Reptilia	Scincidae	2451	<i>Lampropholis guichenoti</i>		Pale-flecked Garden Sunskink	P		47	


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Report generated on 22/12/2022 1:56 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Reptilia	Scincidae	T117	<i>Lampropholis sp.</i>		unidentified grass skink	P		1	
Animalia	Reptilia	Scincidae	2307	<i>Lygisaurus foliorum</i>		Tree-base Litter-skink	P		2	
Animalia	Reptilia	Scincidae	2542	<i>Saiphos equalis</i>		Three-toed Skink	P		1	
Animalia	Reptilia	Scincidae	2583	<i>Tiliqua rugosa</i>		Shingle-back	P		3	
Animalia	Reptilia	Scincidae	2580	<i>Tiliqua scincoides</i>		Eastern Blue-tongue	P		454	
Animalia	Reptilia	Agamidae	2194	<i>Amphibolurus muricatus</i>		Jacky Lizard	P		12	
Animalia	Reptilia	Agamidae	2252	<i>Intellagama lesueurii</i>		Eastern Water Dragon	P		13	
Animalia	Reptilia	Agamidae	5075	<i>Intellagama lesueurii lesueurii</i>		Eastern Water Dragon	P		2	
Animalia	Reptilia	Agamidae	2177	<i>Pogona barbata</i>		Bearded Dragon	P		9	
Animalia	Reptilia	Varanidae	2283	<i>Varanus varius</i>		Lace Monitor	P		19	
Animalia	Reptilia	Pythonidae	5096	<i>Morelia spilota spilota</i>		Diamond Python	P		1	
Animalia	Reptilia	Colubridae	2633	<i>Dendrelaphis punctulatus</i>		Common Tree Snake	P		3	
Animalia	Reptilia	Elapidae	2655	<i>Demansia psammophis</i>		Yellow-faced Whip Snake	P		1	
Animalia	Reptilia	Elapidae	2669	<i>Furina diadema</i>		Red-naped Snake	P		5	
Animalia	Reptilia	Elapidae	2674	<i>Hemiaspis signata</i>		Black-bellied Swamp Snake	P		2	
Animalia	Reptilia	Elapidae	2693	<i>Pseudechis porphyriacus</i>		Red-bellied Black Snake	P		236	
Animalia	Reptilia	Elapidae	2699	<i>Pseudonaja textilis</i>		Eastern Brown Snake	P		55	
Animalia	Aves	Casuariidae	0001	<i>Dromaius novaehollandiae</i>		Emu	P		2	
Animalia	Aves	Megapodiidae	0008	<i>Alectura lathamii</i>		Australian Brush-turkey	P		2	
Animalia	Aves	Phasianidae	0009	<i>Coturnix pectoralis</i>		Stubble Quail	P		3	
Animalia	Aves	Phasianidae	9046	<i>Coturnix sp.</i>		Unidentified Quail	P		9	
Animalia	Aves	Phasianidae	0012	<i>Synoicus chinensis</i>		King Quail	P		1	
Animalia	Aves	Phasianidae	0011	<i>Synoicus ypsilophora</i>		Brown Quail	P		9	
Animalia	Aves	Anatidae	0210	<i>Anas castanea</i>		Chestnut Teal	P		2	
Animalia	Aves	Anatidae	0211	<i>Anas gracilis</i>		Grey Teal	P		9	
Animalia	Aves	Anatidae	0208	<i>Anas superciliosa</i>		Pacific Black Duck	P		81	



Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Entities in selected area [North: -33.76 West: 150.86 East: 150.96 South: -33.86] returned a total of 23,806 records of 1,447 species.

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Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Aves	Anatidae	0215	<i>Aythya australis</i>		Hardhead	P		11	
Animalia	Aves	Anatidae	0202	<i>Chenonetta jubata</i>		Australian Wood Duck	P		75	
Animalia	Aves	Anatidae	0203	<i>Cygnus atratus</i>		Black Swan	P		11	
Animalia	Aves	Podicipedidae	0060	<i>Podiceps cristatus</i>		Great Crested Grebe	P		6	
Animalia	Aves	Podicipedidae	0062	<i>Poliocephalus poliocephalus</i>		Hoary-headed Grebe	P		2	
Animalia	Aves	Podicipedidae	0061	<i>Tachybaptus novaehollandiae</i>		Australasian Grebe	P		7	
Animalia	Aves	Columbidae	0032	<i>Geopelia humeralis</i>		Bar-shouldered Dove	P		2	
Animalia	Aves	Columbidae	9931	<i>Geopelia striata</i>		Peaceful Dove	P		1	
Animalia	Aves	Columbidae	0027	<i>Lopholaimus antarcticus</i>		Topknot Pigeon	P		1	
Animalia	Aves	Columbidae	0029	<i>Macropygia phasianella</i>		Brown Cuckoo-Dove	P		1	
Animalia	Aves	Columbidae	0043	<i>Ocyphaps lophotes</i>		Crested Pigeon	P		110	
Animalia	Aves	Columbidae	0034	<i>Phaps chalcoptera</i>		Common Bronzewing	P		1	
Animalia	Aves	Podargidae	0313	<i>Podargus strigoides</i>		Tawny Frogmouth	P		137	
Animalia	Aves	Caprimulgidae	0330	<i>Eurostopodus mystacalis</i>		White-throated Nightjar	P		3	
Animalia	Aves	Aegothelidae	0317	<i>Aegotheles cristatus</i>		Australian Owlet-nightjar	P		3	
Animalia	Aves	Apodidae	0335	<i>Apus pacificus</i>		Fork-tailed Swift	P	C,J,K	3	
Animalia	Aves	Apodidae	0334	<i>Hirundapus caudacutus</i>		White-throated Needletail	P	V,C,J,K	1	
Animalia	Aves	Anhingidae	8731	<i>Anhinga novaehollandiae</i>		Australasian Darter	P		4	
Animalia	Aves	Phalacrocoracidae	0100	<i>Microcarbo melanoleucos</i>		Little Pied Cormorant	P		14	
Animalia	Aves	Phalacrocoracidae	0096	<i>Phalacrocorax carbo</i>		Great Cormorant	P		3	
Animalia	Aves	Phalacrocoracidae	T021	<i>Phalacrocorax sp.</i>		Unidentified Cormorant	P		1	
Animalia	Aves	Phalacrocoracidae	0097	<i>Phalacrocorax sulcirostris</i>		Little Black Cormorant	P		9	
Animalia	Aves	Pelecanidae	0106	<i>Pelecanus conspicillatus</i>		Australian Pelican	P		11	
Animalia	Aves	Ardeidae	0186	<i>Ardea intermedia</i>		Intermediate Egret	P		3	
Animalia	Aves	Ardeidae	0189	<i>Ardea pacifica</i>		White-necked Heron	P		1	
Animalia	Aves	Ardeidae	T179	<i>Ardea/Egretta sp.</i>		Unidentified Egret	P		1	
Animalia	Aves	Ardeidae	0977	<i>Bubulcus ibis</i>		Cattle Egret	P		3	




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Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Aves	Ardeidae	8712	<i>Casmerodius modesta</i>		Eastern Great Egret	P		3	
Animalia	Aves	Ardeidae	0185	<i>Egretta garzetta</i>		Little Egret	P		1	
Animalia	Aves	Ardeidae	0188	<i>Egretta novaehollandiae</i>		White-faced Heron	P		30	
Animalia	Aves	Ardeidae	0192	<i>Nycticorax caledonicus</i>		Nankeen Night Heron	P		2	
Animalia	Aves	Threskiornithidae	0181	<i>Platalea regia</i>		Royal Spoonbill	P		2	
Animalia	Aves	Threskiornithidae	0179	<i>Threskiornis moluccus</i>		Australian White Ibis	P		158	
Animalia	Aves	Threskiornithidae	0180	<i>Threskiornis spinicollis</i>		Straw-necked Ibis	P		2	
Animalia	Aves	Accipitridae	0222	<i>Accipiter cirrocephalus</i>		Collared Sparrowhawk	P		1	
Animalia	Aves	Accipitridae	0221	<i>Accipiter fasciatus</i>		Brown Goshawk	P		4	
Animalia	Aves	Accipitridae	0220	<i>Accipiter novaehollandiae</i>		Grey Goshawk	P		7	
Animalia	Aves	Accipitridae	T047	<i>Accipiter sp.</i>		Unidentified goshawk	P		1	
Animalia	Aves	Accipitridae	0234	<i>Aviceda subcristata</i>		Pacific Baza	P		2	
Animalia	Aves	Accipitridae	0219	<i>Circus approximans</i>		Swamp Harrier	P		1	
Animalia	Aves	Accipitridae	0232	<i>Elanus axillaris</i>		Black-shouldered Kite	P		8	
Animalia	Aves	Accipitridae	0228	<i>Haliastur sphenurus</i>		Whistling Kite	P		3	
Animalia	Aves	Accipitridae	0225	<i>Hieraetus morphnoides</i>		Little Eagle	V,P		10	
Animalia	Aves	Falconidae	0239	<i>Falco berigora</i>		Brown Falcon	P		2	
Animalia	Aves	Falconidae	0240	<i>Falco cenchroides cenchroides</i>		Nankeen Kestrel	P		20	
Animalia	Aves	Falconidae	0235	<i>Falco longipennis</i>		Australian Hobby	P		4	
Animalia	Aves	Falconidae	0237	<i>Falco peregrinus</i>		Peregrine Falcon	P		6	
Animalia	Aves	Falconidae	9043	<i>Falco sp.</i>		Unidentified Falcon	P		3	
Animalia	Aves	Falconidae	0238	<i>Falco subniger</i>		Black Falcon	V,P		1	
Animalia	Aves	Rallidae	0059	<i>Fulica atra</i>		Eurasian Coot	P		19	
Animalia	Aves	Rallidae	0056	<i>Gallinula tenebrosa</i>		Dusky Moorhen	P		29	
Animalia	Aves	Rallidae	0046	<i>Hypotaenidia philippensis</i>		Buff-banded Rail	P		1	
Animalia	Aves	Rallidae	0058	<i>Porphyrio porphyrio</i>		Purple Swamphen	P		19	




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Animalia	Aves	Charadriidae	0143	<i>Charadrius ruficapillus</i>		Red-capped Plover	P		1	
Animalia	Aves	Charadriidae	0144	<i>Euseyornis melanops</i>		Black-fronted Dotterel	P		2	
Animalia	Aves	Charadriidae	0136	<i>Pluvialis squatarola</i>		Grey Plover	P	C,J,K	1	
Animalia	Aves	Charadriidae	0133	<i>Vanellus miles</i>		Masked Lapwing	P		89	
Animalia	Aves	Charadriidae	0134	<i>Vanellus miles novaehollandiae</i>		[Spur-winged Plover]	P		1	
Animalia	Aves	Scolopacidae	0168	<i>Gallinago hardwickii</i>		Latham's Snipe	P	J,K	1	
Animalia	Aves	Turnicidae	0014	<i>Turnix varius</i>		Painted Button-quail	P		1	
Animalia	Aves	Laridae	0125	<i>Chroicocephalus novaehollandiae</i>		Silver Gull	P		5	
Animalia	Aves	Cacatuidae	0269	<i>Cacatua galerita</i>		Sulphur-crested Cockatoo	P		138	
Animalia	Aves	Cacatuidae	0271	<i>Cacatua sanguinea</i>		Little Corella	P		33	
Animalia	Aves	Cacatuidae	T187	<i>Cacatua sp.</i>			P		3	
Animalia	Aves	Cacatuidae	0272	<i>Cacatua tenuirostris</i>		Long-billed Corella	P		6	
Animalia	Aves	Cacatuidae	9070	<i>Calyptorhynchus sp.</i>		Unidentified Black-cockatoo	P		1	
Animalia	Aves	Cacatuidae	0273	<i>Eolophus roseicapilla</i>		Galah	P		151	
Animalia	Aves	Cacatuidae	0274	<i>Nymphicus hollandicus</i>		Cockatiel	P		11	
Animalia	Aves	Cacatuidae	0267	<i>Zanda funereus</i>		Yellow-tailed Black-Cockatoo	P		11	
Animalia	Aves	Psittacidae	0281	<i>Alisterus scapularis</i>		Australian King-Parrot	P		5	
Animalia	Aves	Psittacidae	0258	<i>Glossopsitta concinna</i>		Musk Lorikeet	P		17	
Animalia	Aves	Psittacidae	0260	<i>Glossopsitta pusilla</i>		Little Lorikeet	V,P		1	
Animalia	Aves	Psittacidae	0309	<i>Lathamus discolor</i>		Swift Parrot	E1,P	CE	27	
Animalia	Aves	Psittacidae	0310	<i>Melopsittacus undulatus</i>		Budgerigar	P		10	
Animalia	Aves	Psittacidae	0302	<i>Neophema pulchella</i>		Turquoise Parrot	V,P,3		1	
Animalia	Aves	Psittacidae	0282	<i>Platycercus elegans</i>		Crimson Rosella	P		12	
Animalia	Aves	Psittacidae	0288	<i>Platycercus eximius</i>		Eastern Rosella	P		42	
Animalia	Aves	Psittacidae	T039	<i>Platycercus sp.</i>		Unidentified Rosella	P		5	
Animalia	Aves	Psittacidae	0295	<i>Psephotus haematonotus</i>		Red-rumped Parrot	P		21	
Animalia	Aves	Psittacidae	0256	<i>Trichoglossus chlorolepidotus</i>		Scaly-breasted Lorikeet	P		8	


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Animalia	Aves	Psittacidae	9947	<i>Trichoglossus haematodus</i>		Rainbow Lorikeet	P		721	
Animalia	Aves	Cuculidae	0338	<i>Cacomantis flabelliformis</i>		Fan-tailed Cuckoo	P		10	
Animalia	Aves	Cuculidae	0342	<i>Chalcites basalus</i>		Horsfield's Bronze-Cuckoo	P		1	
Animalia	Aves	Cuculidae	0343	<i>Chalcites lucidus</i>		Shining Bronze-Cuckoo	P		7	
Animalia	Aves	Cuculidae	0347	<i>Eudynamys orientalis</i>		Eastern Koel	P		13	
Animalia	Aves	Cuculidae	0337	<i>Heteroscenes pallidus</i>		Pallid Cuckoo	P		1	
Animalia	Aves	Cuculidae	0348	<i>Scythrops novaehollandiae</i>		Channel-billed Cuckoo	P		7	
Animalia	Aves	Strigidae	0246	^^ <i>Ninox connivens</i>		Barking Owl	V,P,3		2	
Animalia	Aves	Strigidae	9922	<i>Ninox novaeseelandiae</i>		Southern Boobook	P		17	
Animalia	Aves	Strigidae	0248	^^ <i>Ninox strenua</i>		Powerful Owl	V,P,3		3	
Animalia	Aves	Strigidae	9031	<i>Tyto/Ninox sp.</i>		Unidentified Large Forest Owl	P		5	
Animalia	Aves	Tytonidae	9923	<i>Tyto javanica</i>		Eastern Barn Owl	P		31	
Animalia	Aves	Tytonidae	0250	^^ <i>Tyto novaehollandiae</i>		Masked Owl	V,P,3		3	
Animalia	Aves	Alcedinidae	0319	<i>Ceyx azureus</i>		Azure Kingfisher	P		5	
Animalia	Aves	Alcedinidae	0322	<i>Dacelo novaeguineae</i>		Laughing Kookaburra	P		84	
Animalia	Aves	Alcedinidae	0326	<i>Todiramphus sanctus</i>		Sacred Kingfisher	P		26	
Animalia	Aves	Coraciidae	0318	<i>Eurystomus orientalis</i>		Dollarbird	P		2	
Animalia	Aves	Climacteridae	0558	<i>Cormobates leucophaea</i>		White-throated Treecreeper	P		2	
Animalia	Aves	Ptilonorhynchidae	0680	<i>Chlamydera maculata</i>		Spotted Bowerbird	P		1	
Animalia	Aves	Ptilonorhynchidae	0679	<i>Ptilonorhynchus violaceus</i>		Satin Bowerbird	P		2	
Animalia	Aves	Maluridae	0529	<i>Malurus cyaneus</i>		Superb Fairy-wren	P		163	
Animalia	Aves	Maluridae	0536	<i>Malurus lamberti</i>		Variegated Fairy-wren	P		5	
Animalia	Aves	Acanthizidae	0486	<i>Acanthiza chrysorrhoa</i>		Yellow-rumped Thornbill	P		7	
Animalia	Aves	Acanthizidae	0470	<i>Acanthiza lineata</i>		Striated Thornbill	P		6	
Animalia	Aves	Acanthizidae	0471	<i>Acanthiza nana</i>		Yellow Thornbill	P		36	
Animalia	Aves	Acanthizidae	0475	<i>Acanthiza pusilla</i>		Brown Thornbill	P		6	

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Animalia	Aves	Acanthizidae	0484	<i>Acanthiza reguloides</i>		Buff-rumped Thornbill	P		1	
Animalia	Aves	Acanthizidae	9042	<i>Acanthiza sp.</i>		Unidentified Thornbill	P		1	
Animalia	Aves	Acanthizidae	0454	<i>Gerygone mouki</i>		Brown Gerygone	P		2	
Animalia	Aves	Acanthizidae	0453	<i>Gerygone olivacea</i>		White-throated Gerygone	P		6	
Animalia	Aves	Acanthizidae	0488	<i>Sericornis frontalis</i>		White-browed Scrubwren	P		27	
Animalia	Aves	Acanthizidae	0465	<i>Smicromis brevirostris</i>		Weebill	P		14	
Animalia	Aves	Pardalotidae	0565	<i>Pardalotus punctatus</i>		Spotted Pardalote	P		28	
Animalia	Aves	Pardalotidae	0976	<i>Pardalotus striatus</i>		Striated Pardalote	P		12	
Animalia	Aves	Meliphagidae	0591	<i>Acanthorhynchus tenuirostris</i>		Eastern Spinebill	P		4	
Animalia	Aves	Meliphagidae	0638	<i>Anthochaera carunculata</i>		Red Wattlebird	P		42	
Animalia	Aves	Meliphagidae	0710	<i>Anthochaera chrysoptera</i>		Little Wattlebird	P		8	
Animalia	Aves	Meliphagidae	0603	<i>Anthochaera phrygia</i>		Regent Honeyeater	E4A,P	CE	6	
Animalia	Aves	Meliphagidae	T210	<i>Anthochaera sp.</i>		Unidentified Wattlebird	P		5	
Animalia	Aves	Meliphagidae	0614	<i>Caligavis chrysops</i>		Yellow-faced Honeyeater	P		25	
Animalia	Aves	Meliphagidae	0641	<i>Entomyzon cyanotis</i>		Blue-faced Honeyeater	P		1	
Animalia	Aves	Meliphagidae	0597	<i>Lichmera indistincta</i>		Brown Honeyeater	P		1	
Animalia	Aves	Meliphagidae	0634	<i>Manorina melanocephala</i>		Noisy Miner	P		280	
Animalia	Aves	Meliphagidae	0633	<i>Manorina melanophrys</i>		Bell Miner	P		20	
Animalia	Aves	Meliphagidae	0605	<i>Meliphaga lewinii</i>		Lewin's Honeyeater	P		3	
Animalia	Aves	Meliphagidae	0583	<i>Melithreptus brevirostris</i>		Brown-headed Honeyeater	P		1	
Animalia	Aves	Meliphagidae	0578	<i>Melithreptus lunatus</i>		White-naped Honeyeater	P		3	
Animalia	Aves	Meliphagidae	0586	<i>Myzomela sanguinolenta</i>		Scarlet Honeyeater	P		3	
Animalia	Aves	Meliphagidae	0645	<i>Philemon corniculatus</i>		Noisy Friarbird	P		5	
Animalia	Aves	Meliphagidae	0632	<i>Phylidonyris niger</i>		White-cheeked Honeyeater	P		2	
Animalia	Aves	Meliphagidae	0631	<i>Phylidonyris novaehollandiae</i>		New Holland Honeyeater	P		8	
Animalia	Aves	Meliphagidae	0625	<i>Ptilotula penicillata</i>		White-plumed Honeyeater	P		55	



Australian Government

Department of Climate Change, Energy,
the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 09-Nov-2022

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	45
Listed Migratory Species:	15

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <https://www.dcceew.gov.au/parks-heritage/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	21
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	1
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	9
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[\[Resource Information \]](#)

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	Endangered	Community may occur within area
Coastal Swamp Oak (<i>Casuarina glauca</i>) Forest of New South Wales and South East Queensland ecological community	Endangered	Community may occur within area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community may occur within area
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community may occur within area
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community may occur within area
Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically Endangered	Community may occur within area

Listed Threatened Species

[\[Resource Information \]](#)

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.

Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat likely to occur within area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area

FISH

Scientific Name	Threatened Category	Presence Text
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
FROG		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat may occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat may occur within area
MAMMAL		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Notamacropus parma Parma Wallaby [89289]	Vulnerable	Species or species habitat may occur within area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
PLANT		
Acacia bynoeana Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat may occur within area
Acacia pubescens Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat known to occur within area
Allocasuarina glareicola [21932]	Endangered	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Genoplesium baueri Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid [7528]	Endangered	Species or species habitat may occur within area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat may occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat likely to occur within area
Persoonia nutans Nodding Geebung [18119]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat may occur within area
Pimelea spicata Spiked Rice-flower [20834]	Endangered	Species or species habitat known to occur within area
Pomaderris brunnea Rufous Pomaderris, Brown Pomaderris [16845]	Vulnerable	Species or species habitat likely to occur within area
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area
Pterostylis saxicola Sydney Plains Greenhood [64537]	Endangered	Species or species habitat likely to occur within area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat may occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area

REPTILE

Delma impar Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat may occur within area
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Listed Migratory Species

[[Resource Information](#)]

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		

Scientific Name	Threatened Category	Presence Text
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat may occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area

Extra Information

State and Territory Reserves [\[Resource Information \]](#)

Protected Area Name	Reserve Type	State
Prospect	Nature Reserve	NSW

EPBC Act Referrals [\[Resource Information \]](#)

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Clearance of 6.3ha of Cumberland Plain Woodland for industrial subdivision cnr of Old Walgrove and W	2004/1445	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Concrete Batching Plant and Associated Facilities	2005/2067	Not Controlled Action	Completed
Electricity Substation at Old Wallgrove Road	2005/2220	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Mountain View Classrooms Construction	2001/306	Not Controlled Action	Completed
Residential development at Doonside Crescent Woodcroft, Blacktown LGA	2004/1378	Not Controlled Action	Completed
Subdivision of Residential Lands, Greystanes Estate, western Sydney	2001/499	Not Controlled Action	Completed
Wonderland Business Park Precinct, Stage 1, Lot D1	2004/1626	Not Controlled Action	Completed

Bioregional Assessments

SubRegion	BioRegion	Website
Sydney	Sydney Basin	BA website

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact us](#) page.

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SEED

Sharing and Enabling Environmental Data

SEED Map

Map may contain errors and omissions. Neither the NSW Government nor any other data custodian will accept liability for any loss, damage, cost or expenses incurred as a result of the use of, or reliance upon, the information in the map. Map copyright the State of NSW through the Office of Environment and Heritage.



1.3 0 0.67 1.3 Kilometers
















Scale 1: 26,731.15

WGS_1984_Web_Mercator_Auxiliary_Sphere

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Legend

-  Terrestrial Biodiversity
-  Cumberland Subregion BIO Map
-  Biodiversity Corridors of Regional Significance
-  Bionet Species Sightings
-  Critically Endangered
-  Endangered
-  Endangered Population
-  Endangered Population, Vulnerable
-  Vulnerable
-  Presumed Extinct
-  Not Listed as Threatened
-  Threatened_ecological_communities_Greater_Sydney
-  Saving our Species Management Sites - threatened ecological communities
-  Site Denatured - No
-  Site Denatured - Yes


Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Entities in selected area [North: -33.76 West: 150.86 East: 150.96 South: -33.86] returned a total of 23,806 records of 1,447 species.

Report generated on 22/12/2022 1:56 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Aves	Falcunculidae	0416	<i>Falcunculus frontatus</i>		Eastern Shrike-tit	P		5	
Animalia	Aves	Psophodidae	0421	<i>Psophodes olivaceus</i>		Eastern Whipbird	P		3	
Animalia	Aves	Neosittidae	0549	<i>Daphoenositta chrysoptera</i>		Varied Sittella	V,P		4	
Animalia	Aves	Campephagidae	0424	<i>Coracina novaehollandiae</i>		Black-faced Cuckoo-shrike	P		43	
Animalia	Aves	Campephagidae	0425	<i>Coracina papuensis</i>		White-bellied Cuckoo-shrike	P		2	
Animalia	Aves	Campephagidae	0430	<i>Lalage sueurii</i>		White-winged Triller	P		1	
Animalia	Aves	Pachycephalidae	0408	<i>Colluricincla harmonica</i>		Grey Shrike-thrush	P		14	
Animalia	Aves	Pachycephalidae	0398	<i>Pachycephala pectoralis</i>		Golden Whistler	P		20	
Animalia	Aves	Pachycephalidae	0401	<i>Pachycephala rufiventris</i>		Rufous Whistler	P		21	
Animalia	Aves	Oriolidae	0671	<i>Oriolus sagittatus</i>		Olive-backed Oriole	P		7	
Animalia	Aves	Oriolidae	0432	<i>Sphecotheres vieilloti</i>		Australasian Figbird	P		1	
Animalia	Aves	Artamidae	8519	<i>Artamus cyanopterus</i>		Dusky Woodswallow	V,P		3	
Animalia	Aves	Artamidae	T040	<i>Artamus sp.</i>			P		1	
Animalia	Aves	Artamidae	0700	<i>Cracticus nigrogularis</i>		Pied Butcherbird	P		4	
Animalia	Aves	Artamidae	T022	<i>Cracticus sp.</i>		Unidentified Butcherbird	P		12	
Animalia	Aves	Artamidae	0702	<i>Cracticus torquatus</i>		Grey Butcherbird	P		63	
Animalia	Aves	Artamidae	8489	<i>Cracticus torquatus</i>			P		1	
Animalia	Aves	Artamidae	0705	<i>Gymnorhina tibicen</i>		Australian Magpie	P		395	
Animalia	Aves	Artamidae	8499	<i>Gymnorhina tibicen tibicen</i>			P		1	
Animalia	Aves	Artamidae	0694	<i>Strepera graculina</i>		Pied Currawong	P		78	
Animalia	Aves	Artamidae	T906	<i>Strepera sp.</i>			P		8	
Animalia	Aves	Artamidae	0697	<i>Strepera versicolor</i>		Grey Currawong	P		3	
Animalia	Aves	Dicruridae	0673	<i>Dicrurus bracteatus</i>		Spangled Drongo	P		3	
Animalia	Aves	Rhipiduridae	0361	<i>Rhipidura albiscapa</i>		Grey Fantail	P		54	
Animalia	Aves	Rhipiduridae	0364	<i>Rhipidura leucophrys</i>		Willie Wagtail	P		63	

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Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Aves	Rhipiduridae	0362	<i>Rhipidura rufifrons</i>		Rufous Fantail	P		5	
Animalia	Aves	Corvidae	0930	<i>Corvus coronoides</i>		Australian Raven	P		149	
Animalia	Aves	Corvidae	9067	<i>Corvus sp.</i>		Unidentified Corvid	P		20	
Animalia	Aves	Monarchidae	0415	<i>Grallina cyanoleuca</i>		Maggie-lark	P		121	
Animalia	Aves	Monarchidae	0373	<i>Monarcha melanopsis</i>		Black-faced Monarch	P		1	
Animalia	Aves	Monarchidae	9955	<i>Myiagra inquieta</i>		Restless Flycatcher	P		3	
Animalia	Aves	Monarchidae	0365	<i>Myiagra rubecula</i>		Leaden Flycatcher	P		4	
Animalia	Aves	Corcoracidae	0693	<i>Corcorax melanorhamphos</i>		White-winged Chough	P		4	
Animalia	Aves	Petroicidae	0392	<i>Eopsaltria australis</i>		Eastern Yellow Robin	P		74	
Animalia	Aves	Petroicidae	0377	<i>Microeca fascians</i>		Jacky Winter	P		1	
Animalia	Aves	Petroicidae	0382	<i>Petroica phoenicea</i>		Flame Robin	V,P		1	
Animalia	Aves	Petroicidae	0384	<i>Petroica rosea</i>		Rose Robin	P		4	
Animalia	Aves	Cisticolidae	0525	<i>Cisticola exilis</i>		Golden-headed Cisticola	P		8	
Animalia	Aves	Acrocephalidae	0524	<i>Acrocephalus australis</i>		Australian Reed-Warbler	P		17	
Animalia	Aves	Locustellidae	0522	<i>Poodytes gramineus</i>		Little Grassbird	P		3	
Animalia	Aves	Hirundinidae	0358	<i>Cheramoeca leucosterna</i>		White-backed Swallow	P		1	
Animalia	Aves	Hirundinidae	0357	<i>Hirundo neoxena</i>		Welcome Swallow	P		46	
Animalia	Aves	Hirundinidae	0360	<i>Petrochelidon ariel</i>		Fairy Martin	P		64	
Animalia	Aves	Hirundinidae	0359	<i>Petrochelidon nigricans</i>		Tree Martin	P		1	
Animalia	Aves	Turdidae	7000	<i>Zoothera sp.</i>		unidentified ground thrush	P		1	
Animalia	Aves	Zosteropidae	0574	<i>Zosterops lateralis</i>		Silvereye	P		56	
Animalia	Aves	Dicaeidae	0564	<i>Dicaeum hirundinaceum</i>		Mistletoebird	P		15	
Animalia	Aves	Estrildidae	0657	<i>Lonchura castaneothorax</i>		Chestnut-breasted Mannikin	P		6	
Animalia	Aves	Estrildidae	0662	<i>Neochmia temporalis</i>		Red-browed Finch	P		89	
Animalia	Aves	Estrildidae	0655	<i>Stizoptera bichenovii</i>		Double-barred Finch	P		10	
Animalia	Aves	Estrildidae	0653	<i>Taeniopygia guttata</i>		Zebra Finch	P		1	








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Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Aves	Motacillidae	0647	<i>Anthus novaeseelandiae</i>		Australian Pipit	P		5	
Animalia	Mammalia	Ornithorhynchidae	1001	<i>Ornithorhynchus anatinus</i>		Platypus	P		1	
Animalia	Mammalia	Tachyglossidae	1003	<i>Tachyglossus aculeatus</i>		Short-beaked Echidna	P		9	
Animalia	Mammalia	Dasyuridae	T093	<i>Antechinus sp.</i>		Unidentified Antechinus	P		1	
Animalia	Mammalia	Dasyuridae	1008	<i>Dasyurus maculatus</i>		Spotted-tailed Quoll	V,P	E	7	
Animalia	Mammalia	Peramelidae	1097	<i>Perameles nasuta</i>		Long-nosed Bandicoot	P		1	
Animalia	Mammalia	Vombatidae	1165	<i>Vombatus ursinus</i>		Bare-nosed Wombat	P		4	
Animalia	Mammalia	Petauridae	1138	<i>Petaurus breviceps</i>		Sugar Glider	P		18	
Animalia	Mammalia	Pseudocheiridae	1129	<i>Pseudocheirus peregrinus</i>		Common Ringtail Possum	P		85	
Animalia	Mammalia	Acrobatidae	1147	<i>Acrobates pygmaeus</i>		Feathertail Glider	P		1	
Animalia	Mammalia	Phalangeridae	T082	<i>Trichosurus sp.</i>		brushtail possum	P		7	
Animalia	Mammalia	Phalangeridae	1113	<i>Trichosurus vulpecula</i>		Common Brushtail Possum	P		96	
Animalia	Mammalia	Macropodidae	T108	<i>Macropod sp.</i>		unidentified macropod	P		9	
Animalia	Mammalia	Macropodidae	1265	<i>Macropus giganteus</i>		Eastern Grey Kangaroo	P		107	
Animalia	Mammalia	Macropodidae	T085	<i>Macropus sp.</i>		kangaroo / wallaby	P		82	
Animalia	Mammalia	Macropodidae	1266	<i>Osphranter robustus</i>		Common Wallaroo	P		4	
Animalia	Mammalia	Macropodidae	1242	<i>Wallabia bicolor</i>		Swamp Wallaby	P		21	
Animalia	Mammalia	Pteropodidae	1282	<i>Pteropus alecto</i>		Black Flying-fox	P		25	
Animalia	Mammalia	Pteropodidae	1280	<i>Pteropus poliocephalus</i>		Grey-headed Flying-fox	V,P	V	321	
Animalia	Mammalia	Pteropodidae	T087	<i>Pteropus sp.</i>		Flying-fox	P		130	
Animalia	Mammalia	Emballonuridae	1321	<i>Saccolaimus flaviventris</i>		Yellow-bellied Sheathtail-bat	V,P		2	
Animalia	Mammalia	Molossidae	1324	<i>Austronomus australis</i>		White-striped Freetail-bat	P		22	
Animalia	Mammalia	Molossidae	1329	<i>Micronomus norfolkensis</i>		Eastern Coastal Free-tailed Bat	V,P		24	
Animalia	Mammalia	Molossidae	T454	<i>Molossidae sp.</i>		unidentified mastiff bat	P		2	
Animalia	Mammalia	Molossidae	1938	<i>Ozimops ridei</i>		Eastern Free-tailed Bat	P		29	
Animalia	Mammalia	Vespertilionidae	1353	<i>Chalinolobus dwyeri</i>		Large-eared Pied Bat	V,P	V	1	








Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Entities in selected area [North: -33.76 West: 150.86 East: 150.96 South: -33.86] returned a total of 23,806 records of 1,447 species.

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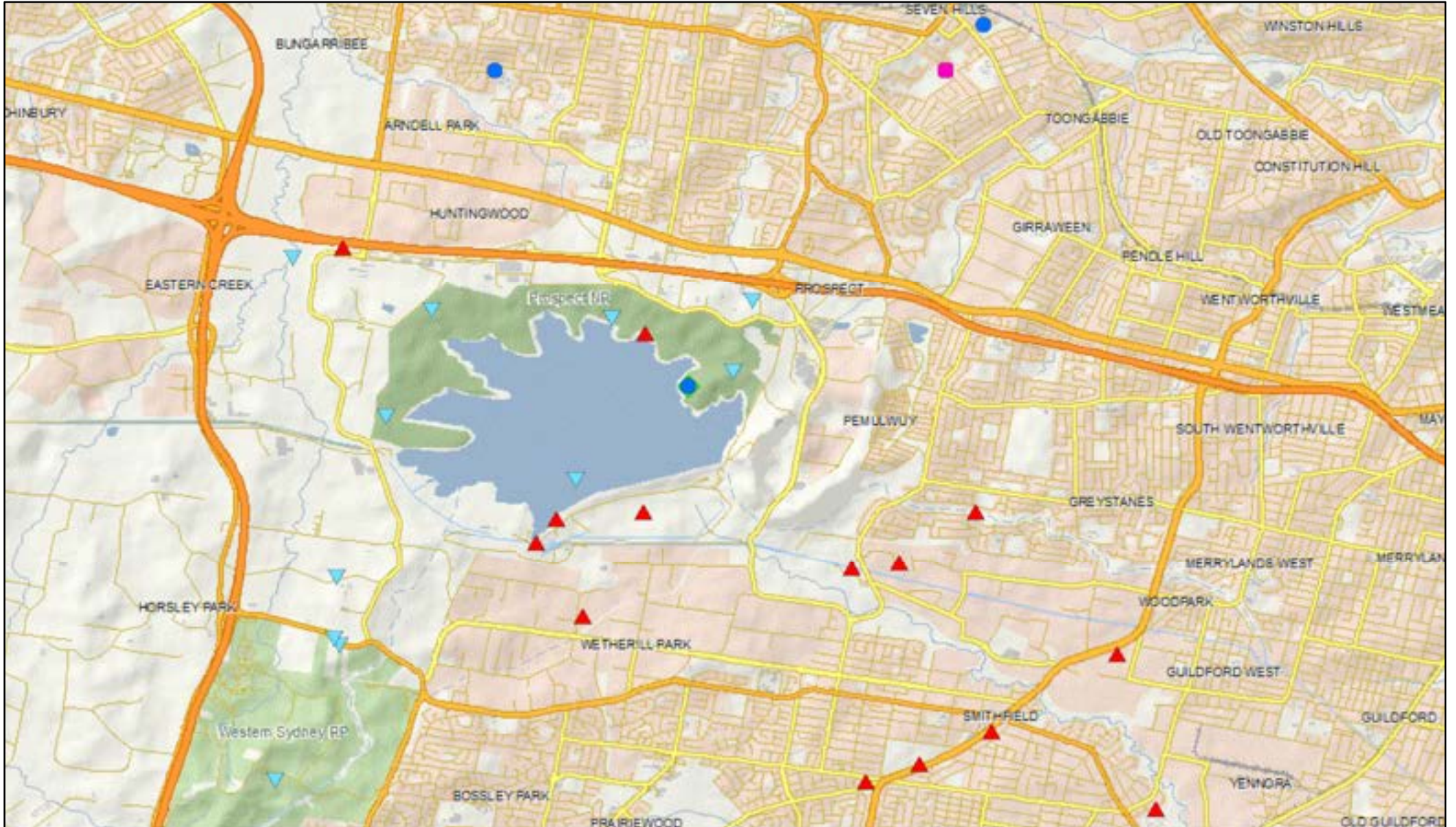
Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Mammalia	Vespertilionidae	1349	<i>Chalinolobus gouldii</i>		Gould's Wattled Bat	P		70	
Animalia	Mammalia	Vespertilionidae	1351	<i>Chalinolobus morio</i>		Chocolate Wattled Bat	P		23	
Animalia	Mammalia	Vespertilionidae	1372	<i>Falsistrellus tasmaniensis</i>		Eastern False Pipistrelle	V,P		6	
Animalia	Mammalia	Vespertilionidae	1357	<i>Myotis macropus</i>		Southern Myotis	V,P		9	
Animalia	Mammalia	Vespertilionidae	1335	<i>Nyctophilus geoffroyi</i>		Lesser Long-eared Bat	P		36	
Animalia	Mammalia	Vespertilionidae	1334	<i>Nyctophilus gouldi</i>		Gould's Long-eared Bat	P		3	
Animalia	Mammalia	Vespertilionidae	T092	<i>Nyctophilus sp.</i>		long-eared bat	P		22	
Animalia	Mammalia	Vespertilionidae	1361	<i>Scoteanax rueppellii</i>		Greater Broad-nosed Bat	V,P		11	
Animalia	Mammalia	Vespertilionidae	1365	<i>Scotorepens orion</i>		Eastern Broad-nosed Bat	P		15	
Animalia	Mammalia	Vespertilionidae	1022	<i>Vespadelus darlingtoni</i>		Large Forest Bat	P		5	
Animalia	Mammalia	Vespertilionidae	1378	<i>Vespadelus regulus</i>		Southern Forest Bat	P		7	
Animalia	Mammalia	Vespertilionidae	T088	<i>Vespadelus sp.</i>		Unidentified Eptesicus	P		1	
Animalia	Mammalia	Vespertilionidae	1379	<i>Vespadelus vulturnus</i>		Little Forest Bat	P		50	
Animalia	Mammalia	Miniopteridae	1346	<i>Miniopterus australis</i>		Little Bent-winged Bat	V,P		3	
Animalia	Mammalia	Miniopteridae	3330	<i>Miniopterus oriana oceanensis</i>		Large Bent-winged Bat	V,P		41	
Animalia	Mammalia	Muridae	T094	<i>Rattus sp.</i>		rat	P		5	
Animalia	Gastropoda	Camaenidae	I006	<i>Meridolum corneovirens</i>		Cumberland Plain Land Snail	E1		77	
Plantae	Flora	Apocynaceae	10896	<i>Marsdenia viridiflora subsp. viridiflora</i>		Marsdenia viridiflora R. Br. subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	E2		38	
Plantae	Flora	Arecaceae	6458	<i>Archontophoenix cunninghamiana</i>		Bangalow Palm	P		1	
Plantae	Flora	Arecaceae	1221	<i>Livistona australis</i>		Cabbage Palm	P		2	
Plantae	Flora	Aspleniaceae	8031	<i>Asplenium australasicum</i>		Bird's Nest Fern	P		1	

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Entities in selected area [North: -33.76 West: 150.86 East: 150.96 South: -33.86] returned a total of 23,806 records of 1,447 species.

Report generated on 22/12/2022 1:56 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Plantae	Flora	Asteliaceae	1018	<i>Cordyline stricta</i>		Narrow-leaved Palm Lily	P		1	
Plantae	Flora	Cyatheaceae	8076	<i>Cyathea cooperi</i>		Straw Treefern	P		1	
Plantae	Flora	Dicksoniaceae	8082	<i>Dicksonia antarctica</i>		Soft Treefern	P		1	
Plantae	Flora	Fabaceae (Faboideae)	3007	<i>Pultenaea parviflora</i>			E1	V	26	
Plantae	Flora	Fabaceae (Mimosoideae)	3860	<i>Acacia pubescens</i>		Downy Wattle	V	V	54	
Plantae	Flora	Gleicheniaceae	11175	<i>Sticherus flabellatus</i> var. <i>flabellatus</i>		Umbrella Fern	P		1	
Plantae	Flora	Marsileaceae	8140	^^ <i>Pilularia novae-hollandiae</i>		Austral Pillwort	E1,3		1	
Plantae	Flora	Myrtaceae	4204	<i>Kunzea ambigua</i>		Tick Bush	P		5	
Plantae	Flora	Orchidaceae	7622	<i>Microtis parviflora</i>		Slender Onion Orchid	P		1	
Plantae	Flora	Orchidaceae	9615	^ <i>Pterostylis saxicola</i>		Sydney Plains Greenhood	E1,P,2	E	1	
Plantae	Flora	Orchidaceae	PTER	<i>Pterostylis</i> spp.		Greenhood	P		2	
Plantae	Flora	Proteaceae	10917	<i>Grevillea juniperina</i> subsp. <i>juniperina</i>		Juniper-leaved Grevillea	V		6	
Plantae	Flora	Proteaceae	5460	<i>Persoonia lanceolata</i>		Lance Leaf Geebung	P		1	
Plantae	Flora	Proteaceae	5463	<i>Persoonia linearis</i>		Narrow-leaved Geebung	P		1	
Plantae	Flora	Pteridaceae	7997	<i>Adiantum aethiopicum</i>		Common Maidenhair	P		1	
Plantae	Flora	Pteridaceae	7999	<i>Adiantum formosum</i>		Giant Maidenhair	P		1	
Plantae	Flora	Rutaceae	10593	<i>Philotheca myoporoides</i> subsp. <i>myoporoides</i>			P		4	
Plantae	Flora	Thymelaeaceae	6965	<i>Pimelea curviflora</i> var. <i>curviflora</i>			V	V	2	
Plantae	Flora	Thymelaeaceae	6190	<i>Pimelea spicata</i>		Spiked Rice-flower	E1	E	153	

Atlas Map



November 9, 2022

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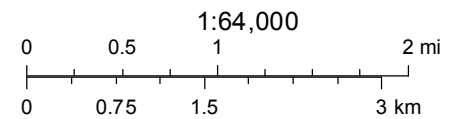
▲ Green and Golden Bell Frog (*Litoria aurea*)

● Fork-tailed Swift (*Apus pacificus*)

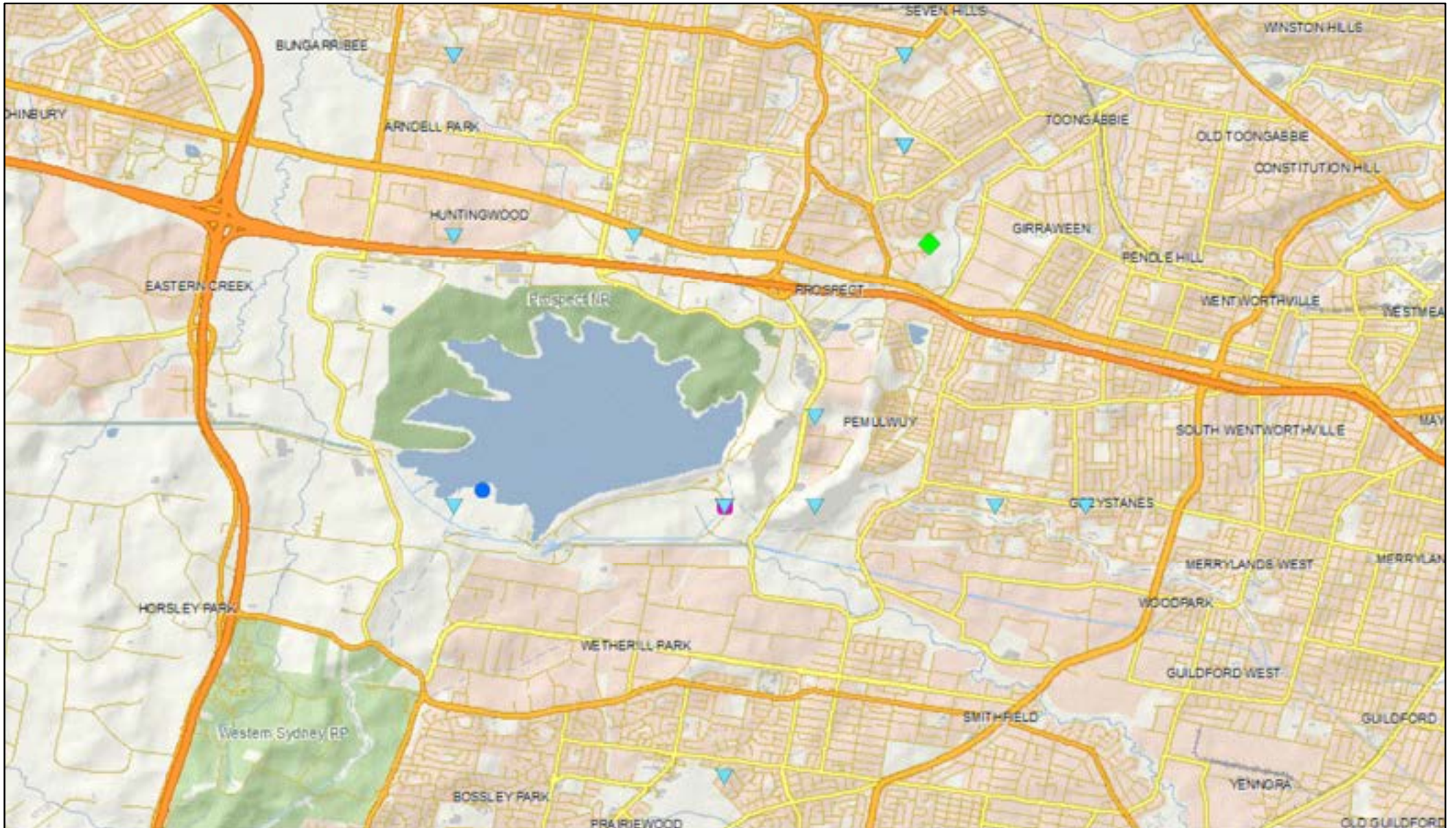
◆ White-throated Needletail (*Hirundapus caudacutus*)

▲ Little Eagle (*Hieraetus morphnoides*)

■ Black Falcon (*Falco subniger*)



Atlas Map



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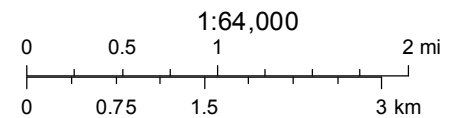
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● Latham's Snipe (*Gallinago hardwickii*)

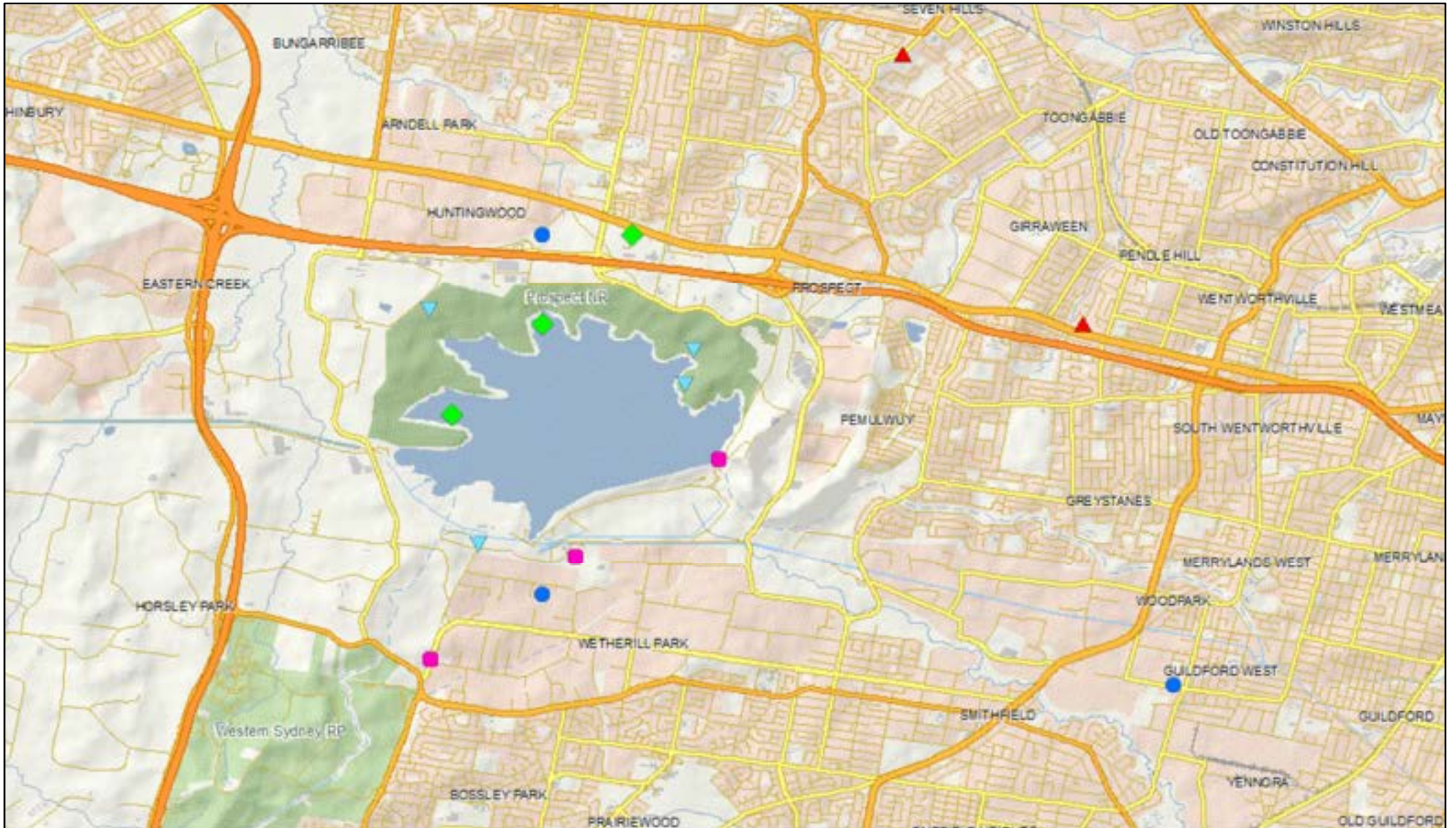
◆ Little Lorikeet (*Glossopsitta pusilla*)

▲ ^Swift Parrot (*Lathamus discolor*)

■ ^Turquoise Parrot (*Neophema pulchella*)



Atlas Map



November 9, 2022

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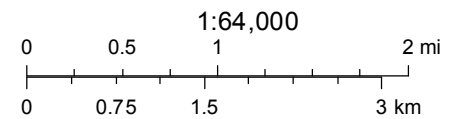
▲ ^^Barking Owl (*Ninox connivens*)

● ^^Powerful Owl (*Ninox strenua*)

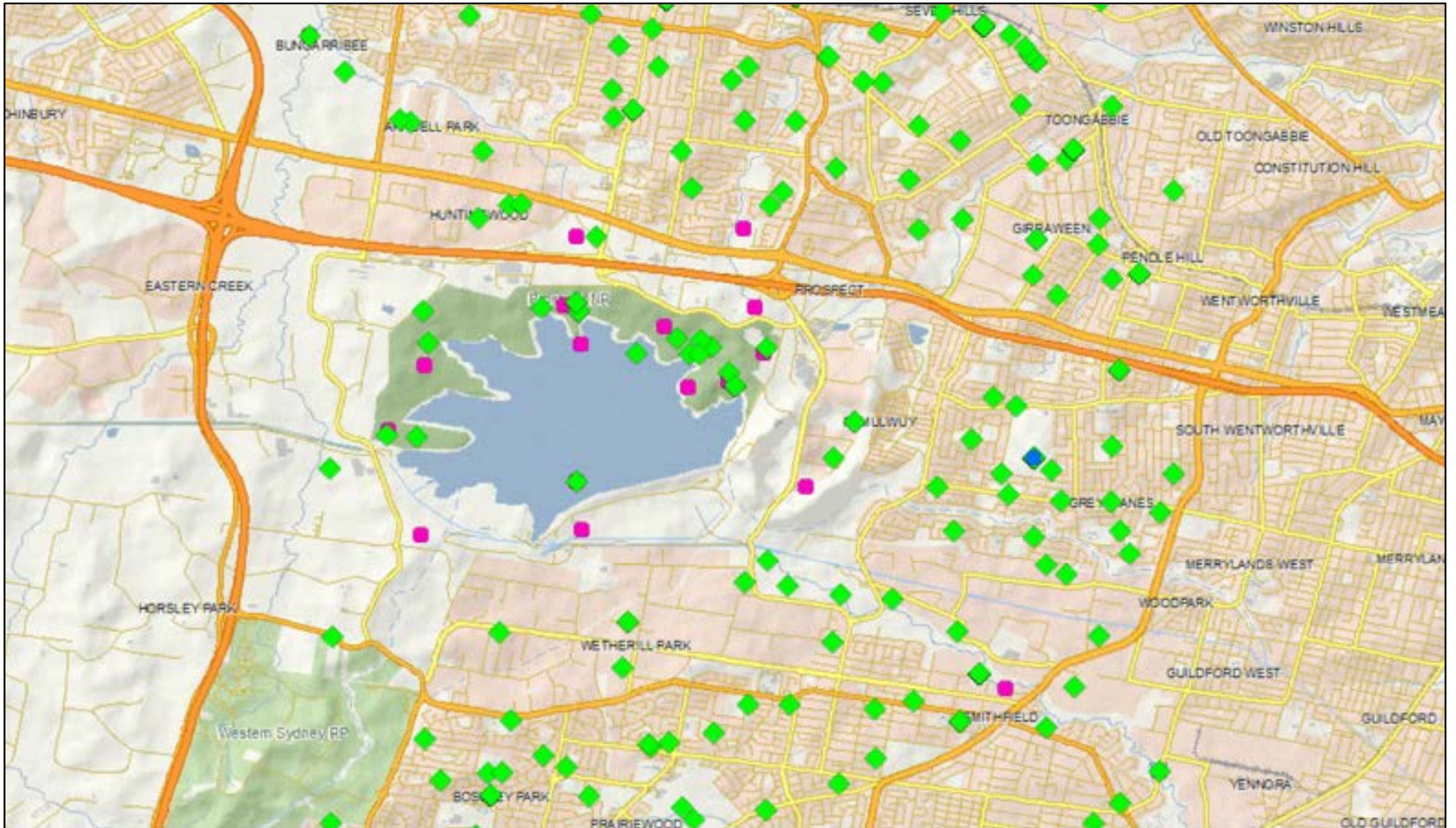
◆ ^^Masked Owl (*Tyto novaehollandiae*)

▼ Varied Sittella (*Daphoenositta chrysoptera*)

■ Dusky Woodswallow (*Artamus cyanopterus cyanopterus*)



Atlas Map



November 9, 2022

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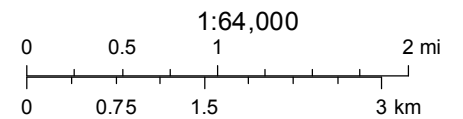
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● Spotted-tailed Quoll (*Dasyurus maculatus*)

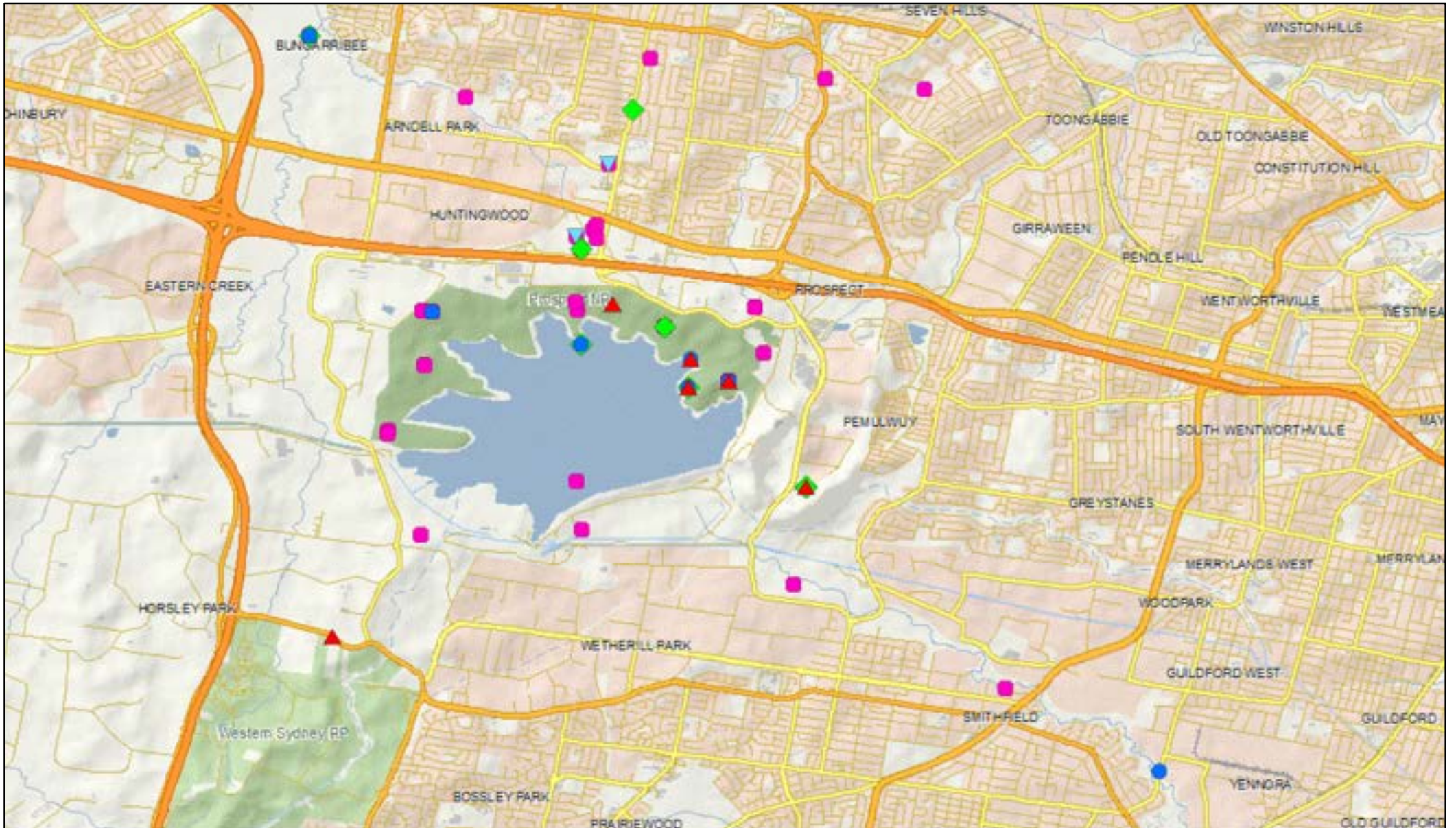
◆ Grey-headed Flying-fox (*Pteropus poliocephalus*)

▲ Yellow-bellied Sheath-tail-bat (*Saccolaimus flaviventris*)

■ Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*)



Atlas Map



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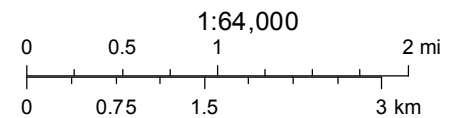
▲ Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)

● Southern Myotis (*Myotis macropus*)

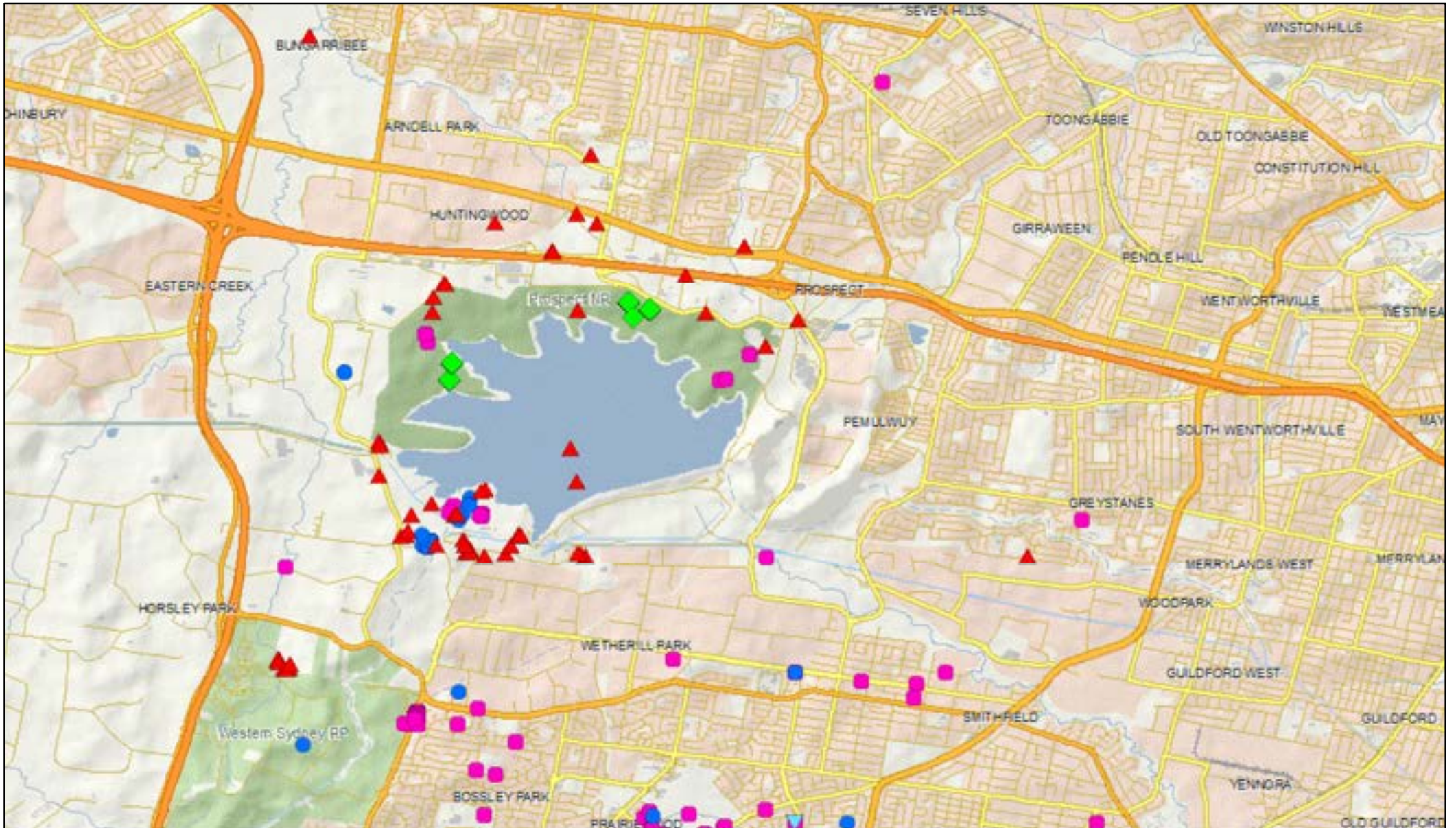
◆ Greater Broad-nosed Bat (*Scoteanax rueppellii*)

▼ Little Bent-winged Bat (*Miniopterus australis*)

■ Large Bent-winged Bat (*Miniopterus orianae oceanensis*)



Atlas Map



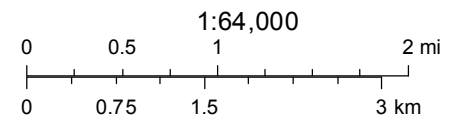
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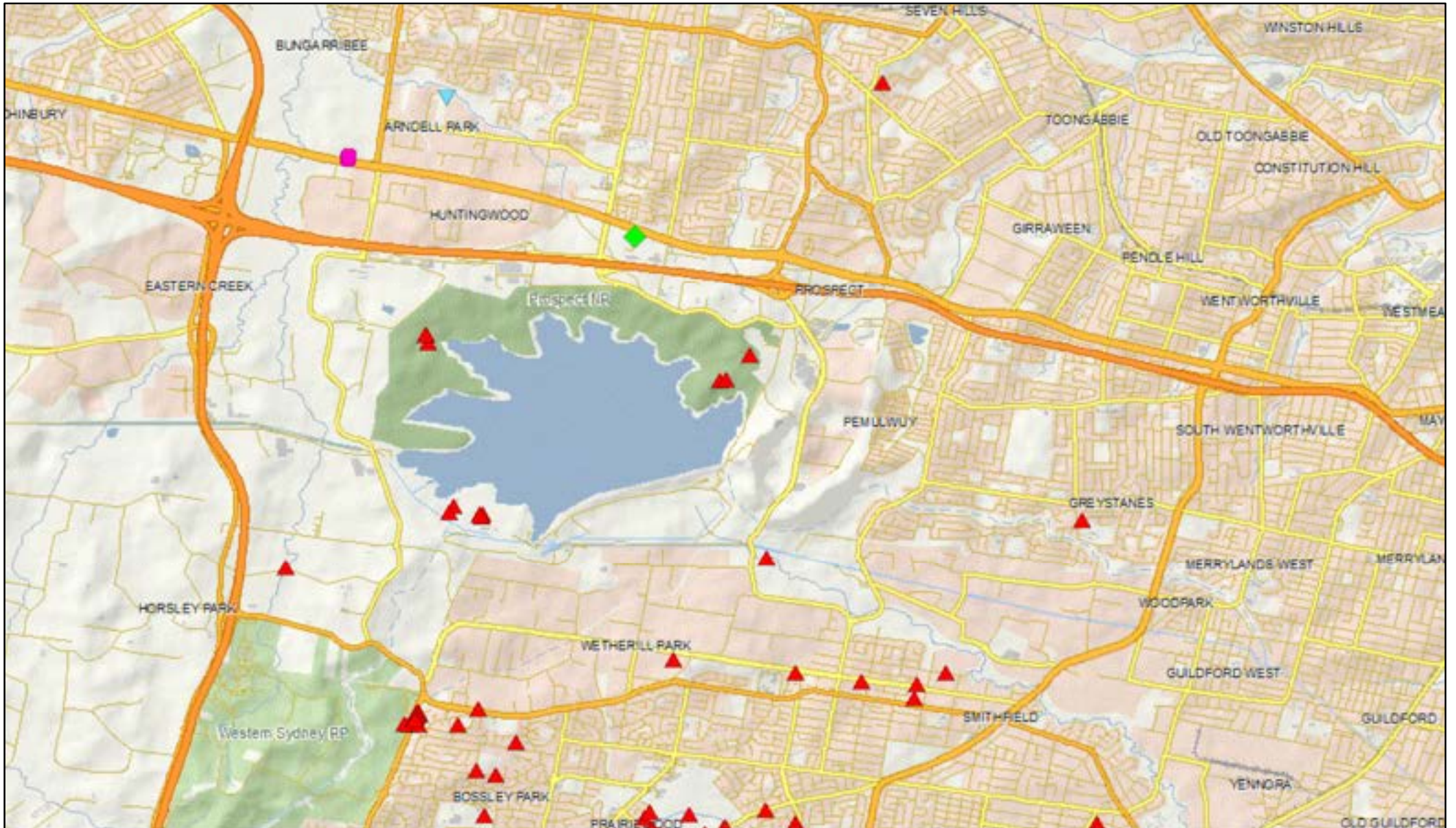
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▲ Cumberland Plain Land Snail (*Meridolum corneovirens*)

● Marsdenia viridiflora R. Br. subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas



Atlas Map



November 9, 2022

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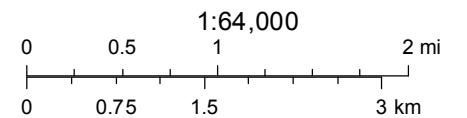
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▲ Downy Wattle (*Acacia pubescens*)

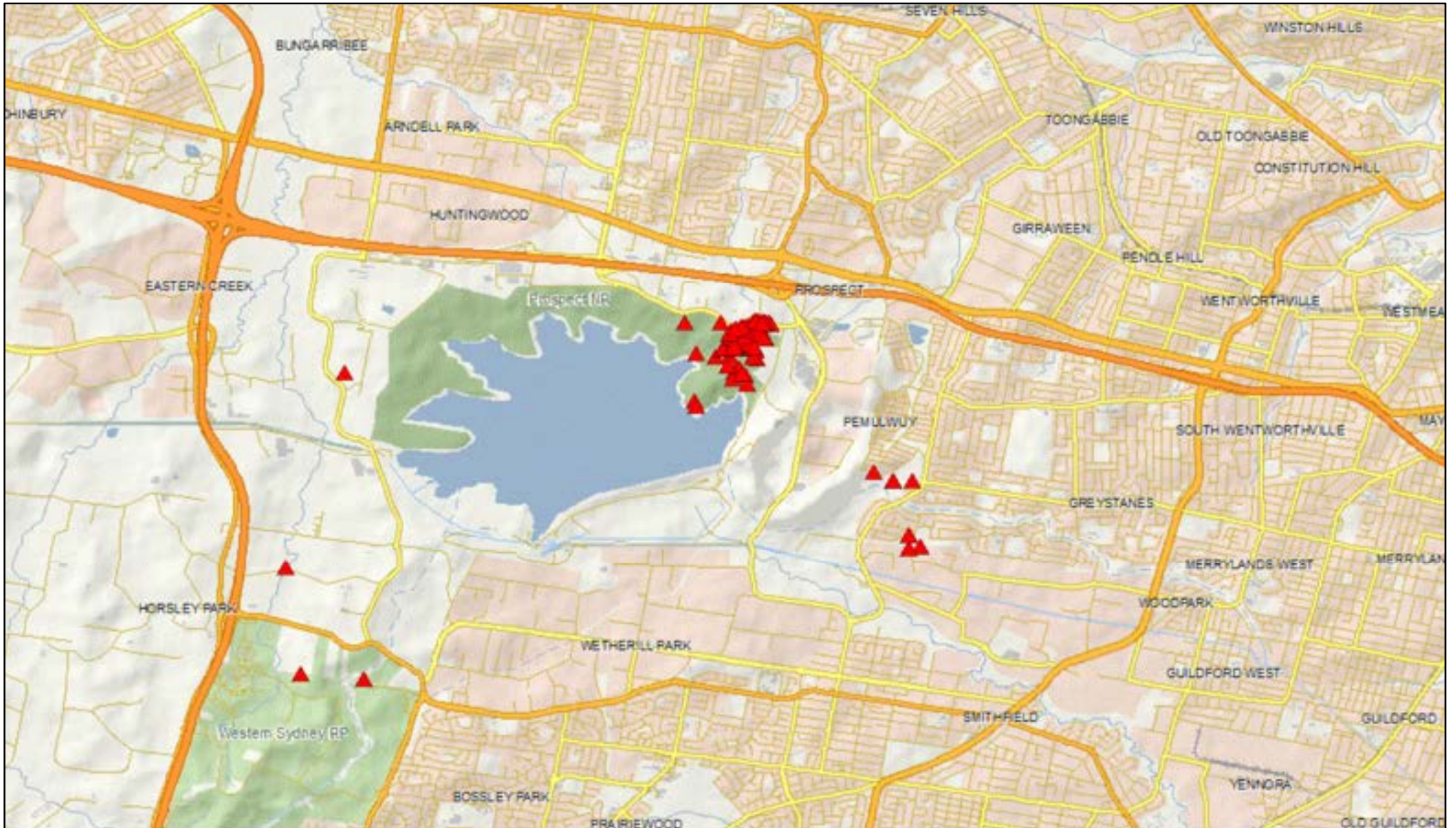
◆ ^Sydney Plains Greenhood (*Pterostylis saxicola*)

▲ Juniper-leaved Grevillea (*Grevillea juniperina* subsp. *juniperina*)

■ *Pimelea curviflora* var. *curviflora*



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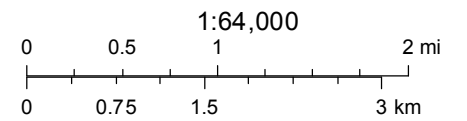


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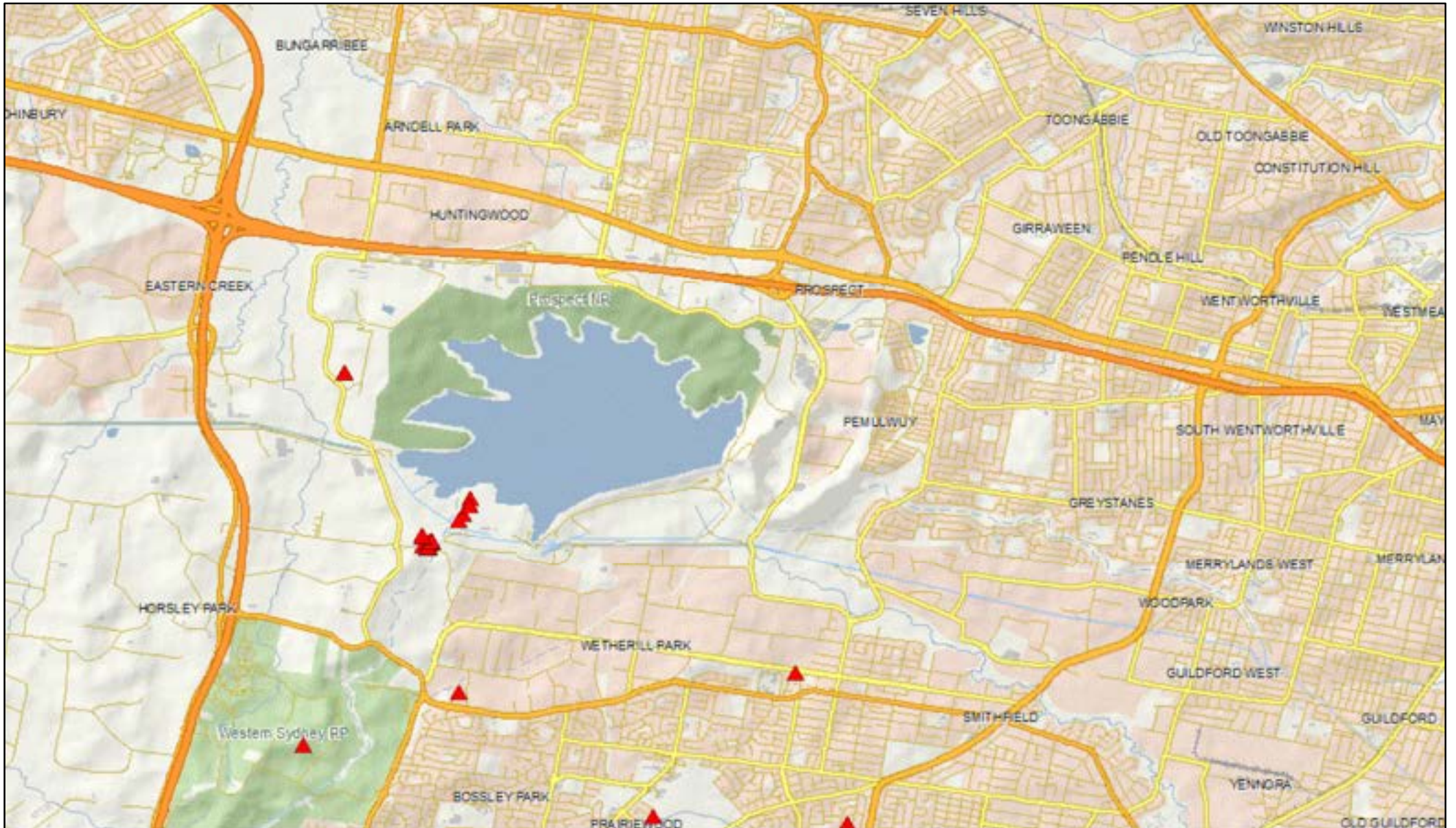
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▲ Spiked Rice-flower (*Pimelea spicata*)



Atlas Map

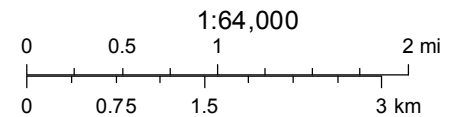


November 9, 2022

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▲ Marsdenia viridiflora R. Br. subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas



Appendix H Vegetation Management Plan

VEGETATION MANAGEMENT PLAN

**Prospect Reservoir
Endeavour Energy Communications Tower**

January 2023.

**Prepared for Endeavour Energy by
Roger Lembit B.Sc.Agr
Gingra Ecological Surveys**

**Gingra Ecological Surveys
P.O. Box 1
Canterbury NSW 2193**

1. INTRODUCTION

Endeavour Energy is planning construct a communications tower within the Prospect Reservoir precinct. The precinct has heritage significance, and a Visual Impact Assessment (VIA) has been completed in response to a submission by the NSW Heritage Council. Following consideration of the VIA the Heritage Council have requested the preparation of a Vegetation Rehabilitation Strategy. As this report identifies bush regeneration and tree planting options it was considered that titling it as a Vegetation Management Plan was more appropriate.

The VIA indicated that existing vegetation would mitigate the visual impact of tower construction to a large degree. Endeavour Energy now wish to develop a Vegetation Management Plan (VMP) to identify measures such as plantings or bush regeneration which can be undertaken to further reduce the visual impact of the proposal and to protect the heritage landscape.

The objectives of this VMP are:

- The establishment of an Asset Protection Zone (APZ) by the selective removal of vegetation components in a manner that is consistent with Rural Fire Service (RFS) requirements;
- Management of vegetation to allow for native trees in sightlines to mature and attain a height which will mitigate visual impact;
- Selective planting of appropriate tree species to reduce visual impact at key viewing locations, and;
- The retention of vegetation and trees that contribute to wildlife corridors and provide habitat for native fauna.

2. PLANNING CONTEXT

The proposal takes place at a site with a complex layer of interests. The land on which the tower is to be constructed is managed by Sydney Water which operate Prospect Reservoir. Management of land within the Prospect Reservoir precinct is subject to the Property Environmental Management Plan (PEMP) Prospect Reservoir, Reservoir Road WS0095 (Sydney Water 2001). The PEMP deals with the Reservoir lands in different sections. The sites discussed in this VMP include parts of the areas identified as the southern and eastern sides.

The following planning instruments are relevant to the subject area:

- Blacktown Local Environmental Plan 2015
- State Environmental Planning Policy (Western Sydney Employment Area) 2009 (SEPP (WSEA))
- State Environmental Planning Policy (Western Sydney Parklands) 2009 (SEPP (WSP))

Prospect Reservoir Site and associated works is one of the 59 assets owned by Sydney Water Corporation that is listed on the State Heritage Register. Sydney Water commissioned the preparation of a Conservation Management Plans (CMP) which was completed in 2005 and then approved by NSW Heritage in 2006 (Sydney Water Corporation 2005).

As indicated above NSW Heritage have expressed concerns relating to the visual impact of the proposed 60 m high communications tower. Endeavour Energy responded to this by commissioning a Visual Impact Assessment (EMM 2022).

This VMP seeks to ensure any proposed vegetation management is consistent with the PEMP and to ensure any planting scheme has regard to the CMP and additional elements of heritage significance such as historic plantings which are associated with key themes identified in the CMP. A meeting was held with Sydney Water staff during the preparation of this VMP and elements of the meeting discussion have been incorporated in the approach adopted in this report.

3. SITE DESCRIPTION

The site for construction of the communications tower is on a high ridge near the top of Prospect Hill and close to the eastern boundary of the Prospect Reservoir lands. The site is to the south of existing water reservoirs. To the east is the former quarry, now being redeveloped. Access to the site is via William Lawson Drive, which is also the access road for Sydney Water staff and members of the public using facilities provided with the Prospect Reservoir lands including picnic areas and lookouts.

The land is gently inclined along the ridge crest, dropping more steeply to the west towards William Lawson Drive.

The eastern side of the Prospect Hill ridge drains into Girraween Creek, a tributary of Toongabbie Creek and the Parramatta River. Western Slopes are in the catchment of Prospect Reservoir, an artificial impoundment in the head catchment of Prospect Creek, a tributary of the Georges River.

Whilst the majority of the Prospect Reservoir lands are within the Blacktown soil landscape, Prospect Hill is mapped as being within the Volcanic soil landscape (Hazelton, Bannerman & Tillie 1989). The Volcanic soil landscape features red podzolic soils associated with the Jurassic dolerite intrusion found at Prospect (Australian Museum 2018).

Whilst the primary function of the Prospect Reservoir lands is as an intermediate water storage fed by pipes and canals from Warragamba Dam and the Metropolitan catchments, the lands also serve as a workplace and recreational site.

The areas of land subject to this VMP fall within the Blacktown local government area. The land lies within the Central Coast botanical subdivision.

3.1 Existing Vegetation and Habitat

Vegetation patterns across the Prospect Reservoir lands have been mapped by Total Earth Care (2018).

The vicinity of the tower location includes areas classed as Native/Exotic Grassland and Exotic Shrubland. These vegetation classes appear to also include stands of native trees with a disturbed understorey. Tree species include Forest Red Gum (*Eucalyptus tereticornis*), Coastal Grey Box (*E. moluccana*) and Narrow-leaved Ironbark (*E. crebra*). The dominant exotic shrubs are Large-leaved Privet (*Ligustrum lucidum*), African Olive (*Olea europaea* subsp. *cuspidata*) and Lantana (*Lantana camara*).

The PEMP divides the Prospect Reservoir lands into a set of management zones. The vicinity of the communications tower is classed as Zone W Weed Management as is the entrance precinct along William Lawson Drive.

4. VEGETATION MANAGEMENT OPTIONS

The strategy for reduced visual impact of the communications tower is to provide conditions conducive to the growth and survival of native trees in the vicinity of the tower in order that they increase in height, together with selective plantings to screen the tower from viewing points.

A number of viewing points were assessed to allow consideration of vegetation management options which would address visual impact. These included the entrance along William Lawson Drive, the tower location itself and the Prospect Hill ridgeline, William Lawson Drive near the Sydney Water Offices, the Valve House and Maunder Lookout and the associated picnic area. Options for vegetation management are discussed below. A plan identifying preferred locations is included as Figure 1.



Figure 1. Vegetation Management locations

Tower Location

The vegetation in this area includes native tree species and exotic shrubs and grasses.

The preferred management of this area is implementation of bush regeneration works to remove exotic shrubs which are competing with the native tree species.

This management approach is consistent with the PEMP.

A separate bushfire management report is recommending the creation of a 10 m radius Asset Protection Zone (APZ) around the edge of the fenced tower footprint. Achievement of this APZ is possible through selective removal of exotic shrubs. Lopping of branches of native trees may also be necessary to achieve crown separation. A small dead eucalypt tree to the south-west of the tower is recommended for removal. The tree should be laid on the ground across not down the slope to provide habitat.

Sightline from South

Figure 2 shows that there is a gap in tree cover when viewing the tower location from the south.



Figure 2. View of tower location from northern end of Maunder Lookout car park

This gap can be filled by planting of up to 10 trees in the somewhat more clear area seen in the centre of Figure 2. The tree species to be used would be Forest Red Gum (*E. tereticornis*) and Coastal Grey Box (*E. moluccana*). Stock in 15 to 20 cm pots is recommended as these are likely to have a higher survival rate than advanced stock.

Supplementary planting of up to 50 Cumberland Plain Woodland Shrubs is recommended in this area. The shrub species to be used are Hop Bush (*Dodonaea viscosa* subsp. *cuneata*), Native Indigo (*Indigofera australis*) and Sickle Wattle (*Acacia falcata*).

These plantings would need protection to prevent damage from browsing animals. It is also recommended the area around the plantings be periodically mown or slashed to reduce competition. The plantings should be maintained for five years.

Sightlines from West

Consideration was given to potential for screening of the tower from the area around the Sydney Water offices along William Lawson Drive (see Figure 3). Such an approach was not considered appropriate as the lower area has historically been cleared and there are utilities in the area including water pipelines and electricity supply lines.



Figure 3. View of tower location from vicinity of Sydney Water offices

Another potential viewing point assessed was the Valve House area. It was determined that existing vegetation and the intervening landform provided effective screening from this location (Figure 4).



Figure 4. View towards tower location from Valve House

William Lawson Drive

Whilst views of the tower from William Lawson Drive in the vicinity of Andrew Campbell Reserve are not likely to be of high impact planting along the eastern side of the Drive is proposed. Consideration was given to an extension to the existing Hoop Pine avenue, consistent with the historic nature of the avenue. An aerial photograph from January 1956 shows that the avenue then extended to a point north-east of a house on the western side of William Lawson Drive (Figure 5). It is not considered appropriate to extend planting of Hoop Pine beyond the limit seen in the historic evidence, but replacement of trees which have died along the historic section could be undertaken.



Figure 5. Northern end, William Lawson Drive 1/1/1956

Figure 5 shows additional plantings along William Lawson Drive to a point opposite Prospect History Cottage, including what is now a large Lemon-scented Gum (*E. citriodora*). In the early 1980s secondary plants occurring to the east of the Drive in two rows using species including Hoop Pine and Monterey Pine (Figure 6). Some of the Monterey Pines have now died, possibly due to the 2018-19 drought. Hoop Pine saplings have now established as a tertiary tree layer along the rows in the north.

It is proposed to undertake infill planting along the two rows of trees, avoiding infrastructure such as a water main, electricity supply line, fencing and an access way to the paddock. The area may be prone to saturated soil profiles during wet conditions so careful tree species selection may be required.

Suitable local native tree species would include Spotted Gum (*Corymbia maculata*), Forest Red Gum (*E. tereticornis*) and Cabbage Gum. Additional planting of Lemon-scented Gum is not recommended as this species seeds readily and has the potential to become a future management problem.



Figure 6. Eastern side of William Lawson Drive

5. RECOMMENDED MANAGEMENT

This section includes a summary of the management actions proposed for this Vegetation Management Plan. Action and timing seeks to align with actions in Table 4-1 of the PEMP. Works may be undertaken by Endeavour Energy or outsourced and incorporated in a site wide vegetation management plan subject to agreement with Sydney Water and subject to the discussion and recommended actions in this Plan.

Location	Action	Timing
Vicinity of Tower	Establishment of APZ	Within 3 months of tower construction
	Bush regeneration ¹	5 years from construction completion
Ridgeline to south of Tower	Tree planting & protection	Spring 2023
	Mowing/slashing	Monthly from September – March 2023-2028
William Lawson Drive ²	Infill tree planting	Spring 2023, annual assessment of planting success in spring

NOTES

- 1 Contribute to Sydney Water bush regeneration works subject to agreement between Endeavour Energy & Sydney Water
- 2 Section between Andrew Campbell Reserve and Prospect Heritage Cottage (eastern side)

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- Australian Museum (2018) *The Sydney Basin. Igneous Activity*. website
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Reservoir Road WS0095*. Sydney Water, Sydney.
- Total Earth Care (2018) *Biodiversity Assessment – Prospect Reservoir*. Total Earth Care,
Warriewood.

Appendix I Bushfire Risk Assessment



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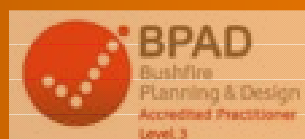
Bush Fire Risk Assessment



**Proposed Communications Tower
Prospect Reservoir**

Prepared for Endeavour Energy

Project No. BA230123



Report Title	Bush Fire Risk Assessment
Project	Proposed Communications Tower
Property	Prospect Reservoir
Client	Endeavour Energy
Report Number	BA230123
Draft/Final	Final – 14 February 2023

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Date: 14 February 2023

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1. Executive Summary

The bush fire risk assessment relates to a proposed installation of a communications tower on land identified as Lot 304 DP 1122291, Picrite Close, Wetherill Park (Prospect Reservoir). The details relevant to the assessment are:

Real Property Description	Lot 304 DP 1122291
Property Address	Picrite Close, Wetherill Park (Prospect Reservoir)
Date of Assessment	13 October 2022
Fire Danger Index	100 (Greater Sydney Region)
Zoning	SP2 – Infrastructure
Local EPI	Blacktown Local Environmental Plan 2015 Cumberland Local Environmental Plan 2021 Fairfield Local Environmental Plan 2013 Holroyd Local Environmental Plan 2013
Proposed Development	Communications tower and associated infrastructure
Existing Building	Yes (various buildings and infrastructure)
Assessment based on plans by	Endeavour Energy
Plan Date/Reference Number	Plan date: 14/12/2022; Reference no: 528567
Any amendments to plan?	None indicated
What is the highest assessed BAL as per PBP?	BAL-FZ
Can this development comply with the acceptable solution provisions of PBP?	Yes (as per PBP 8.3.7 & the RFS Practice Note 1/11)
Assessment by	Steve Britt Accredited BPAD Practitioner Accreditation No: BPAD9334

This is to certify that bush fire risks can be satisfactorily managed for the proposed development, subject to recommendations 1-4.

2. Introduction

2.1 Background

FloraFauna Consulting has been engaged by Endeavour Energy to undertake a bushfire risk assessment in relation to a proposed communications tower on land at Prospect Reservoir in Sydney's west. The subject site comprises land identified as Lot 304 in DP 1122291, which is zoned SP2 – Infrastructure. The proposed development involves the installation of a new communications tower together with an equipment building, associated electrical equipment and cabling, and fenced compound. This report has been prepared to inform the potential bush fire risk and propose measures to mitigate the risk for the proposed development.

2.2 Legislative Context

Development on land that has been determined as bush fire prone must meet specific requirements under NSW legislation. *Planning for Bushfire Protection 2019* (PBP) is the current legislated document for specifying the requirements for building on bush fire prone land (BFPL) in NSW. PBP contains specific provisions in relation to 'telecommunications towers' (communications facilities), which states they should be designed in such a way as to minimise the impact of bush fire. In addition, the NSW Rural Fire Service (RFS) has produced the document; *Practice Note 1/11 – Telecommunication Towers in Bushfire Prone Areas* (RFS Practice Note), which provides direction on the provision of bush fire protection measures that should be applied to communications tower facilities that are located in bush fire prone areas. These measures include provision of a 10 metre wide Asset Protection Zone (APZ), which is only concerned with the underlying infrastructure required to support such facilities. Typically, the infrastructure to be protected comprises structures and buildings. Essential equipment should be designed and housed in such a way as to minimise the impact of bush fire on the capabilities of the infrastructure to provide communications during bush fire emergencies. The Practice Note also states that infrastructure does not include road access to the site, power or other services to the site and associated fencing.

2.3 The Locality

The subject site is located on Sydney Water land at Prospect Hill in western Sydney, adjacent to the Prospect Reservoir. The reservoir and associated infrastructure are the most prominent landscape features of the locality. The surrounding land use is a mix of urban, commercial and industrial with areas of agricultural land to the west. The relative position of the proposed communications tower within the landscape is shown on the locality map at Figure 1 on the following page.



Figure 1: Locality map (location of proposed development site circled)

2.4 Subject Site and Development Footprint

The proposed communications tower facility is located on the southern hillslope of Prospect Hill at an elevation of approximately 110 metres asl and is accessed from William Lawson Drive via an internal Sydney Water access road. The land on which the proposed facility will be located is identified as Lot 304 DP 1122291. The proposed facility site is situated approximately 100 metres to the southwest of the existing water reservoir tanks located near the top of Prospect Hill. The approximate centre of the proposed facility site is located at latitude -33.822043, longitude 150.914234. The following images (Figures 2-10) show the general conditions in proximity to the development site. Figure 11 on page 14 is an aerial image showing the relative position of the proposed development within the subject site and the conditions on the adjacent land.

2.5 Proposed Development

The proposal involves the installation of 60 metres high communications tower, together with an equipment building and associated electrical equipment and cabling, which will be enclosed within a fenced compound measuring 15 metres by 15 metres. It is also proposed to establish a new pole mounted substation to the southwest of the communications tower facility that will be connected to an existing overhead power supply that extends to the northwest within the Sydney Water land. Provision of power from the new substation to the proposed communications tower facility will be via an underground power supply that will require a trench of approximately 63 metres long.



Figure 2: View of the proposed development site from the south-western side



Figure 3: View looking directly north from the proposed development footprint



Figure 4: View looking northeast along the existing access road from the proposed development footprint



Figure 5: View looking southeast from the access road adjacent to the proposed development footprint



Figure 6: View looking southwest along the existing access road from the proposed development footprint



Figure 7: View looking southwest across the proposed development footprint



Figure 8: View of the vegetation adjacent to the northwest margin of the proposed development footprint



Figure 9: View of the vegetation adjacent to the northwest margin of the proposed development footprint



Figure 10: View of the dense understorey vegetation on the adjacent northwest slope



Figure 11: Aerial imagery of the proposed communications tower facility within subject site

3. Bush Fire Risk Assessment

The subject site is situated on bush fire-prone land. The bush fire prone land map for the area, obtained from the ePlanning Spatial Viewer (NSW Department of Planning and Environment) indicates that the proposed development footprint is located on land containing bush fire-prone Category 1 vegetation (shown red). This is not considered to be an accurate indication of the bush fire risk present at the site as much of the mapped land contains areas that are either unvegetated or vegetation that is highly modified and would be better represented as being Category 2 vegetation. Notwithstanding the inaccuracies of the mapping, there is little doubt that the land is bush fire prone, with the intent of the mapping to act as trigger for bush fire risk to be consideration for any proposed development of the land being achieved. The extract of the bush fire-prone land map showing the subject site and surrounding land is provided in Figure 13 on the following page. The bush fire risk assessment has been undertaken for the proposed Endeavour Energy communications tower facility as detailed on the overall site plan and detailed site prepared by Endeavour Energy, reference No. 528567, dated 14 December 2022, which are appended to this report as Appendix A.

3.1 Vegetation Assessment

The State Vegetation Type Map (SVTM) indicates the vegetation within the proposed development footprint and on the adjacent land is not native, however the findings of the field survey suggest that the vegetation around the proposed development footprint comprises remnant native vegetation in association with an assemblage of exotic species. The canopy contained three native eucalypt species and although dominated by exotics, several native species were recorded in the groundcover. Based on the assemblage of native species recorded at the site and proximity of mapped Plant Community Types (PCTs) in the surrounding landscape, the vegetation is considered to be a highly disturbed remnant of PCT 3320: *Cumberland Shale Plains Woodland*, or less likely PCT 3319: *Cumberland Shale Hills Woodland*, which overlaps with PCT 3320 and has a similar species assemblage but typically occurs on higher elevation hills and ridges. The presence of *Acacia parramattensis*, *Acacia decurrens* and *Acacia falcata* helps to distinguish PCT 3320 from PCT 3319, which typically includes *Acacia implexa*. A small stand of *Acacia parramattensis* was recorded opportunistically nearby on land adjacent to the water storage tanks to the north of the site, which indicates that PCT 3320 is the more likely plant community that the remnant vegetation is associated with. The site's landscape position and the underlying geology suggest that the plant community located in proximity to the proposed development footprint is not associated with any listed TEC.

The vegetation in proximity to the proposed development site is highly modified and disturbed in association with past clearing, the land use and existing adjacent infrastructure. The vegetation has a reduced canopy resembling a woodland community. To the northeast and southwest the understorey is absent, and the groundcover is maintained to a low height. To the northwest the understorey is dense and comprised mostly of exotic species that are considered to be environmental weeds. To the southeast the land is developed and does not contain any unmanaged vegetation. Based on the Keith vegetation formation descriptions provided under A1.2 of PBP, the vegetation formation within 140 metres around the development footprint incorporating the proposed Endeavour Energy communications tower facility site was determined as being woodland in all directions except the east.



Figure 12: Extract of bush fire prone land map, position of development site indicated by arrow

3.2 Effective Slope

The effective slope is the slope of the land under the classified vegetation as this is the slope that directly influences bush fire behaviour including the rate of spread, the severity of the fire and the level of radiant heat. The effective slope was determined during the site assessment using a Suunto Tandem 360PC/360R clinometer and validated by Six Map topographic data produced by Spatial Services (NSW Government). The site is characterised by mostly slight to moderate slopes on the adjacent land. The slopes on the land to the southeast are very steep, however in this direction the land is managed in associated with an industrial area and does not contribute to the potential bush fire risk at the site. The effective slopes in each direction as determined on site are shown in Table 1 below.

Table 1: Effective slope applicable to the proposed development

Direction	Vegetation	Slope (degrees)
Northeast	Woodland	0
Southeast	Managed	Not assessed
Southwest	Woodland	6
Northwest	Woodland	15

NOTE: All upslopes are indicated as 0 degrees

The slopes to the northeast and southwest are unambiguous and were readily discernible onsite and verified by the topographic data. The slopes to the northwest are locally variable, but generally around 15 degrees. Therefore, 15 degrees (downslope) has been applied as the effective slope in the northwest direction. Six Map imagery showing the two metre contours around the proposed development footprint is shown in Figure 13 on page the following page.

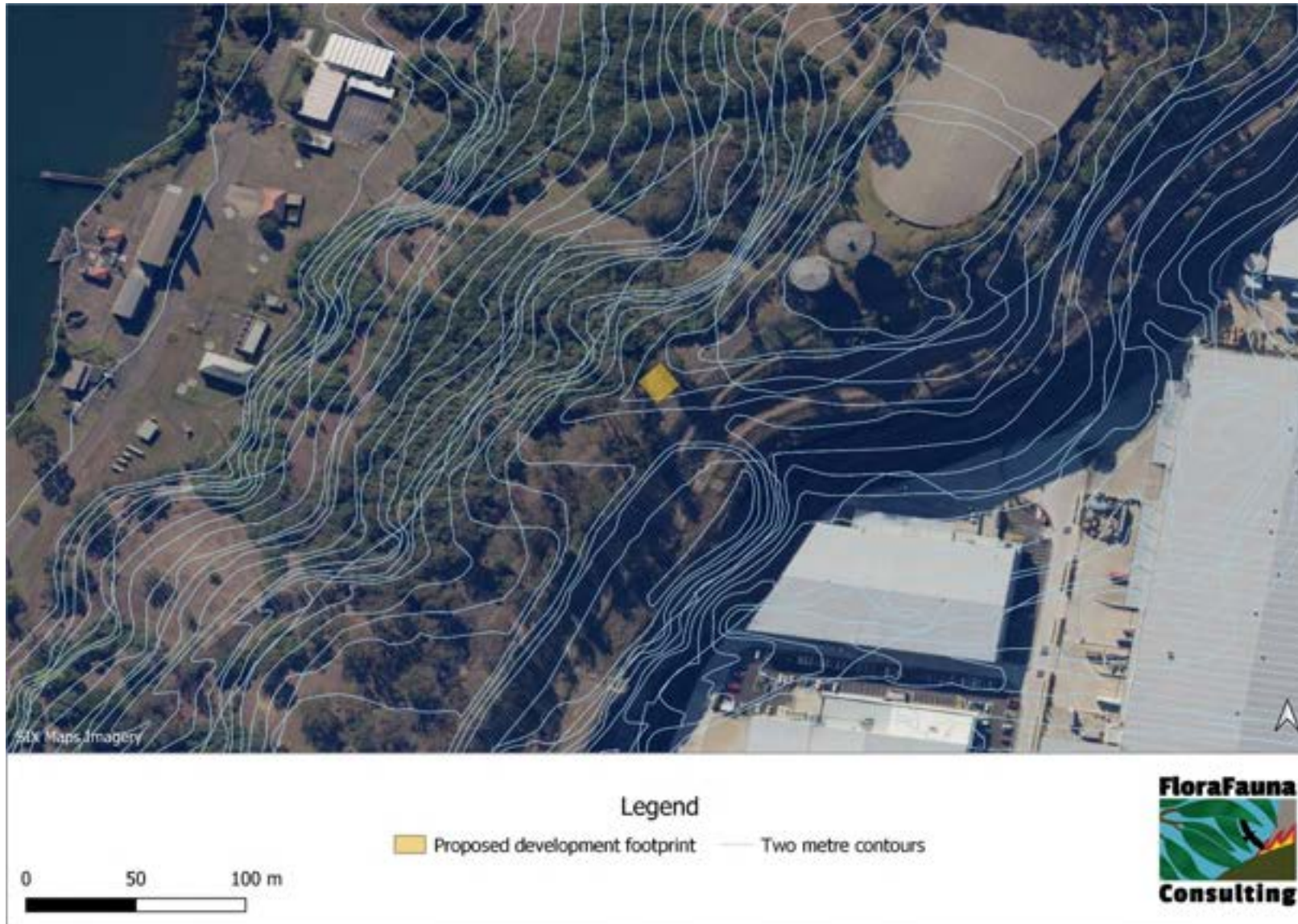


Figure 13: Aerial image with contours showing slopes in proximity to the development footprint

3.3 Forest Fire Danger Index (FFDI)

The FDI for the Sydney basin, including the areas in and around the Prospect Reservoir is FFDI 100.

3.4 Separation

There is existing separation between the proposed Endeavour Energy communications tower facility and the classified vegetation in the north-eastern and south-western directions provided by the existing management regime of the land. It is proposed to provide a 10 metre wide APZ (measured from the infrastructure) on the northeast, southwest and northwest sides of the facility that is unlikely to necessitate removal of any tree or other significant vegetation. To the northwest, removal of some understorey vegetation comprising environmental weeds, including *Ligustrum lucidum* (Large-leaved Privet), *Olea europaea* subsp. *cuspidata* (African Olive), *Lycium ferocissimum* (African Boxthorn) and *Lantana camara* (Lantana) is proposed. To the southeast, the equivalent of a ten metre wide APZ will be afforded by the existing site access road and adjacent managed land. The separation distances between the infrastructure and the classified vegetation is summarised in Table 11 below.

3.5 Bush Fire Attack Level (BAL) Determination

This assessment recommends that the existing cleared footprint around the proposed communications tower facility be maintained as an APZ for a distance of not less than ten metres. This will require removal of a relatively small amount of understorey vegetation in the northwest direction as previously detailed and reducing the height of the groundcover to as low as reasonably practical in all directions around the proposed facility. The BAL and radiant heat flux applicable to the proposed communications tower facility is based on the separation provided by a ten metre wide APZ, which is summarised in Table 2.

Table 2: Summary of the applicable BAL (as per PBP Table A1.12.5)

Direction	Classified Vegetation	Slope (degrees)	Flamesol	BAL
Northeast	Woodland	0	49.42 kW/m ²	BAL-FZ
Southeast	Managed	-	-	-
Southwest	Woodland	6	76.03 kW/m ²	BAL-FZ
Northwest	Woodland	15	76.03 kW/m ²	BAL-FZ

The bush fire risk assessment has determined that the bushfire attack level that the development is likely to be exposed to as per Table A1.12.5 of PBP is BAL-FZ. The FLAMESOL calculator confirms the BAL-FZ exposure with a potential radiant heat flux of 49.42 kW/m² in the northeast direction being slightly more than a BAL-40 exposure and 76.03 kW/m² in the southwest and northwest directions which indicates significantly high potential radiant heat exposure. The characteristics of BAL-FZ are that significant radiant heat and significantly higher likelihood of flame contact from the fire front will threaten the integrity of the infrastructure.

4. Recommendations

The following measures are recommended for bush fire protection of the proposed Endeavour Energy communications tower facility:

1. At the commencement of construction works the land within the proposed development footprint and extending for a distance of 10 metres (measured from the equipment) shall be managed as an Inner Protection Area (IPA) of an APZ as outlined in the Appendix 4 of PBP;
2. The APZ shall be provided around the entirety of the proposed infrastructure, noting that adequate protection in the southeast direction is afforded by the existing site access road and the development of the adjacent land further to the southeast;
3. As per the Asset Protection Zone Standards detailed under Appendix 4 of PBP, the tree canopy cover within an IPA should be less than 15% at maturity. As such, the canopy cover in proximity to the proposed development footprint has been significantly reduced in the past and therefore, it is unlikely that any tree removal will be necessary to achieve the required maximum allowable canopy cover. The dense understorey (comprising woody weeds) on the adjacent northwest slope should be removed entirely;
4. In relation to the provision of an APZ on the northwest slope, this is considered to be the only area of significance with respect to bush fire risk at the site. If possible, with approval from Sydney Water, it would be preferable to extend the APZ as far as practicable in the northwest direction to improve bush fire protection of the proposed development.

5. Conclusion

This report has been prepared to assess the bush fire risk in relation to the proposed installation of a 60 metres high communications tower, together with an equipment building and associated electrical equipment and cabling, which will be enclosed within a fenced compound. The proposed development site is located on the southern hillslope of Prospect Hill at an elevation of approximately 110 metres asl and is accessed from William Lawson Drive via an internal Sydney Water access road. The land on which the proposed facility will be located is identified as Lot 304 DP 1122291, which forms part of the Prospect Reservoir site.

The proposed development allows for the provision of the minimum required APZ without significant impacts to adjacent vegetation, including nearby trees, which can be retained without reducing the APZ effectiveness. The bushfire assessment demonstrates that bushfire protection with respect to the proposed development within the subject site can generally satisfy the requirements of PBP and the RFS Practice Note. Moreover, subject to the recommendations of this report, there are no significant impediments to the proposed development at the site from a bushfire risk perspective.

6. Note and Disclaimer:

1. This assessment relates to a proposed development on the subject land and only the plans referenced in this bush fire risk assessment report have been considered;
2. This bush fire assessment has been based on bush fire protection guidelines as outlined in the documents; *Planning for Bush Fire Protection 2019 (PBP)* and *Practice Note 1/11 – Telecommunication Towers in Bushfire Prone Areas*;
3. As noted by PBP and notwithstanding the precautions recommended, it should always be borne in mind that bush fires burn under a range of conditions and an element of risk always remains; and
4. This bush fire assessment does not imply or infer any approval for the removal of vegetation for asset protection or other purposes. It is the responsibility of the client/landowner to obtain any and all necessary approvals in this regard.



Steve Britt 14 February 2023

Graduate Diploma in Design for Bush fire Prone Areas

Accredited Practitioner BPAD9334, Bush fire Planning and Design, FPAA



7. References

Keith, D., 2004, *Ocean Shores to Desert Dunes: The Native Vegetation of New South Wales and the ACT*, Department of Environment and Conservation, Sydney

NSW Department of Planning and Environment, 2023, ePlanning Spatial Viewer, retrieved from; <https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address>

NSW Rural Fire Service (2005), *Standards for Asset Protection Zones*, NSW Rural Fire Service, Sydney Olympic Park

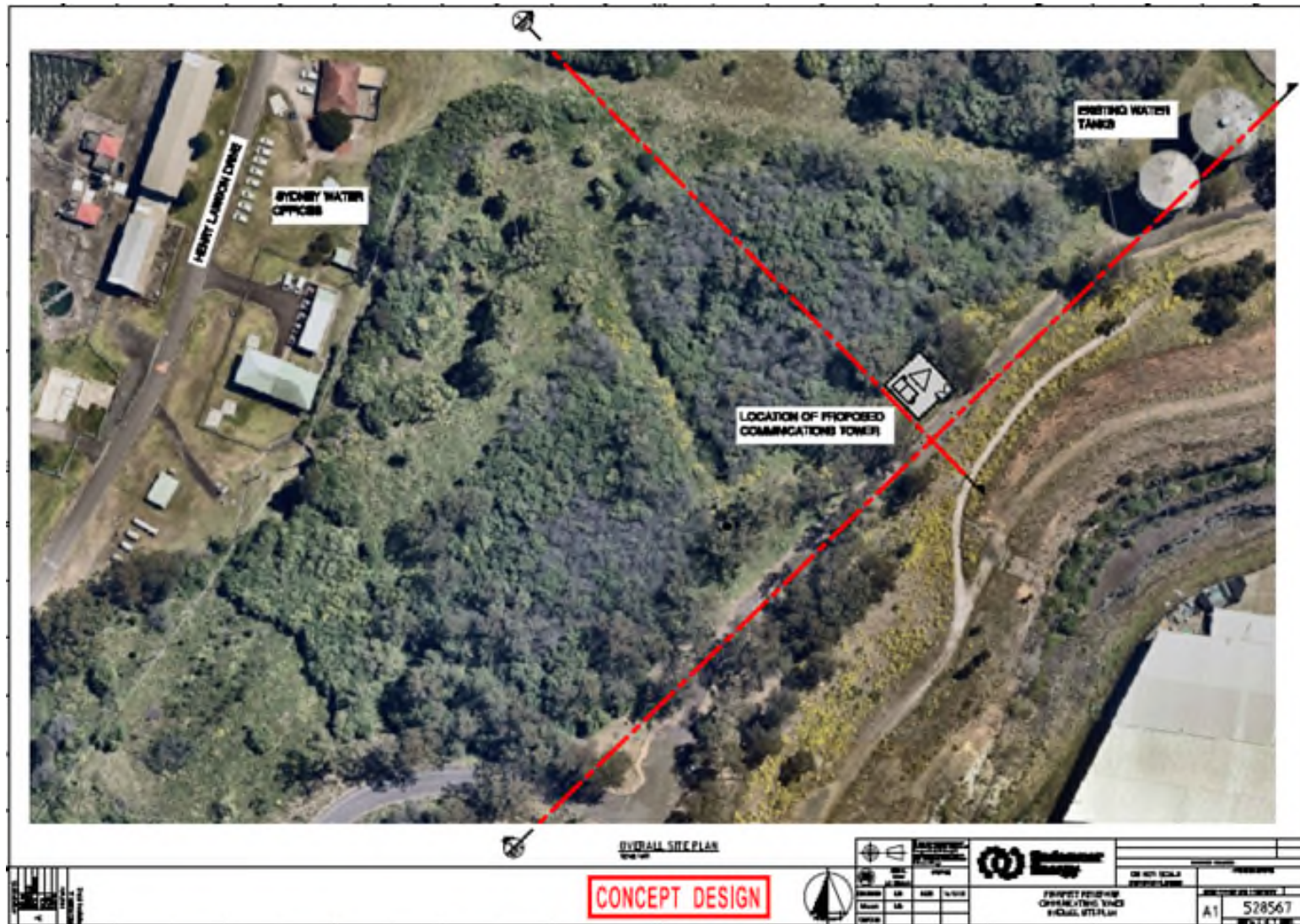
NSW Rural Fire Service (2006), *Guideline: Bush Fire Prone Land Mapping*, NSW Rural Fire Service, Sydney Olympic Park

NSW Rural Fire Service, 2011, *Practice Note 1/11 – Telecommunication Towers in Bushfire Prone Areas*, NSW Rural Fire Service, Sydney Olympic Park

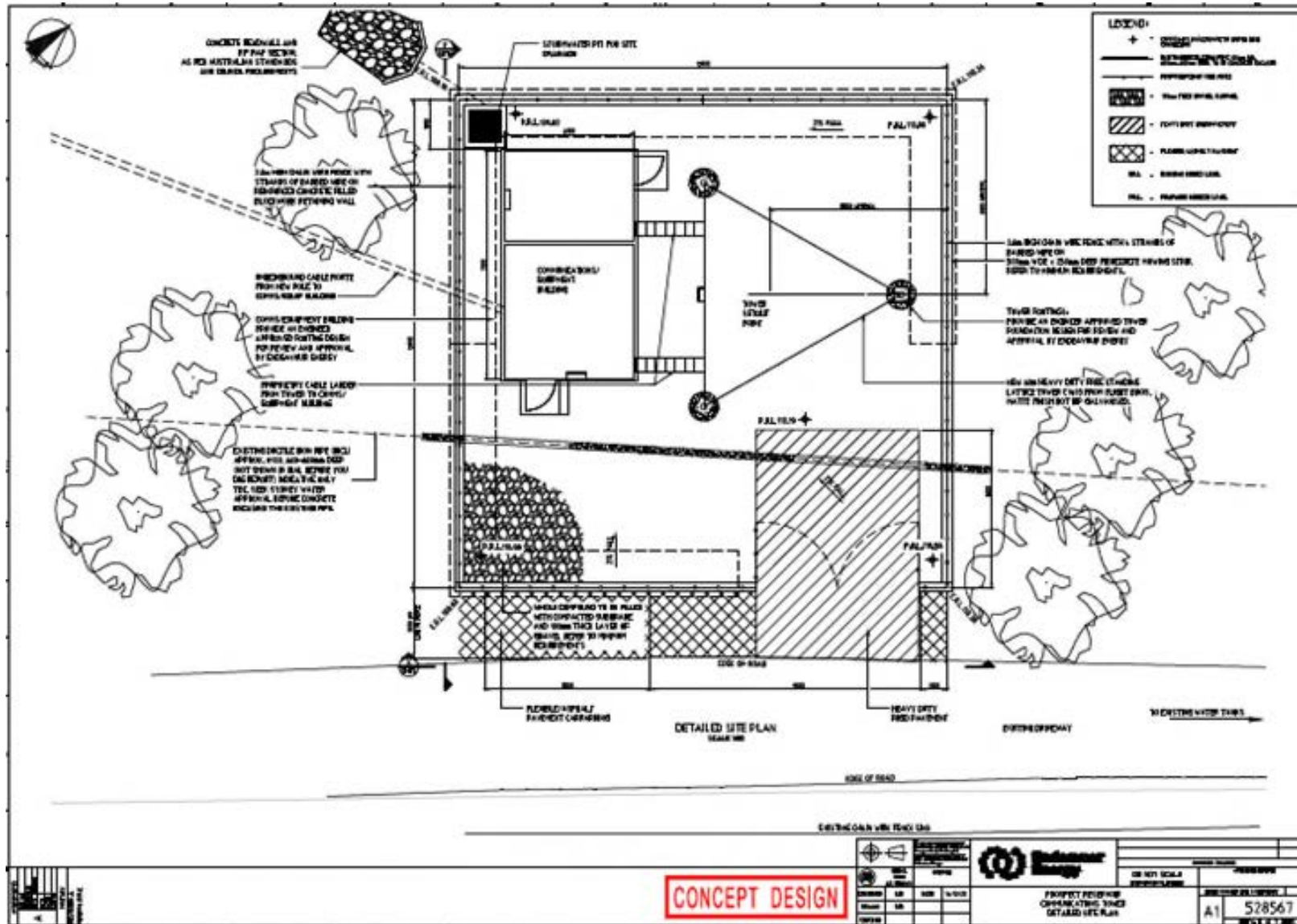
NSW Rural Fire Service, 2019, *Planning for Bush Fire Protection 2019*, NSW Rural Fire Service, Sydney Olympic Park

Standards Australia (2018), *AS3959-2018 Construction of buildings in bush fire-prone areas*, Standards Australia, Sydney

8. Appendix A: Site Plans



Bush Fire Risk Assessment: Proposed Communications Tower – Prospect Reservoir



Appendix J EMF Compliance Report

Preliminary EME Drawings

Prospect Reservoir Communications Tower - 5156-8072

Diagram History

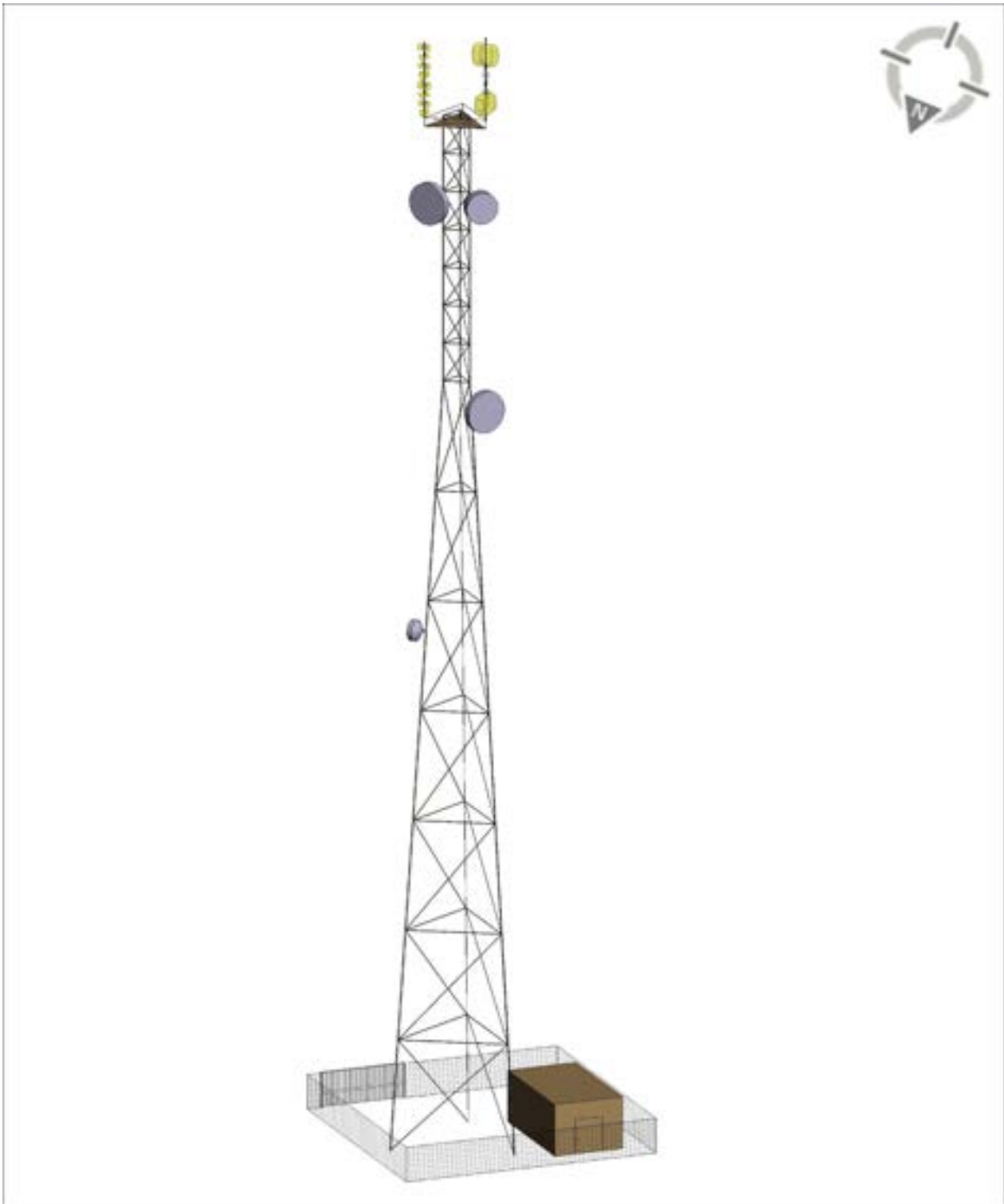
Drawn	Checked	Amendment	Date	Issue
JW	TRS	Preliminary EME Drawings	27/1/2023	A

The drawings of the latest issue use the ARPANSA RPS S-1 standard



TOTAL RADIATION SOLUTIONS

Perspective View



Exclusion zone Legend

- Areas above RPS S-1 public limits
- Areas above RPS S-1 occupational limits

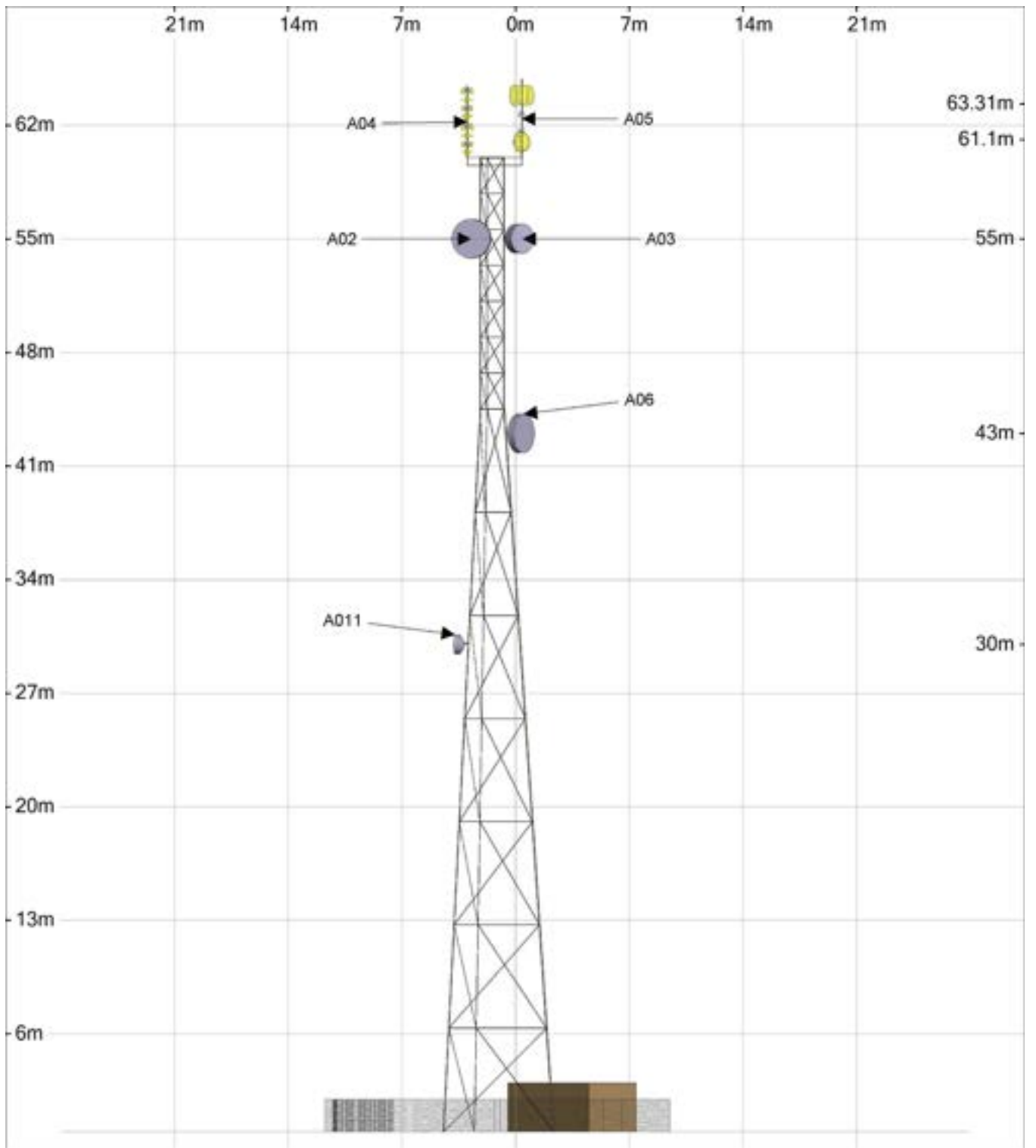
Overall Plan View



Exclusion zone Legend

- Areas above RPS S-1 public limits
- Areas above RPS S-1 occupational limits

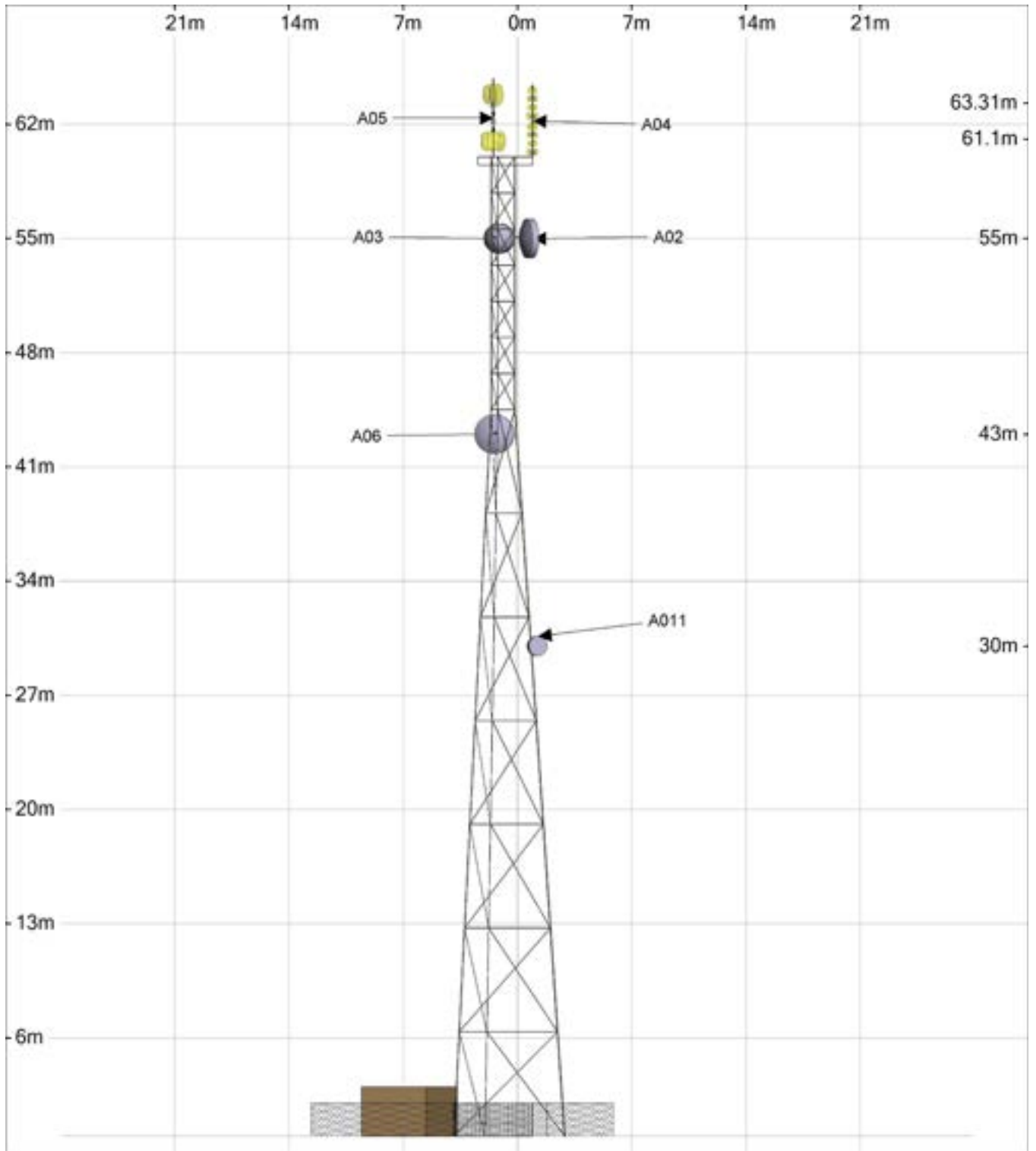
Elevation View from 0° TN



Exclusion zone Legend

- Areas above RPS S-1 public limits
- Areas above RPS S-1 occupational limits

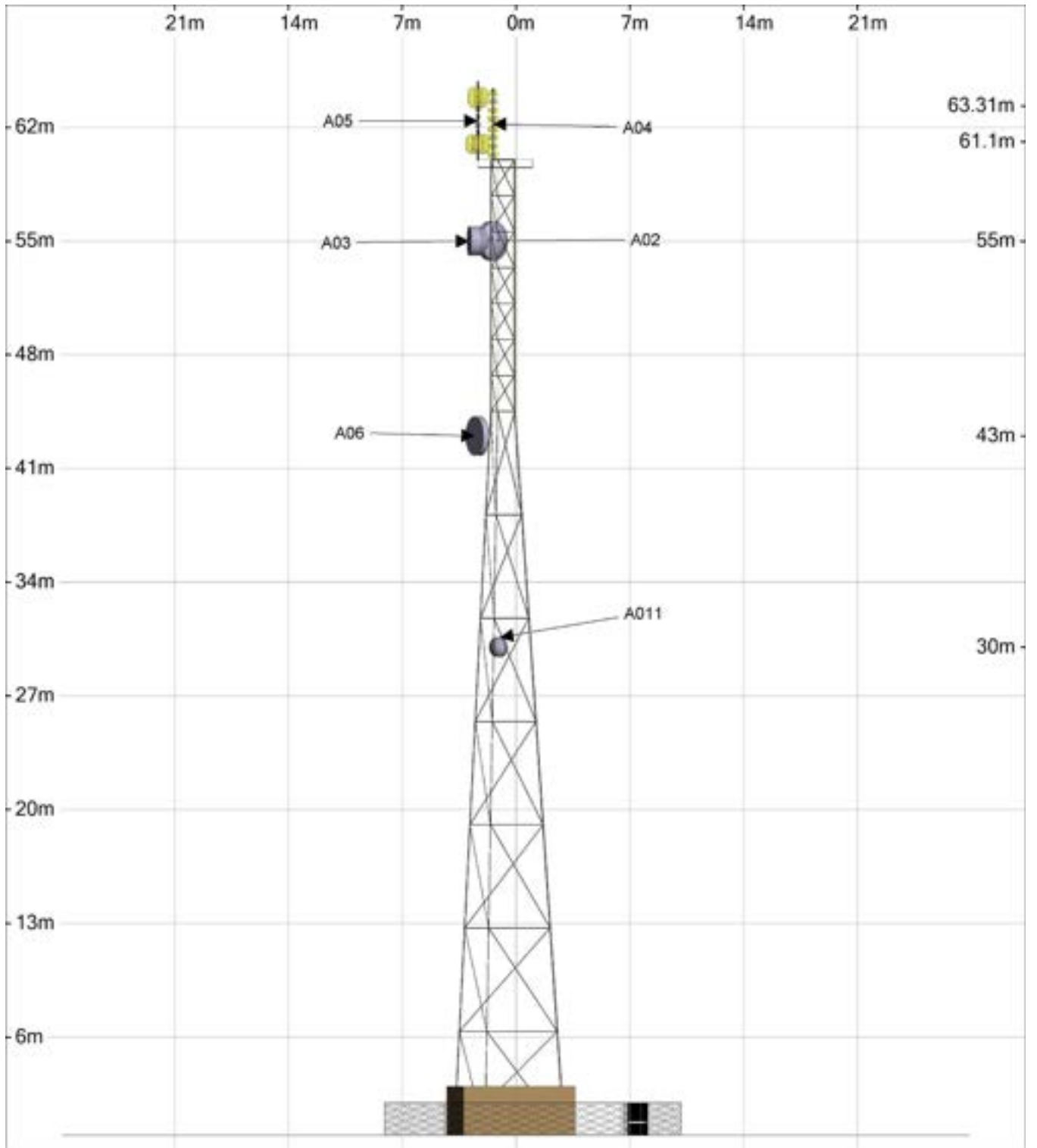
Elevation View from 120° TN



Exclusion zone Legend

- Areas above RPS S-1 public limits
- Areas above RPS S-1 occupational limits

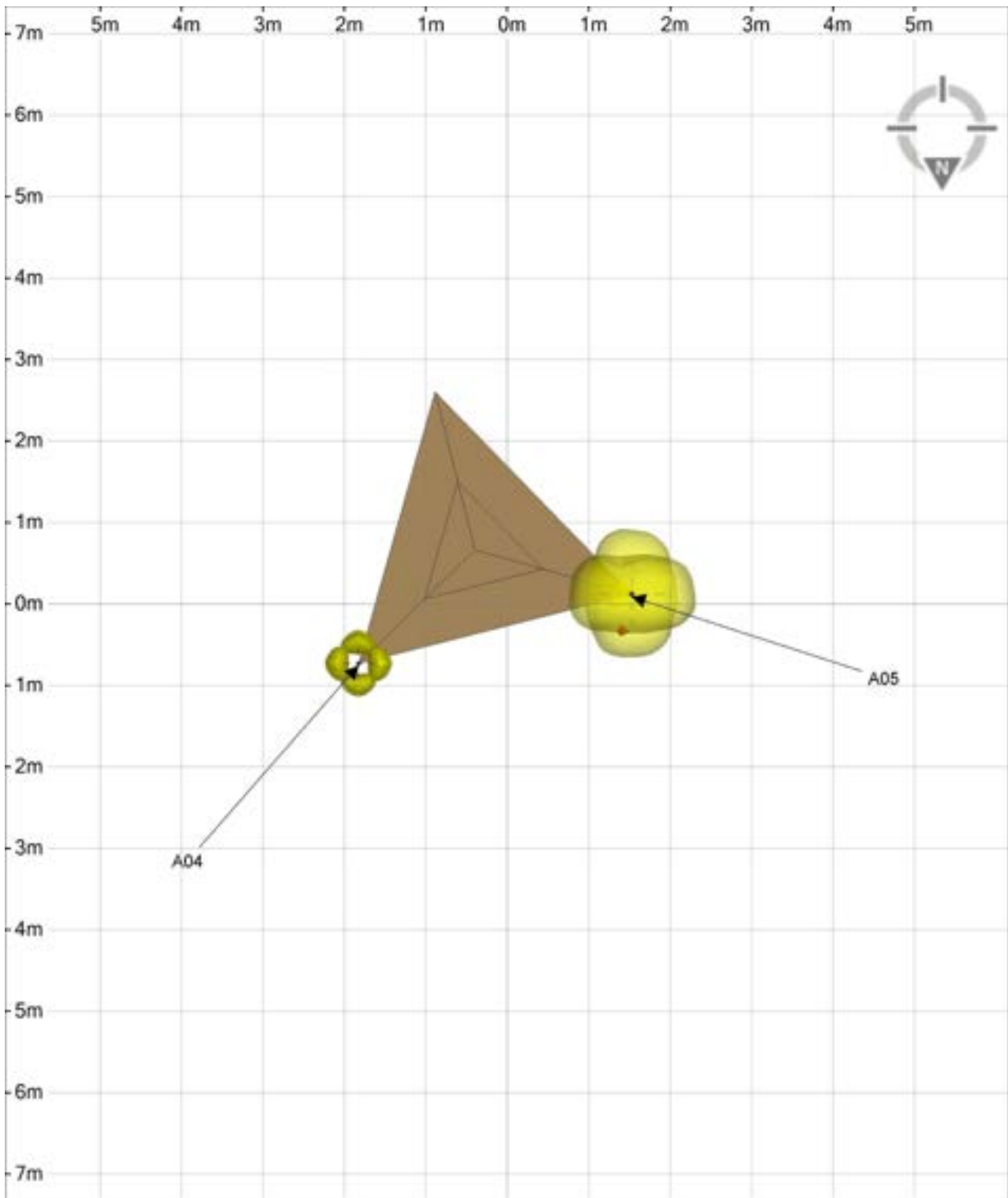
Elevation View from 240° TN



Exclusion zone Legend

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- Areas above RPS S-1 occupational limits

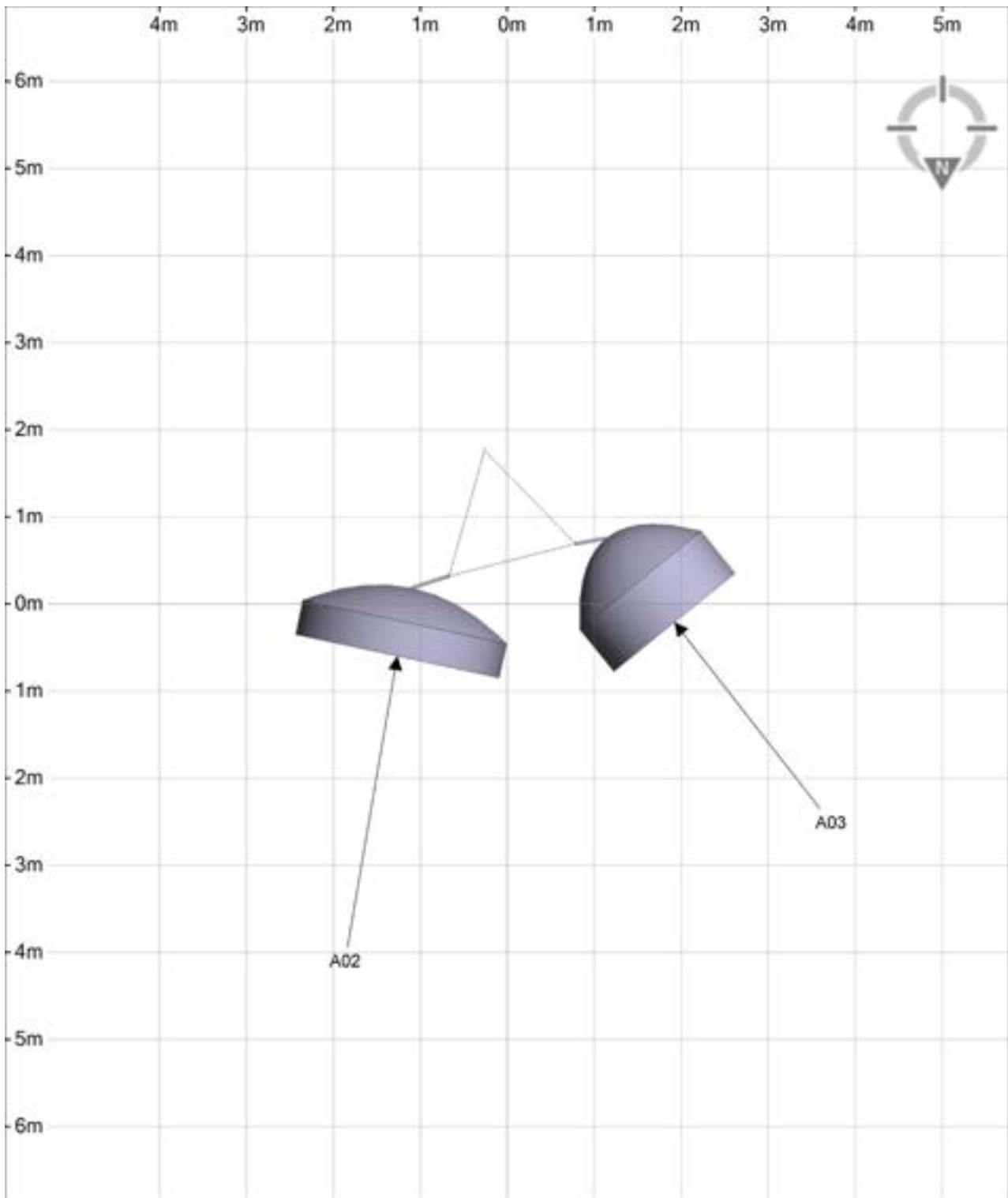
Plan View from 66.0m - 58.0m



Exclusion zone Legend

- Areas above RPS S-1 public limits
- Areas above RPS S-1 occupational limits

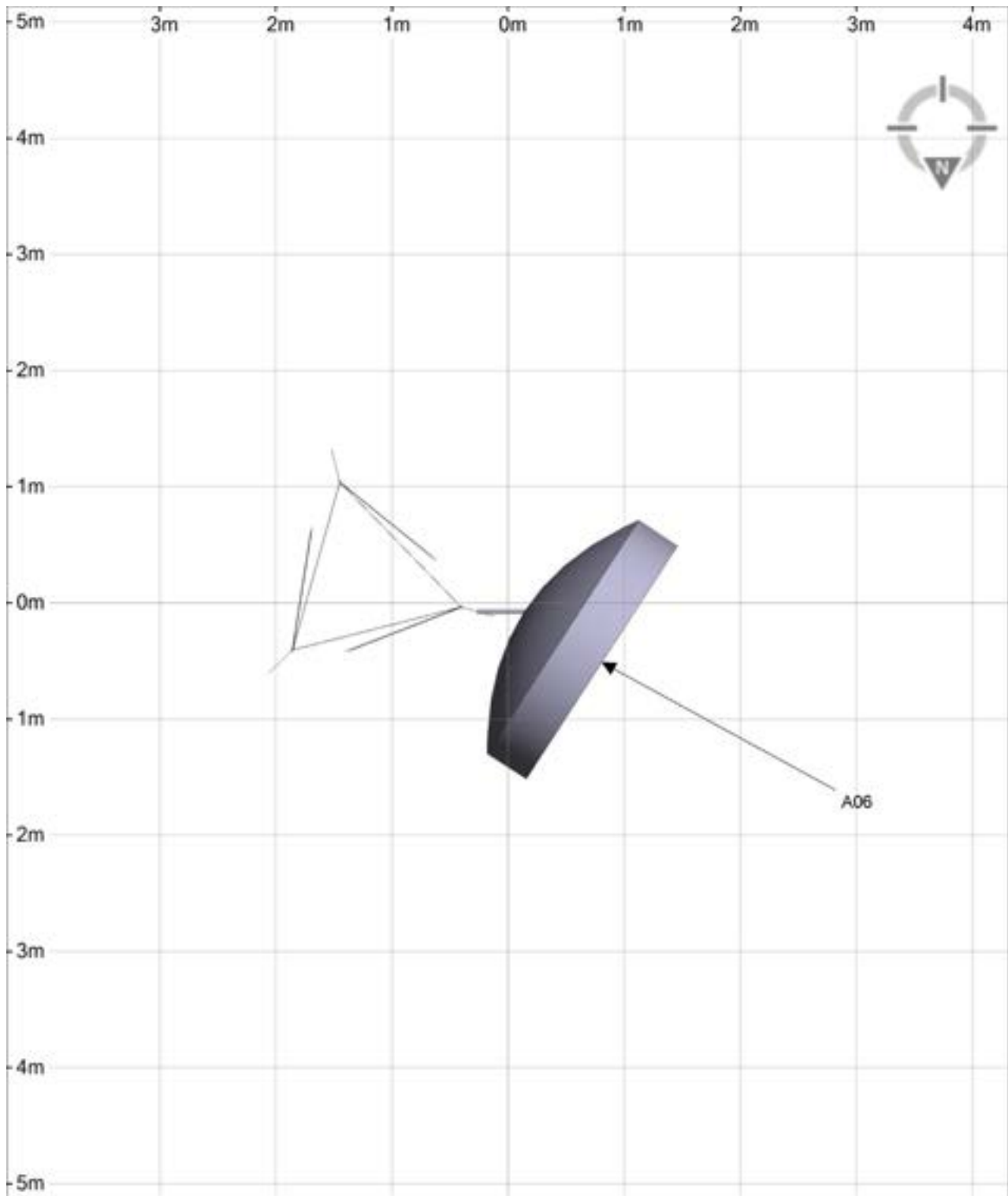
Plan View from 58.0m - 53.0m



Exclusion zone Legend

- Areas above RPS S-1 public limits
- Areas above RPS S-1 occupational limits

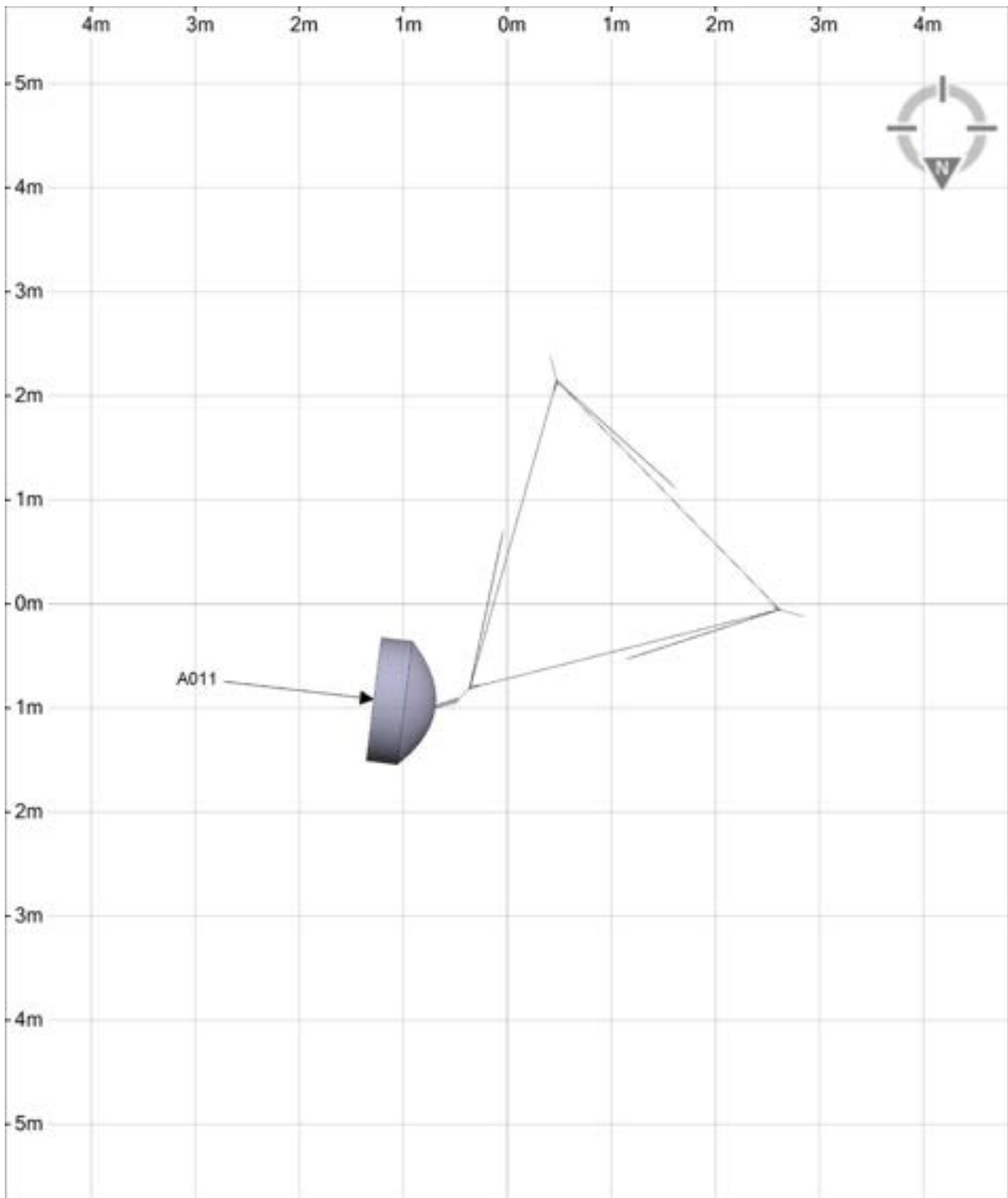
Plan View from 46.0m - 41.0m



Exclusion zone Legend

- Areas above RPS S-1 public limits
- Areas above RPS S-1 occupational limits

Plan View from 32.0m - 29.0m



Exclusion zone Legend

- Areas above RPS S-1 public limits
- Areas above RPS S-1 occupational limits

Section 4: Equipment List

Diagram Ref	Owner	Ant No.	Type/Make/Model	Height (m)	Bearing (°)	Mech. Tilt (°)	Elec. Tilt (°)	Pol	System/Function/Sector	Power (Watts)
A02	Endeavour Energy	EE01	Parabolic reflector/Andrew/HP8-71W	55	12	0	-	H	Wisemans Ferry Microwave Link	1
A03	Endeavour Energy	EE02	Parabolic reflector/RFS/DAX6-59b	55	321	0	-	V	Kurrajong Heights Microwave Link	0.8
A04	Endeavour Energy	EE03	RF Industries/BA80-67	59.5	0	0	-	V	SCADA Base 1	5
		EE04	RF Industries/BA80-67L				-	V	SCADA Base 2	5
A05	Endeavour Energy	EE05-UHF1 (Upper)	RF Industries/BA404040-41-67	59.5	0	0	-	V	SCADA Base 3	5
		EE06-UHF2 (Lower)					-	V	SCADA Base 4	5
		EE07-VHF1					-	V	SCADA Base 5	5
A06	Endeavour Energy	EE08	Parabolic reflector/Andrew/HP8-71W	43	303	0	-	V	Mt Tomah Microwave Link	1.26
A011	Endeavour Energy	EE09	Parabolic reflector/Andrew/VHLPX4-7W	30	97	0	-	V/H	Horsley Park Microwave Link	0.282 + 0.282

Appendix K Ecological Assessment

Prospect Communications Tower Pole Replacement and Access Track Ecological Assessment

Report by
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February 2023

1.0 INTRODUCTION

Endeavour Energy is planning to construct a new communications tower within the Sydney Water managed Prospect Reservoir lands. Part of the works involve the replacement of a transmission line pole to the south of the tower location and establishment of an access track to the pole.

The images in Figure 1 show the pole location from the proposed access points on the existing eastern boundary track in this part of the Reservoir lands.



The subject area may support the Cumberland Plain Woodland Critically Endangered Ecological Community (CEEC), although it has been mapped as Disturbed Vegetation in Sydney Water’s Property Environmental Management Plan (2021). The potential impact of the proposed works on Cumberland Plain Woodland is the main focus of this ecological assessment.

2.0 METHODS

The pole replacement precinct was assessed in the field on 8th February 2023.

Flora assessment involved recording species observed during the field survey, including native and exotic plants. A list of plant species detected during the survey is included in Appendix 1.

Fauna habitat value was also recorded, including the presence of any hollow-bearing trees.

3.0 FLORA

The precinct has been mapped as supporting disturbed vegetation. The field survey revealed the presence of a number of native trees, with three main species present, Coastal Grey Box (*Eucalyptus moluccana*), Forest Red Gum (*E. tereticornis*) and Narrow-leaved Ironbark (*Eucalyptus crebra*)

There are scattered shrubs, including exotic and native species. Exotic species recorded included Lantana (*Lantana camara*), Large-leaved Privet (*Ligustrum lucidum*), African Olive (*Olea europaea* subsp. *cuspidata*) and Narrow-leaf Cotton Bush (*Gomphocarpus fruticosus*). The native shrub, Austral Indigo (*Indigofera australis*) was also present close to the existing pole.

The ground layer also had a mix of exotic and native plants, with some parts of the area supporting a ground layer dominated by native grasses and forbs, including Weeping Meadow Grass (*Microlaena stipoides*), Windmill Grass (*Chloris truncata*), *Eragrostis leptostachya* and *Carex inversa*. Exotic ground layer plants included Panic Veldt Grass (*Ehrharta erecta*), African Lovegrass (*Eragrostis curvula*), Purple-top (*Verbena bonariensis*) and Blue Heliotrope (*Heliotropium amplexicaule*).

A total of 40 plant species were detected during the field survey, including 22 locally native species and 18 exotic species. The high proportion of exotic species reflects the disturbed nature of the site. A list of plant species found within the study area is included in Appendix 1.

4.0 FAUNA HABITAT

The fauna habitats in the study area include woodland and grassland, with the dense thickets of exotic shrubs on the western slopes providing shelter for small woodland birds. The woodland habitat is predominantly regrowth with few trees older than about 40 years.

There is a dead tree with hollows capable of providing shelter and nesting for fauna species along the eastern boundary track between the pole location and the tower site (Figure 2). No other trees mature enough to support hollows were observed in the area subject to the proposed works.



Figure 2. Hollow bearing dead tree (left) along boundary track

4.1. Threatened Fauna

The works are minor in nature and not of a scale, nor within a location, likely to have a significant effect on threatened fauna. It is considered that there is no need to undertake detailed assessment in relation to threatened fauna species.

5.0 LIKELY IMPACTS OF DEVELOPMENT

Whilst the pole replacement precinct has been mapped as disturbed vegetation, the presence of areas of ground layer vegetation dominated by native species means it would be prudent to undertake an Assessment of Significance in relation to likely impact on the Cumberland Plain Woodland CEEC. That assessment is included in section 6 of this report.

The establishment of an access track which provides sufficient clearance for passage of tall heavy vehicles may require lopping of overhanging branches. There is sufficient room to create the access without the need for any tree removal.

The Vegetation Management Plan (VMP) required for the Communications Tower identified an area for tree and shrub planting along this ridgeline, partially intersecting with the northern arm of access to the pole replacement pad.

The integrity of the tree and shrub planting proposal would be achieved if access to the pole was restricted to the southern access as viewed in Figure 1A.

If this reconfiguring of access is not feasible and practical, it may be necessary to reduce the number of trees to be planted. As the wording of the VMP states 'up to 10 trees' this action will still be consistent with the VMP.

It is envisaged that all access to the pole location will be from the Maunder Lookout carpark (south) and that it won't be necessary for heavy vehicles to move between the tower site and the pole site. Prohibition of movement of large vehicles through this section should ensure the retention of the dead tree shown on the left of Figure 2.

6.0 THREATENED SPECIES ASSESSMENT

It is considered that a formal Assessment of Significance needs to be completed in relation to the Cumberland Plain Woodland CEEC based on the precautionary principle and the presence of areas of ground layer vegetation dominated by native grasses and forbs.

CUMBERLAND PLAIN WOODLAND

Areas of vegetation in the pole replacement precinct include tree, shrub and ground layer species which are components of the Cumberland Plain Woodland CEEC as listed under the NSW Biodiversity Conservation Act. There are also patches where exotic shrubs or ground layer plant dominate and these patches do not correspond to the listed CEEC.

No mature trees are likely to be removed in the area subject to the proposed works, although lopping of branches may be required to provide clearance.

The total area of modified Cumberland Plain Woodland likely to be impacted by establishment of an access track is less than 160 m².

According to the NSW Biodiversity Conservation Act the following factors are to be taken into account when making a determination as to whether an action, development or activity is likely to significantly affect threatened species, populations or ecological communities or their habitats:

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Not relevant as this assessment relates to a threatened ecological community, not a threatened species.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Modified vegetation, which according to the precautionary principle could be considered to be a component of the Cumberland Plain Woodland CEEC, will be further modified to provide access for heavy vehicles. Clearing will not include any mature trees which are a component of the community, although some branches may be lopped. The trees will continue to flower and set seed. Occurrences of modified Cumberland Plain Woodland in the vicinity, but outside of the direct impact will not be affected. A much larger area of Cumberland Plain Woodland will remain unaffected in the local area with about 100 ha of Cumberland Plain Woodland being present within the nearby Prospect Nature Reserve. The community is also present along Eastern Creek at Doonside.

The local occurrence of the community is not at risk of extinction due to the proposed activity.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

The existing habitat is modified by historic clearing and uncontrolled weed invasion. The proposed action will involve further modification of up to about 160 m² of Cumberland Plain Woodland.

There will be no new isolation or fragmentation of habitat for Cumberland Plain Woodland.

The disturbed nature of the habitat means it has no particular value in the context of protection of the Cumberland Plain Woodland CEEC. The CEEC will continue to exist within a large area of Prospect Nature Reserve.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

There is no declared area of outstanding biodiversity value in the study area.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

The proposed development is not recognised as a key threatening process.

Conclusion of the Assessment of Significance for Cumberland Plain Woodland

The proposed development is not likely to have a significant effect on the Cumberland Plain Woodland. The area of habitat that will be disturbed is already modified and the area likely to be affected is negligible in relation to the local extent of Cumberland Plain Woodland.

From the above 5-part test, it is concluded that:

- ***It is highly unlikely that the development will significantly affect the regional or local population status of Cumberland Plain Woodland, and***
- ***There is no need to provide a Species Impact Statement or Biodiversity Development Assessment Report (BDAR).***

7.0 CONCLUSION

The proposed activity involves replacement of a transmission line pole and establishment of an access track to the pole location. The works will partially intersect with an area designated for tree and shrub planting under the VMP prepared for the Communications Tower.

The integrity of the tree and shrub planting proposal would be achieved access to the pole was restricted to the southern access as viewed in Figure 1A.

If this reconfiguring of access is not feasible and practical, it may be necessary to reduce the number of trees to be planted. As the wording of the VMP states 'up to 10 trees' this action will still be consistent with the VMP.

It is envisaged that all access to the pole location will be from the Maunder Lookout carpark (south) and that it won't be necessary for heavy vehicles to move between the tower site and the pole site. Prohibition of movement of large vehicles through this section should ensure the retention of the dead tree shown on the left of Figure 2.

An Assessment of Significance under the BC Act has been completed in relation to Cumberland Plain Woodland. A significant impact is not likely, and a Species Impact Statement or Biodiversity Development Assessment Report is not required.

REFERENCES

- Lembit R.S. (2023) *Vegetation Management Plan. Prospect Reservoir Endeavour Energy Communications Tower January 2023*. report to Endeavour Energy. Gingra Ecological Surveys, Canterbury.
- Sydney Water (2021) *Property Environmental Management Plan (PEMP) Prospect Reservoir, Reservoir Road WS0095*. Sydney Water, Sydney.

APPENDIX 1. FLORISTIC LIST FOR STUDY AREA, FEBRUARY 2023.

Scientific Name	Common Name
<i>Aristida ramosa</i>	Wire Grass
<i>Austrostipa</i> sp.	Spear Grass
<i>Bidens pilosa</i> *	Cobbler's Peg
<i>Cayratia clematidea</i>	
<i>Chloris truncata</i>	Windmill Grass
<i>Cirsium vulgare</i> *	Spear Thistle
<i>Conyza</i> sp. *	Fleabane
<i>Cyperus eragrostis</i> *	Dirty Dora
<i>Desmodium brachypodium</i>	
<i>Desmodium varians</i>	
<i>Dichondra repens</i>	Kidney Weed
<i>Ehrharta erecta</i> *	Panic Veldt Grass
<i>Einadia hastata</i>	Saloop
<i>Einadia polygonoides</i>	
<i>Eragrostis curvula</i> *	African Lovegrass
<i>Eragrostis leptostachya</i>	
<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark
<i>Eucalyptus moluccana</i>	Coastal Grey Box
<i>Eucalyptus tereticornis</i>	Forest Red Gum
<i>Glycine clandestina</i>	
<i>Gomphocarpus fruticosus</i> *	Narrow-leaf Cotton Bush
<i>Heliotropium amplexicaule</i> *	Blue Heliotrope
<i>Indigofera australis</i>	Austral Indigo
<i>Lachnagrostis filiformis</i>	Blown Grass
<i>Lantana camara</i> *	Lantana
<i>Ligustrum lucidum</i> *	Large-leaved Privet
<i>Ligustrum sinense</i> *	Small-leaved Privet
<i>Lomandra longifolia</i>	Spiny Mat-rush
<i>Modiola caroliniana</i> *	Red-flowered Mallow
<i>Microlaena stipoides</i>	Weeping Meadow Grass
<i>Nassella neesiana</i> *	Chilean Needlegrass
<i>Olea europaea</i> subsp. <i>cuspidate</i> *	African Olive
<i>Oplismenus aemulus</i>	Basket Grass
<i>Rumex brownii</i>	Slender Dock
<i>Senecio linearifolius</i>	Fireweed Groundsel
<i>Senecio pterophorus</i> *	African Daisy
<i>Sigesbeckia orientalis</i>	Indian Weed
<i>Solanum pseudocapsicum</i> *	Madeira Winter Cherry

Scientific Name	Common Name
Verbena bonariensis *	Purple=top
Verbena officinalis *	Common Verbena

KEY

* Exotic species

sp. species

WN Non-local weedy native

