
NARROMINE SHIRE COUNCIL
ORDINARY MEETING BUSINESS PAPER – 13 MARCH 2024
REPORTS TO COUNCIL – COMMUNITY AND ECONOMIC DEVELOPMENT

1. DEVELOPMENT APPROVALS

Author	Director Community and Economic Development
Responsible Officer	Director Community and Economic Development
Link to Strategic Plans	CSP – 3.1.6 – Encourage developers to consider energy efficiency and sustainable building design options in new developments DP – 3.1.6.1 - Ensure compliance with relevant building codes and regulations

Executive Summary

This report provides information to Council on the approved Development Applications for February 2024.

Report

The approvals for the month of February 2024 brings the total approved Development Applications for the financial year to 36, with a total value of \$7,878,771. At this time last year there were 35 applications approved with a value of \$9,448,040.

DA No.	Location	LOT/DP	Description	Value	Assessment Time/Days
2023/26.2	Terangion St, Narromine	8/26/758759	Modification to School Alts /Adds	\$605,660*	52
2023/35	Dandaloo Rd, Narromine	1/-/110169	Inground Swimming pool	\$47,839	20
2023/49	Dandaloo Rd, Narromine	1/-/109556	Telecommunication Tower	\$407,000	49
2023/60	Maple Cres, Narromine	103/-/810143	Carport	\$33,745	18
2024/6	Wattle Cres, Narromine	5/-/829026	Aboveground Swimming Pool	\$14,000	15
2024/07	Booth St, Narromine	101/-/560253	Domestic Storage Shed	\$9,000	10
2024/09	Park Hill Rd, Narromine	5/-/752572	Inground Swimming pool	\$65,477	9

*already allocated to total value of development for the financial year.

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1. DEVELOPMENT APPROVALS (Cont'd)

There are currently 10 applications under assessment.

Legal and Regulatory Compliance

Environmental Planning and Assessment Act 1979

Environmental Planning and Assessment Regulation 2000

Risk Management Issues

Nil

Internal/ external Consultation

Nil

Attachments

Nil

RECOMMENDATION

That the information be noted.

2. PLANNING PROPOSAL – E5 HEAVY INDUSTRIAL LAND AT CRAIGIE LEA LANE

Author Manager Planning

Responsible Officer Director Community and Economic Development

Link to Strategic Plans

Delivery Program 2.1.5 New plans and strategies are developed in line with the community's needs and encourages economic growth.

Narromine Shire Community Strategic Plan 2032 - Goal 2 – Growing Our Economy - Sustain and grow our local population; The ongoing development, diversification and sustainability of the local business and industry base. To encourage industry development.

Narromine Shire Employment Lands Strategy - Larger Lot Agricultural Related Industrial Lands - Narromine Shire Council is strategically evaluating options for development opportunities to take advantage of agribusiness, transport links, proximity to Dubbo, and the emergence of Mining.

Narromine Local Strategic Planning Statement - Priority 8 - Encourage employment and skills development to address industry needs and grow the regions knowledge base.

Action 39.1. Inland Rail Project presents a key opportunity for the Narromine Shire Narromine Shire; this represents a significant opportunity to create a secondary inland hub focusing on agricultural commodities. Sites identified with good intermodal transport links to be identified in strategic planning.

2. PLANNING PROPOSAL – E5 HEAVY INDUSTRIAL LAND AT CRAIGIE LEA LANE (Cont'd)

Executive Summary

The intention of this report is to seek Council's endorsement of a Planning Proposal to be submitted to the Department of Planning, Housing and Infrastructure. The Project concept has been previously presented to Council and referred to as the Narromine Industrial Precinct and Freight Exchange.

This Planning Proposal is to amend the Narromine Local Environmental Plan 2011 (LEP) to change zoning of part Lot 2 DP 1294897 from RU1 Primary Production to E5 Heavy Industrial for the purpose of a new industrial estate to service largely the agriculture and transport sectors. The area to be rezoned is 99.65 HA.

Report

The proposal is for Council-owned land, aiming to facilitate an Industrial Precinct adjacent to the future freight exchange. The site adjoins the land associated with the Materials Distribution Centre that will service the Inland Rail construction.

The Planning Proposal is supported by a concept layout for future subdivision and development of a mixture of lot sizes from 2,464m² to 200,000m². The layout facilitates a yield of 29 industrial lots; thirteen (13) of which are approximately 30,000m². The LEP amendment will support development of various scales and sectors in the precinct proposed.

Key constraints addressed:

- Proximity to the Inland Rail alignment and planned road over rail grade separation construction on the Tomingley Road.
- Site specific environmental constraints such as Gilgai formation and biodiversity sensitive areas.
- Servicing of the land, and
- Land use conflicts potentially arising due to the rural setting.

Scope of the LEP amendment

Planning matters specific to the site at 397 Craigie Lea Lane, Narromine have been addressed in the Planning Proposal document prepared by Barnson Pty Ltd.

The proposal seeks to include a new 'employment zone' in the Narromine LEP 2011 – E5 Heavy Industrial. The proposed zoning aligns with the vision for the land and industrial future and is unique to the Shire. This will be enacted through LEP mapping changes.

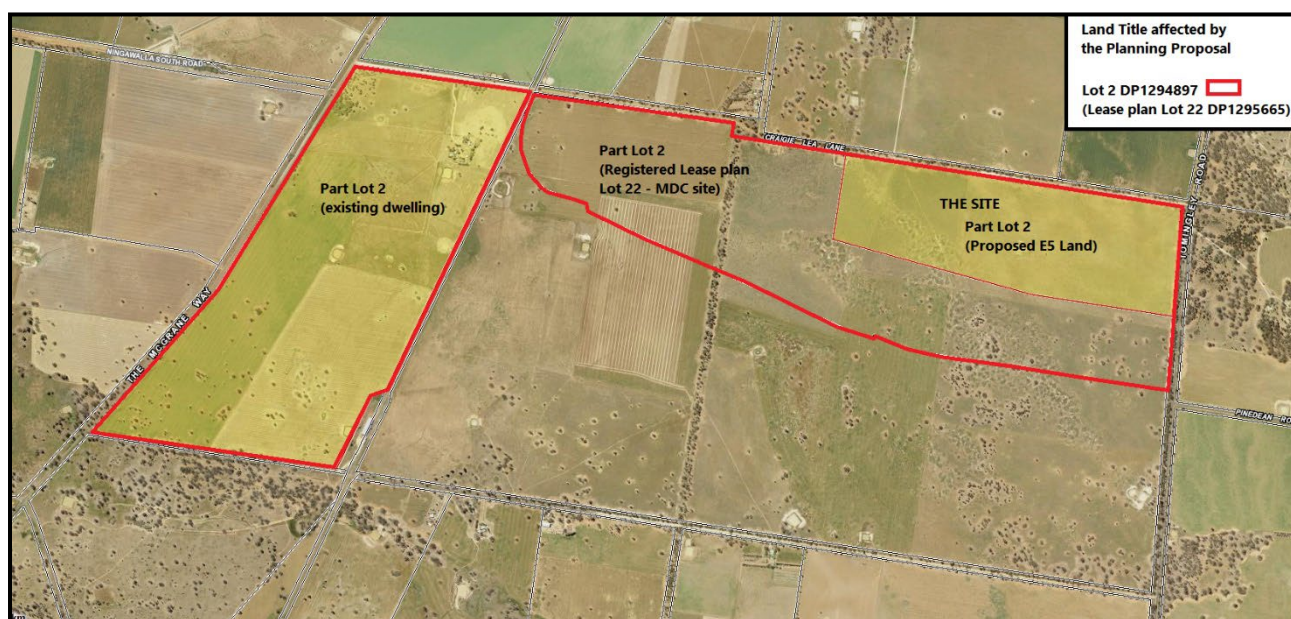
The Planning Proposal addresses specific clauses and relevance to a future development proposal, as depicted in the concept plans.

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2. PLANNING PROPOSAL – E5 HEAVY INDUSTRIAL LAND AT CRAIGIE LEA LANE (Cont'd)

Land impacted by the Proposal

The land affected by the planning proposal is identified as part of Lot 2 DP1294897 as depicted below.



Land affected by the Planning Proposal

Existing Lot	Location		Details	Area
Pt 2 (DP1294897)	Western Railway	Side of	Supports existing dwelling (Proposed to be standalone lot with dwelling – keep RU1 zoning)	229.7ha
Pt 2 (DP1294897)	Eastern Railway	Side of	Lease Plan for MDC - Lot 22 DP1295665 registered on the title (Proposed to be standalone lot – keep RU1 zoning)	192.5ha
	Eastern Railway	Side of	Proposed to be zoned E5 Future development land	99.65ha

**2. PLANNING PROPOSAL – E5 HEAVY INDUSTRIAL LAND AT CRAIGIE LEA LANE
(Cont'd)**

The Intention of this Planning Proposal

The Planning Proposal is seeking to facilitate amendments to the Narromine LEP by way of:

1. Land Rezoning - The Planning Proposal aims to revise the existing land zoning of the property by introducing an E5 – Heavy Industrial Land Zone to a specific area within the site.

2. Adoption and modification of Land Use Table - The proposal involves incorporating the E5 – Heavy Industrial Land Use Table into the Local Environmental Plan (LEP) and adjusting the land use table to establish specific objectives and type of development that are permissible in the zone. These objectives are designed to guide the future development of the site in alignment with the strategic vision, which focuses on supporting the agriculture industry and facilitating freight exchange.

3. Adjustment Minimum Allotment Size Adjustment to the current Minimum Allotment Size requirements are proposed to facilitate the future subdivision of E5 – Heavy Industrial Allotments. Additionally, a site-specific pre-conditioning to services will be introduced.

4. Amendment to Split Zone Clause - A modification to the Split Zone Clause (Cl4.1C of the LEP) is proposed to enable the creation of single-zoned lots for the original lots that following the introduction of the E5 Heavy Industrial zone, will become split-zoned.

5. Address mechanism to subdivide the RU1 land – The final outcome of achieving separate title to the RU1 land separated by the Parkes to Narromine Railway line (west of the line, with existing dwelling) to the RU1 zoned land (east of the line, containing the Inland Rail's MDC).

Supporting studies carried out prior to seeking Gateway Determination

The Planning Proposal has been preceded by specialist studies and advice to best progress a concept for an Industrial precinct. These are attached to the planning proposal report. A traffic report is in progress and is intended to also be provided to the Dept as part of the documentation.

- Aboriginal Due Diligence Assessment Report prepared by Ozark Environment and Heritage.
- Biodiversity Site Suitability Assessment prepared by Ozark Environment and Heritage.
- Strategic Bushfire Study prepared by Barnson Pty Ltd.
- Preliminary Site Contamination Investigation prepared by Barnson Pty Ltd.
- Onsite Effluent Management Report prepared by Barnson Pty Ltd.
- Land Use Conflict Risk Assessment prepared by Narromine Shire Council staff.

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2. PLANNING PROPOSAL – E5 HEAVY INDUSTRIAL LAND AT CRAIGIE LEA LANE (Cont'd)

Excerpt from possible future E5 subdivision layout (BARNSON PTY LTD):



Legal and Regulatory Compliance

Environmental Planning and Assessment Act 1979
Environmental Planning and Assessment Regulation 2021

Risk Management Issues

The Proposal will provide certainty of future development parameters and risk mitigation for future investment, esp. where land has been the focus of grant funding, supporting a future Industrial Precinct and Freight Exchange Hub.

Future demand on public facilities and amenities may be addressed with a subsequent review of the Narromine Shire Council Section 7.12 Contributions Plan 2019.

Similarly, a review of the developer servicing charges for new lots created in the future under the Development Servicing Plan for Water Supply and Sewerage to ensure levels of service are met and service areas are relevant. An area serviced by a separate sewage treatment work may need separate consideration in the Plan.

Council as landowner manages conflicts of interest through implementation of Policy (Conflicts of Interest Policy - Dealing with Council-Related Development Throughout the Development Process).

**2. PLANNING PROPOSAL – E5 HEAVY INDUSTRIAL LAND AT CRAIGIE LEA LANE
(Cont'd)**

Internal/ external Consultation

Executive Leadership Team have been consulted internally.

Narromine Shire Council has undertaken a broad range of consultation activities to engage with local businesses, transport and freight industry representatives. This process has found significant support for the proposed Industrial Precinct and Freight Exchange Hub among stakeholders.

A Scoping Report was prepared and presented to agencies for consultation prior to preparing the Planning Proposal. Feedback from the agencies has been directly referenced and addressed in the Planning Proposal report.

The following agencies have been consulted regarding the Planning Proposal at the Scoping Report phase:

- Department of Planning, Housing and Infrastructure;
- Biodiversity & Conservation Division
- Transport for NSW;
- DPI – Agriculture;
- NSW Rural Fire Service;
- Inland Rail;
- ARTC;
- Essential Energy;
- DPIE NRAR;
- Water NSW;
- DPIE Water; and
- Narromine Local Aboriginal Land Council.

In the future, formal consultation will also be carried out in accordance with any Gateway Determination.

Attachments

1. Planning Proposal Report: Rezoning of land at Craigie Lea Lane – Narromine Heavy Industrial Precinct (Barnson Pty Ltd, March 2024)

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**2. PLANNING PROPOSAL – E5 HEAVY INDUSTRIAL LAND AT CRAIGIE LEA LANE
(Cont'd)**

As this is a planning decision made in the exercise of a function of a Council under the Environmental Planning and Assessment Act 1979, including a decision relating to an environmental planning instrument under that Act, a division is required to be called for the motion (section 375A, Local Government Act 1993).

RECOMMENDATION

That Council:

1. Support the Planning Proposal to subdivide RU1 zoned land and rezone part of the RU1 Primary Production land to E5 Heavy Industrial (with related clause and mapping amendments) as shown in **Attachment No. 1**;
2. Resolve to formally submit the Planning Proposal including any supporting specialist studies to the Department as the Planning Proposal Authority seeking a Gateway Determination.
3. Advise the Department where the Council as planning proposal authority be authorised to exercise functions of the local plan-making authority that Council's General Manager (or delegate) be nominated to fulfil the role.

Phil Johnston
Director Community and Economic Development



Planning Proposal Report

Rezoning of land at Craigie Lea Lane – Narromine Heavy Industrial Precinct.

Client: Narromine Shire Council

Site Address: 397 Craigie Lea Lane, Narromine

6 March 2024

Our Reference: 40038-PR01_B



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DISCLAIMER

This report has been prepared solely for **Narromine Shire Council** in accordance with the scope provided by the client and for the purpose(s) as outlined throughout this report.

Barnson Pty Ltd accepts no liability or responsibility for or in respect of any use or reliance upon this report and its supporting material by anyone other than the client.

Project Name:	Planning Proposal Report for
Client:	Narromine Shire Council
Project Number:	39707
Report Reference:	40038-PR01_B
Date:	6 March 2024

Prepared by:	Reviewed by:
	
Josh Eagleton B.Urb & Reg Planning Senior Town Planner	Jim Sarantzouklis MAIBS MEHA RPIA Director

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1. INTRODUCTION

1.1. Background of development around the Planning Proposal area.

Inland Rail Network

The Australian Government has committed to delivering a significant piece of national transport infrastructure by constructing a high-performance and direct interstate freight rail corridor between Melbourne and Brisbane, via central-west New South Wales (NSW) and Toowoomba in Queensland. Inland Rail is a major national program that will enhance Australia's existing national rail network and serve the interstate freight market. The Inland Rail route, which is about 1,700 kilometres (km) long, involves:

- Using the existing interstate rail line through Victoria and southern NSW
- Upgrading about 400 km of existing track, mainly in western NSW
- Providing about 600 km of new track in NSW and south-east Queensland.

The Inland Rail Program has been divided into 13 sections, 7 of which are in NSW. The objectives of the Inland Rail Program are to:

- Provide a rail link between Melbourne and Brisbane that is interoperable with train operations to Perth, Adelaide, and other locations on the standard-gauge rail network, to serve future rail freight demand, and stimulate growth for inter-capital and regional/bulk rail freight;
- Provide an increase in productivity that will benefit consumers through lower freight transport costs;
- Provide a step-change improvement in rail-service quality in the Melbourne to Brisbane corridor and deliver a freight rail service that is competitive with road;
- Improve road safety, ease congestion and reduce environmental impacts by moving freight from road to rail;
- Bypass bottlenecks within the existing metropolitan rail networks, and free up train paths for other services along the coastal route; and
- Act as an enabler for regional economic development along the Inland Rail corridor.

Narromine sits along the path of the Inland Rail, serving as a crucial junction linking two significant inland rail projects: the Narromine to Narrabri and Parkes to Narromine lines.

Narwonah Material Distribution Centre

The Narwonah Material Distribution Centre (MDC) forms a key component of the Inland Rail Program. It is in regional NSW, south of the township of Narromine (**Figure 1**). The proposed MDC is used for temporary track material storage and management prior to their distribution to multiple Inland Rail projects and sections across NSW, including Narromine to Narrabri (N2N).

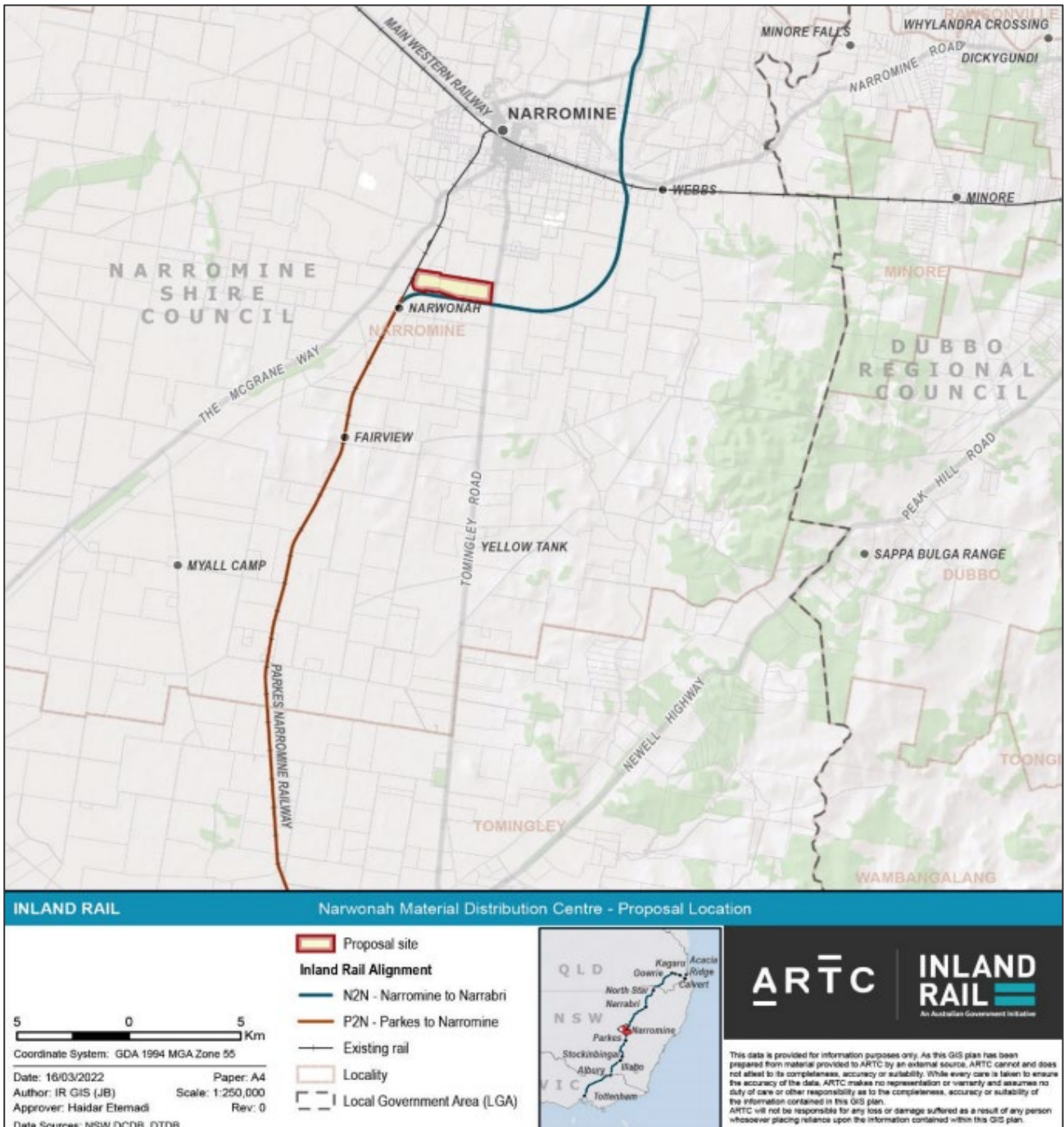


Figure 1: Inland Rail Alignment (Narwonah Material Distribution Centre)

Source: Inland Rail (Edited by Barnson Pty Ltd)

Narromine Heavy Industrial Precinct

In February 2021, the NSW Government affirmed its support for the Narromine Heavy Industrial Precinct and Freight Exchange by successfully securing \$9 million in funding from the Growing Local Economies Fund. The Industrial Hub, covering approximately 100 hectares, is designed to accommodate a total of 29 allotments for industrial use across various sectors.

Presently, the provisions of the Narromine Local Environmental Plan 2011 are not conducive to the further subdivision or development of the land adjoining the MDC area. Therefore, Narromine Shire Council is seeking to introduce amendments to the LEP to establish a viable framework for the continued development of the land.

Craigie Lea Lane Road Upgrade

Narromine Shire Council is currently preparing the environmental assessment for the proposed public road upgrades of Craigie Lea Lane Road. The upgrades include the sealing and widening of Craigie Lea Lane Road from the intersection of Tomingley Road to McGrane Way. The upgrades will allow for two-way traffic and has been upgraded to support the MDC and service industrial uses that will be accommodated within the future Heavy Industrial Precinct.

1.2. Planning Proposal

Narromine Shire Council has engaged Barnson Pty Ltd to assist with the preparation of a Planning Proposal affecting a portion of (referred to as the site) 397 Craige Lea Lane, Narromine, legally described as Lot 2 in Deposited Plan 1294897, that seeks to amend the *Narromine Local Environmental Plan 2011* by way of:

1. **Land Rezoning** - The Planning Proposal aims to revise the existing land zoning of the property by introducing an E5 – Heavy Industrial Land Zone to a specific area within the site.
2. **Adoption and modification of Land Use Table** - The proposal involves incorporating the E5 – Heavy Industrial Land Use Table into the Local Environmental Plan (LEP) and adjusting the land use table to establish specific objectives and type of development that are permissible in the zone. These objectives are designed to guide the future development of the site in alignment with the strategic vision, which focuses on supporting the agriculture industry and facilitating freight exchange.
3. **Adjustment Minimum Allotment Size** Adjustment to the current Minimum Allotment Size requirements are proposed to facilitate the future subdivision of E5 – Heavy Industrial Allotments. Additionally, a site-specific pre-conditioning to services will be introduced.
4. **Provisions to allow for subdivision of the land affected by the Planning Proposal -**
 - a. **Possible amendment to Split Zone Clause** - A modification to the Split Zone Clause (CI4.1C of the LEP) is proposed to enable the creation of single-zoned lots for the original lots that would become split zoned E5 and RU1. Possible special provision to allow Part of Lot 2 being land on the western side of the railway and part of Lot 2 being land affected by the Inland Rail Material Distribution Centre to be subdivided.

Consistent with the NSW Government Planning & Environment's *Planning Proposals: Local Environmental Plan Making Guideline* (the Guide), this Planning Proposal has been prepared in the following format:

- Part 1 – Objectives or intended outcomes
- Part 2 – Explanation of Provisions
- Part 3 – Justification and strategic and site-specific merit
- Part 4 – Maps
- Part 5 – Community Consultation
- Part 6 – Project Timeline

1.3. Proponent

The proponent for this Planning Proposal is Narromine Shire Council.

1.4. Consultant

Josh Eagleton
 Barnson Pty Ltd
 Suite 34/361 Harbour Drive
 Coffs Harbour NSW 2450

1.5. Supportive Documentation

This Planning Proposal is supported by the following documentation. Refer to **Table 1** below.

Table 1: Appendices

Document	Prepared by	
Deposited Plan	NSW LRS	Appendix A
Site Survey	Barnson Pty Ltd	Appendix B
Aboriginal Due Diligence Assessment Report	Ozark Environment and Heritage	Appendix C
Biodiversity Site Suitability Assessment	Ozark Environment and Heritage	Appendix D
Strategic Bushfire Study	Barnson Pty Ltd	Appendix E
Narwonah MDC REF (Hydrology and Hydraulic Report)	ARTC	Appendix F
Site Contamination Investigation	Barnson Pty Ltd	Appendix G
Onsite Effluent Management Report	Barnson Pty Ltd	Appendix H
Mapping and Concept Plan	Barnson Pty Ltd	Appendix I
Land Use Conflict Risk Assessment	Narromine Shire Council	Appendix J
Agency Consultation	Various agencies	Appendix K

2. PLANNING PROPOSAL AREA

2.1. Location and Title

Land impacted by the Proposal

The parcel impacted by the planning proposal has been identified as Lot 2 DP1294897. Presently, Lot 2 is divided into two distinct sectors, referred to herein as the eastern and western portions, as outlined in Figure 2. A copy of the Deposited Plan has been provided at **Appendix A** of this report. Notably, the proposed alteration to the land zoning and minimum allotment size solely concerns the eastern portion of Lot 2, as delineated in Figure 3 below.

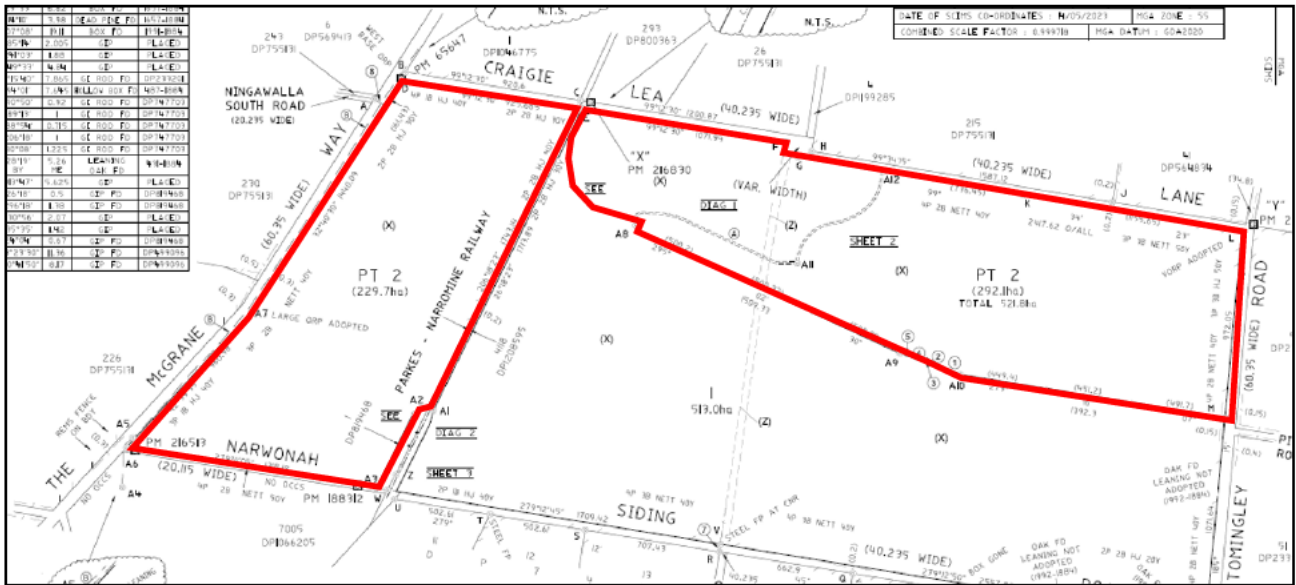


Figure 2: Existing Deposited Plan of Lot 2 in DP 1294897

Source: Deposited Plan

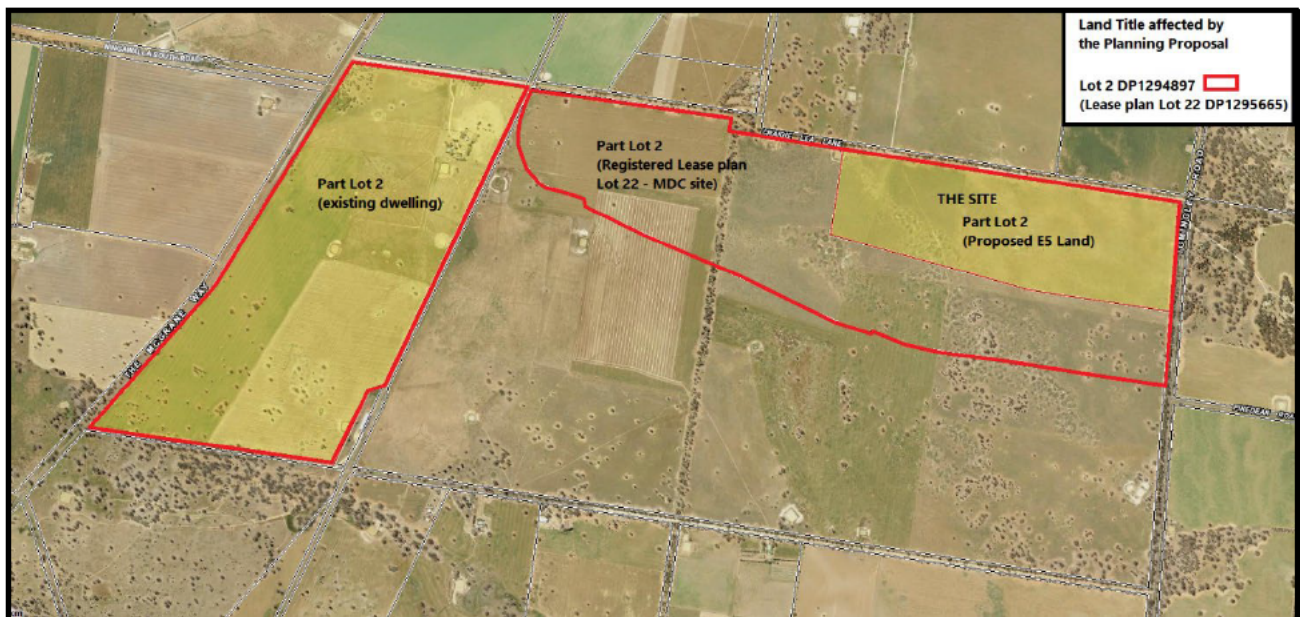


Figure 3: Aerial Image of Lot 2 in DP 1294897.

Source: SIXMAPS (Edited by Barnson Pty Ltd)

Table 2 below provides a breakdown of each allotment.

Table 2: Land affected by the Planning Proposal

Existing Lot	Location	Details	Area
Pt 2 (DP1294897)	Western Side of Railway	Supports existing dwelling	229.7ha
Pt 2 (DP1294897)	Eastern Side of Railway	Lease Plan for MDC - Lot 22 DP1295665 registered on the title	292.5ha
	Eastern Side of Railway	Proposed to be zoned E5	99.65ha

Table 3 Provides a summary of the key attributes of the site.

Table 3: Subject Land Details Summary

Street Address:	397 Craigie Lea Lane
Suburb:	Narromine
Subject Land Property Description:	Part Lot 2 in Deposited Plan 1294897
Existing Land Zone Land Zoning:	RU1 – Primary Production
Local Government Area:	Narromine Shire Council

A copy of the titles and deposited plans have been provided at **Appendix A** of this report. **Image 1 -3** below depicted the site. The pictures were taken in November 2023 by Barnson.

**Image One: Craigie Lea Lane**

Image One captures the view facing east along Craigie Lea Lane, featuring the site on the right side of the photograph. The lane is presently an unsealed road situated within a 40-metre road reserve, lined with vegetation on both sides. It's important to note that Craigie Lea Lane is currently undergoing a Part 5 Environmental Assessment that proposes road upgrade.



Image Two: Junction of Craigie Lea Lane and Tomingley Road

Image Two was captured at the junction of Craigie Lea Lane and Tomingley Road. In contrast to Craigie Lea Lane, Tomingley Road is a paved two-way road and located within a 65-metre wide road reserve. Functioning as an arterial road, Tomingley Road serves as a vital connection linking Narromine CBD, the site, and the surrounding areas to Tomingley and the Newell Highway (zoned SP2 Infrastructure).



Image Three: Site

Image Three was taken from the northeastern corner of the site, offering a southwest view across the land affected by this Planning Proposal and the broader Material Distribution Centre (MDC) area. The terrain is level and predominantly clear of vegetation, with only some vegetation along the road frontage or on the eastern and western sides of the allotment.

2.2. Existing Land Use

The site is located within the Local Government Area (LGA) of Narromine Shire and is therefore subject to the provisions of the *Narromine Local Environmental Plan 2011* (NLEP 2011). The NLEP 2011 establishes a policy framework for land use planning decisions and guides the community in terms of how land can and cannot be used within the Shire. The site is zoned RU1 – Primary Production (Refer to **Figure 4** below). The site is located approximately seven (7) kilometres south of the Narromine Central Business District and is generally surrounded by other similar rural product allotments. There are several surrounding land uses, which includes a railway siding, MDC, cropping and livestock grazing in proximity to the site. The site sits approximately 1.5 kilometres south of the existing R5 – Large Lot Residential precinct that is situated along Tomingley Road, known as “Villeneuve Estate”. – **Figure 4**.

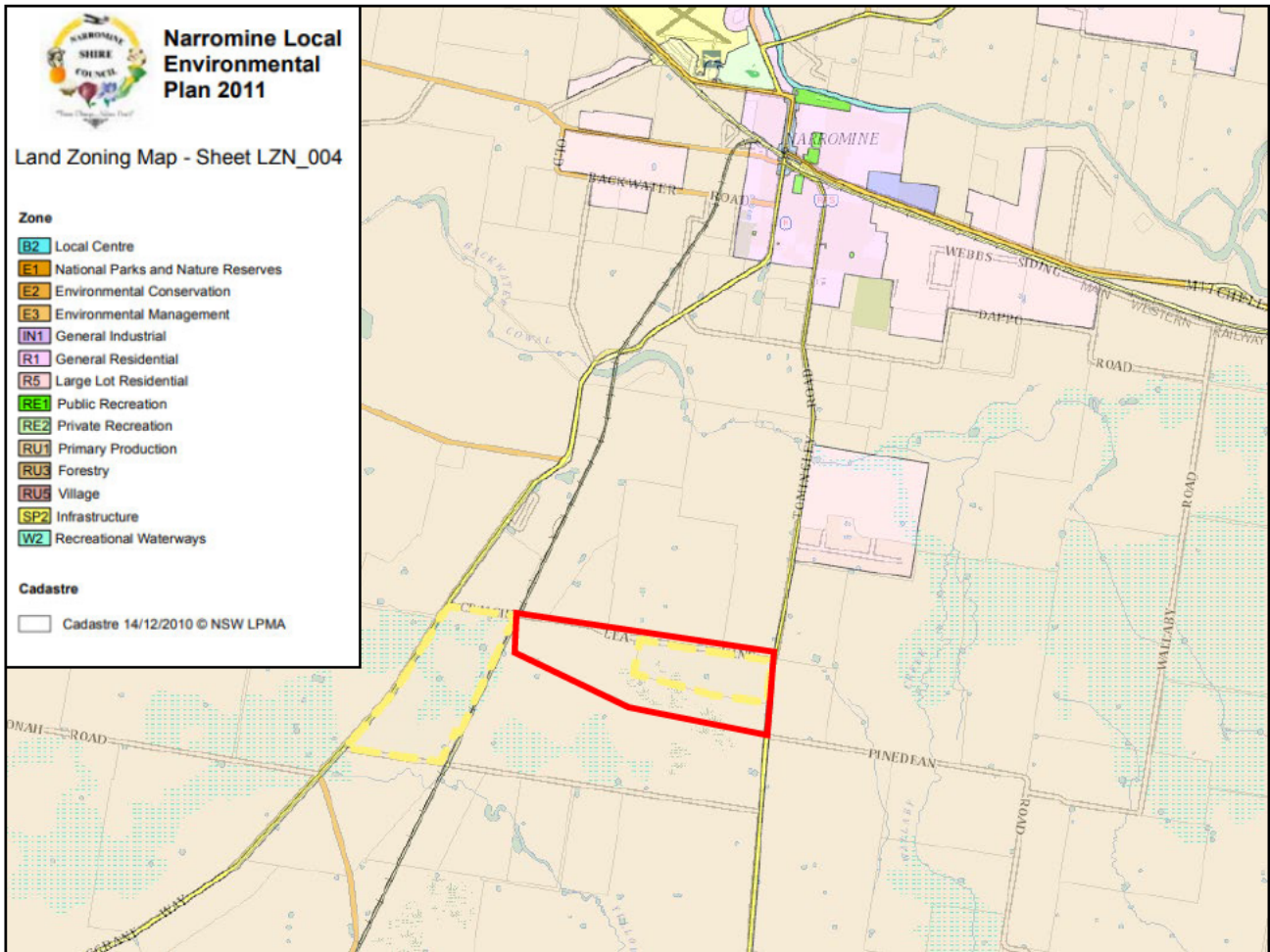


Figure 4: Existing Land Use Zones – Narromine Local Environmental Plan 2011

Source: NLEP 2011 – Edited Barnson Pty Ltd

2.3. Existing Lot Size

The current Minimum Allotment Size for the subject site is 400 hectares under the NLEP 2011 – Figure 5. It is noteworthy that the land zoned RU1 Primary Production typically adheres to a 400-hectare Minimum Allotment Size. However, a small section of RU1 Land, located opposite the property, has a minimum allotment size of 80 hectares (which was historically addressed through a Planning Proposal 2014/05).

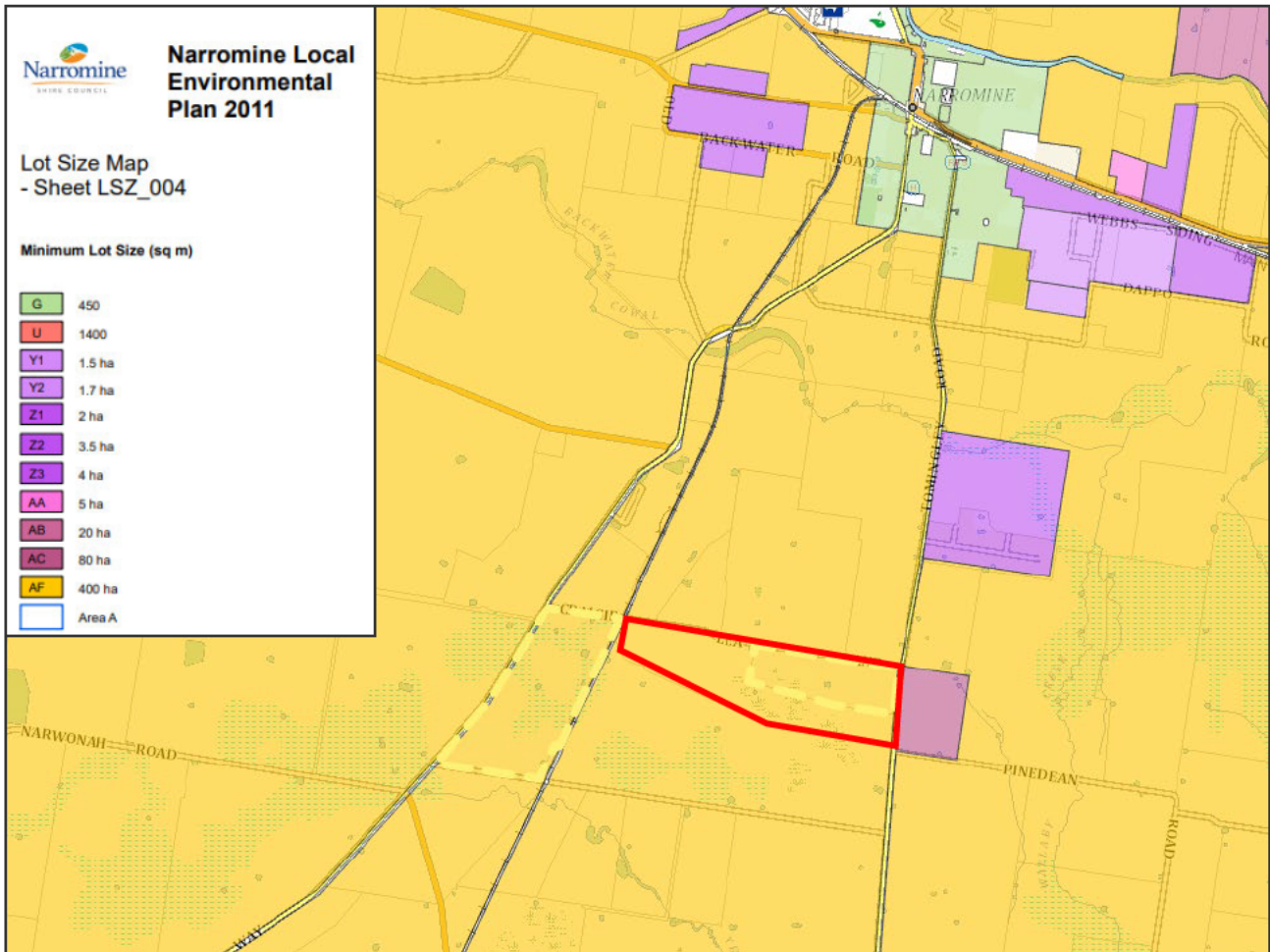


Figure 5: Existing Minimum Allotment Size – Narromine Local Environmental Plan 2011

Source: NLEP 2011 – Edited Barnson Pty Ltd

2.4. Topography

Barnson was engaged to undertake a site survey in this area, and the results have been incorporated into **Figure 6** and **Appendix B** of this report, providing an illustration of the site and its topographic slope. The landscape generally slopes from Tomingley Road to the west, decreasing from approximately 248m AHD to 244m AHD, resulting in a 4-metre descent over a distance of about 1.5 kilometres. Despite the predominantly level nature of the site, there is a noticeable overland flood path running through the centre and along the southern boundary.

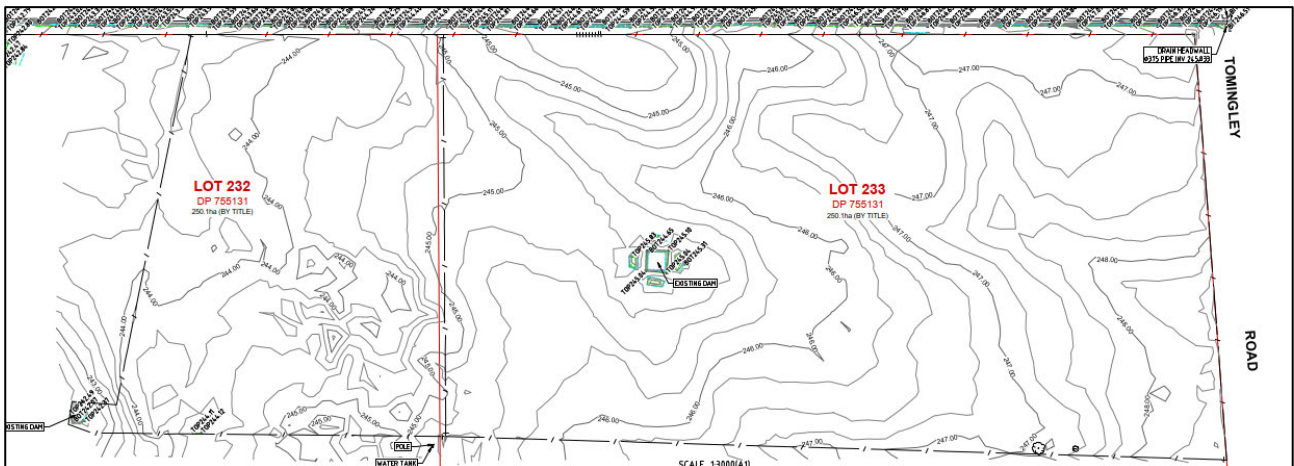


Figure 6: Topography of the Planning Proposal Area.

Note: Please disregard former lot descriptions the area above illustrates the portion of Lot 2 subject to a change in land zoning

Source: Barnson Pty Ltd.

2.5. Heritage

European Heritage

The site and immediate surrounding area have not been identified on the existing NLEP 2011 Heritage Mapping to accommodate any heritage items or to be located within a heritage conservation area. A review of Schedule 5 of the NELP 2010 does not locate any items within proximity to the subject site. The closest items have been identified in **Figure 7**– These include:

- Item I22 Tantitha Homestead, located along Tantitha Road at Lot 37 in Deposited Plan 42130

The site is located more than 12km away from these items.

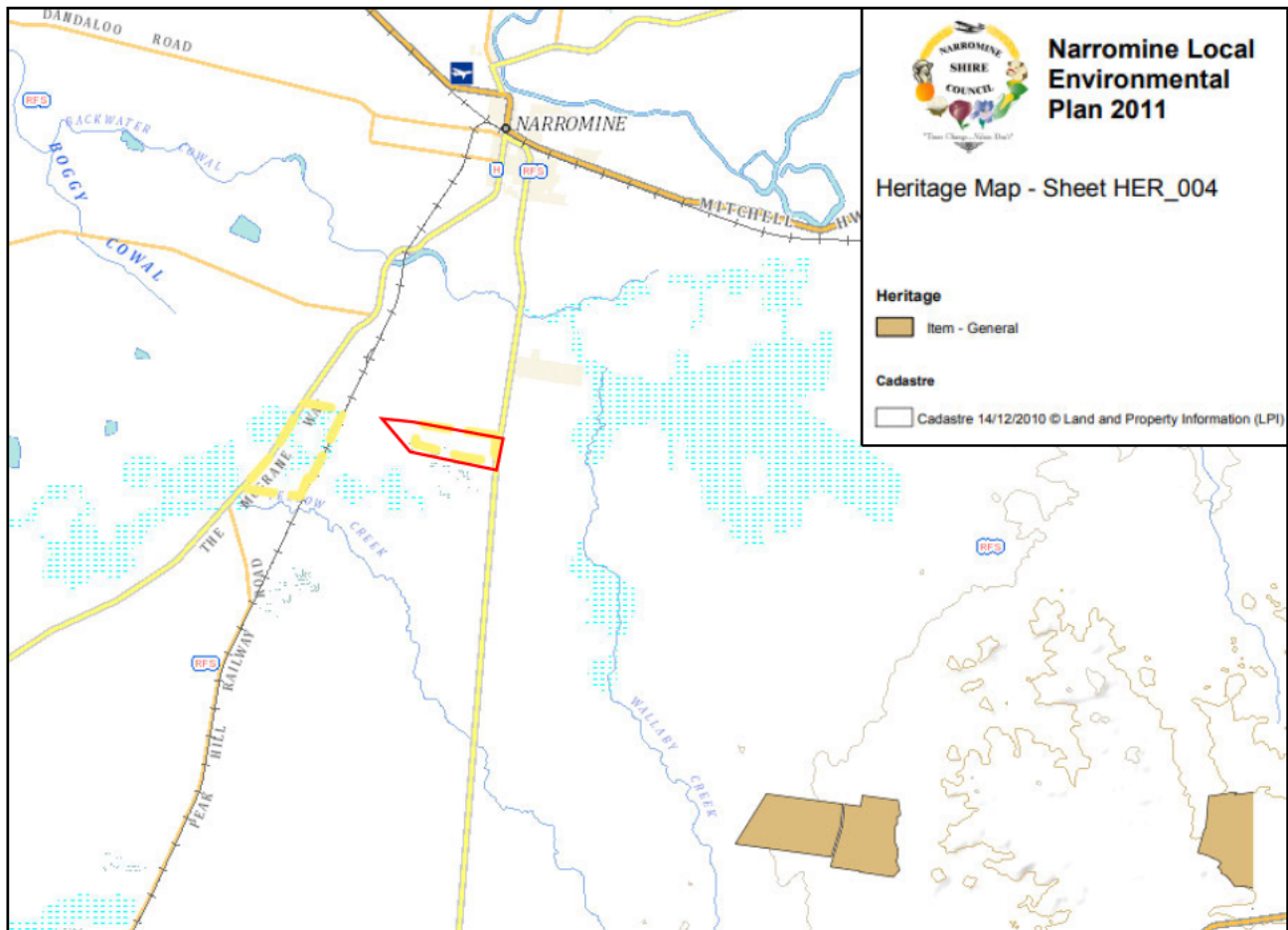


Figure 7: Heritage Map – Narromine Local Environmental Plan 2011

Source: NSW Legislation - Edited Barnson Pty Ltd

Aboriginal Cultural Heritage

The property under consideration in the planning proposal currently exhibits characteristics of a modified and disturbed area, largely devoid of vegetation. In the course of preparing the Planning Proposal, Narromine Shire Council enlisted the services of OzArk Environment and Heritage to produce an Aboriginal Due-Diligence Assessment Report – a copy of which is available in **Appendix C**. The report's preparation involved a desktop analysis, confirming the absence of previously recorded Aboriginal sites within the study area. With the exception of the corridors along Craigie Lea Lane, the entire study area qualifies as "disturbed land."

A search conducted on March 17, 2023, using the Aboriginal Heritage Information Management System (AHIMS) within a 5 x 5 km search area (GDA Zone 55 Eastings: 610694–620637, Northings: 6420967–6430960) revealed 24 recorded Aboriginal sites within that broader search area. Importantly, none of these sites are located within the specific study area, as depicted in **Figure 8**.

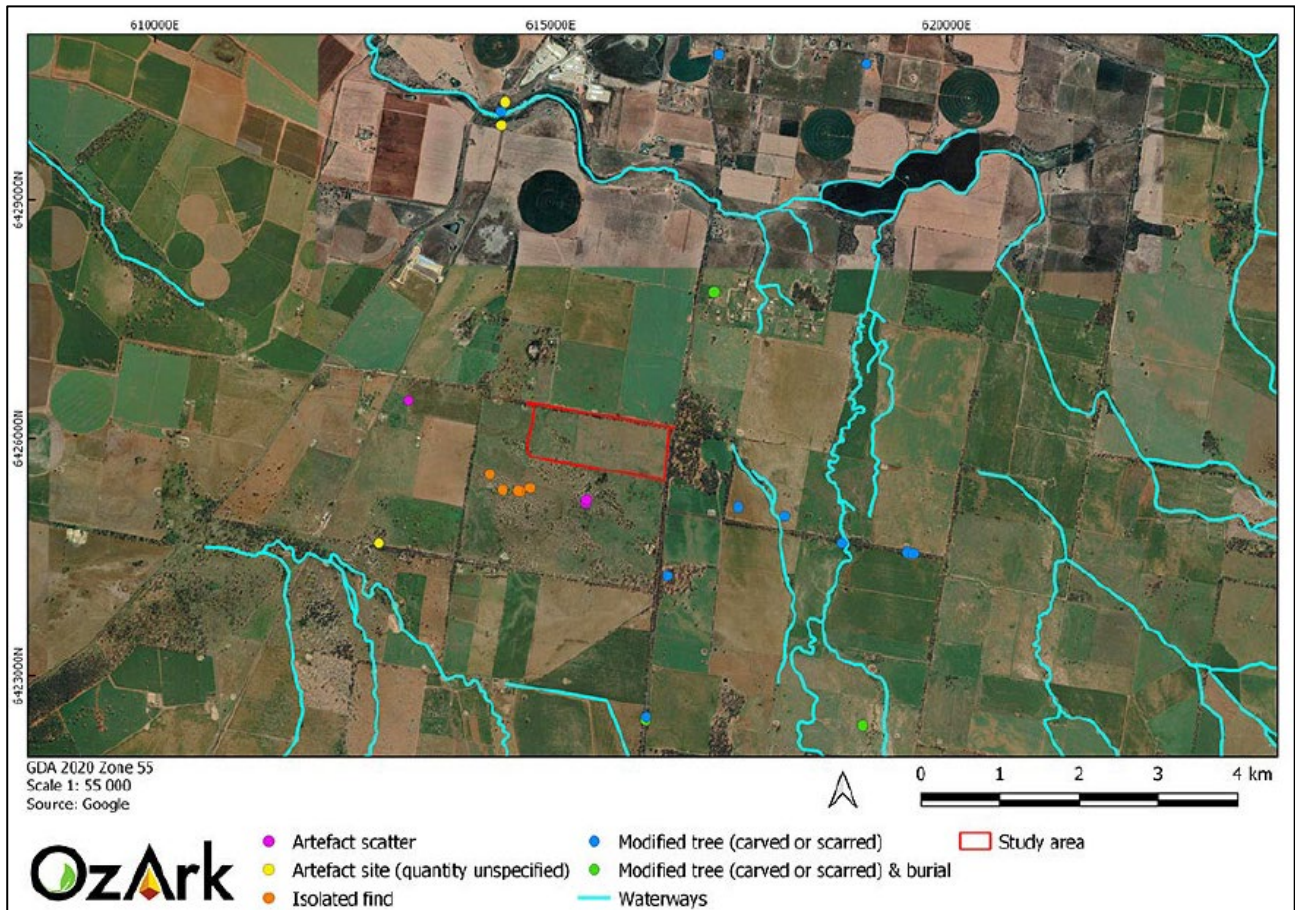


Figure 8: AHIMS Search

Source: Ozark Environment and Heritage

Findings from the AHIMS search indicate that modified trees, such as those with carvings or scars, are the most likely recorded site type in the region, followed by isolated finds. Culturally modified trees have been previously documented along creek or drainage lines and road corridors, where mature trees are more likely to be present. The AHIMS search also reveals that artefact sites have predominantly been recorded on landforms with gilgai and/or along the Macquarie River. Other recorded sites include modified trees associated with burials, artefact scatters, and artefact sites with unspecified quantities.

Given that the western part of the study area contains gilgai, there is an increased potential for artefact sites, such as isolated finds or low-density scatters, to be present. Any scarred trees, if found, would likely be restricted to the road corridors. Due to past disturbances, such as ploughing, any artefact sites would exist in a secondary context.

A visual inspection of the northern boundary of the study area conducted by OzArk Archaeologist Imogen Crome on April 26, 2023, confirmed that the study area consists of flat plains with remnant mature vegetation. Grey and Bimble box species remain within the road corridor at the northern end, some of which have been naturally scarred. However, no vegetation displayed comprehensive signs of cultural modification.

The ground cover primarily consists of long grasses and weeds, significantly limiting ground surface exposure within the study area to approximately 0-10%. Areas with increased visibility (10-15%) result from exposure due to wild animal trampling.

The visual inspection did not identify any Aboriginal sites or landforms with subsurface archaeological potential. The lack of archaeological potential is attributed to the undifferentiated nature of the landform and the absence of resources, such as water, which would have attracted Aboriginal occupation. While the proposed works are anticipated to impact the ground surface, it is concluded that no Aboriginal objects or intact archaeological deposits will be harmed. Notably, Council are consulting with the Local Aboriginal Land Council within respect to Aboriginal Cultural Heritage within the area.

2.6. Flora and Fauna

OzArk Environment & Heritage (OzArk) has been engaged by Narromine Shire Council (the client) to undertake a Biodiversity Site Suitability Assessment of the proposed site of a freight hub associated with the east-west greenfield take-off point for the Narromine to Narrabri (N2N) rail corridor, on the property "Cragie Lea" near Narromine, NSW – **Appendix D**. An area of approximately 800 ha of this property was assessed in April 2021 ("initial assessment area") as part of the N2N programme. Subsequently, an area in the northeastern corner of this property was earmarked for future development of a freight hub and was subjected to additional assessments in April 2023. This area approximately 100 ha in size and including part of the road corridor in Craigie Lea Lane, was defined as the "subject site" of this study – **Figure 9**.



Figure 9: Regional Location of Subject site

Source: Ozark Environment and Heritage

As per the BioNet Vegetation Classification Database, all Plant Community Types (PCTs) identified within the subject site are linked to Threatened Ecological Communities (TECs). Additionally, various TECs listed under the BC Act and EPBC Act were identified, showing similarities in structure or composition with the site's vegetation, although not catalogued in the BioNet Database.

The results of the field survey for each community were evaluated against composition and condition thresholds for each vegetation type. A summary of the findings has been provided below:

1. The field survey verified the presence of these PCTs within the subject site. The vegetation within the site comprises a mix of derived and/or natural grasslands, small ephemeral wetlands, isolated remnant trees, and remnant woodland communities in the road corridor. Consequently, a total of five PCTs were documented within the subject site. The extent of each PCT within the subject site and the future expansion area is detailed in **Table 4**, respectively. **Figure 10** maps the vegetation communities within the site.
2. The boundaries between specific communities, especially PCT 45 and PCT 250, and between PCT 53 and the surrounding grasslands, are likely to fluctuate based on seasonal conditions. The mapping of each community within the site reflects conditions observed during the surveys. Although much of the paddock was initially classified as non-native, field surveys revealed that this area is predominantly occupied by native groundcover species, with only minor areas of disturbance. Consequently, it has been classified as a derived grassland community (PCT 250).
3. Additionally, the area modelled as containing PCT 45 was found to host numerous gilgai-associated wetlands, which were mapped as a separate ephemeral wetland community (PCT 53).
4. The survey also identified patches of a Fuzzy Box (*Eucalyptus conica*)-dominated community within the road corridor (PCT 201), intergrading with PCT 82. Minor occurrences of a narrow-leaved eucalypt consistent with Pilliga Box (*E. pilligaensis*) or a hybrid between Pilliga Box and Grey Box (*E. microcarpa*) were noted in the road corridor. These individuals were mapped to PCT 82. Note that additional areas of the BC Act- and EPBC Act-listed Grey Box EECs and the BC Act-listed Fuzzy Box EEC occur in the northern road corridor of Cragie Lea Lane. It was noted that the Fuzzy Box community in particular was extensive on the northern side of the road.



Figure 10: Plant Community Types (PCT)

Source: Ozark Environment and Heritage

Table 4: PCT within site boundaries.

PCT ID	PCT Name	Associated TEC	Area in Site	TEC Conditions met (BC Act)
45	Plains Grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion	BC Act, CE: Artesian Springs Ecological Community in the Great Artesian Basin.	12.56	No
53	Shallow freshwater wetland sedgeland in depressions on floodplains on inland alluvial plains and floodplains	BC Act, CE: Artesian Springs Ecological Community in the Great Artesian Basin.	4.07	No
82	Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Penepplain Bioregion	BC Act, E: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Penepplain, Nandewar and Brigalow Belt South Bioregions. EPBC Act, E: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Penepplain, Nandewar and Brigalow Belt South Bioregions.	2.67	Yes. Areas mapped as PCT 82 were dominated by Grey Box (<i>E. microcarpa</i>) and understorey possessed associated native species. No condition thresholds are specified for the BC Act TEC.
201	Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion	BC Act, E: Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions.	0.70	Likely. Areas mapped as PCT 82 were dominated by Grey Box (<i>E. microcarpa</i>) and understorey possessed associated native species. Many sites appeared to meet the thresholds for

PCT ID	PCT Name	Associated TEC	Area in Site	TEC Conditions met (BC Act)
				consideration as this TEC; however, guidelines specify that surveys should take place in spring and, given the scope of the present survey, closer attention to each individual patch may be required to determine whether it meets the threshold conditions. Some patches fell below the 0.5 ha minimum size threshold and were excluded from consideration.
250	Derived tussock grassland of the central western plains and lower slopes of NSW	<p>BC Act, CE: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions.</p> <p>EPBC Act, CE: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions.</p> <p>BC Act, E: Inland Grey Box Woodland in the Riverina, NSW South</p>	96.32	<p>Yes.</p> <p>All areas of PCT 201 belong to this community. The listing applies to all remnant woodland in which Fuzzy Box (<i>Eucalyptus conica</i>) is the dominant species and does not specify a minimum patch threshold.</p>

PCT ID	PCT Name	Associated TEC	Area in Site	TEC Conditions met (BC Act)
		Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions. EPBC Act, E: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions.		
		EPBC Act, CE: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions.		No. Sites lacked associated species.
		BC Act, CE: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions.		No. Sites lacked associated species.

PCT ID	PCT Name	Associated TEC	Area in Site	TEC Conditions met (BC Act)
		BC Act, E: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Penepplain, Nandewar and Brigalow Belt South Bioregions.		<p>Yes (Part).</p> <p>Areas adjacent to or largely enclosed by PCT 82, and where the understorey was consistent with the TEC description, were considered to belong to the derived grassland form of this TEC. Areas of PCT 250 that could not confidently be assumed to have formerly been dominated by Grey Box (<i>Eucalyptus microcarpa</i>) as they may have been derived from other woodland types, such as Fuzzy Box (<i>Eucalyptus conica</i>), were not included in this TEC. While it is likely that much larger areas of PCT 250 were historically derived from a former Grey Box woodland, this cannot be stated with certainty.</p>

The most significant identified constraints associated with any proposal situated in the subject site or future expansion area are the relatively large areas of TEC that would be impacted and the presence of the threatened Bluegrass. Ozark confirmed that significant efforts to reduce impacts to these entities are encouraged in order for future development to comply with the requirement to avoid and/or minimise impacts to biodiversity values. It is noted that the proposed concept subdivision detailed in this report illustrates how the land could be potentially subdivided whilst retaining and protecting the Bluegrass and the land identified as "typical habitat" for blue grass.

2.7. Hazard

Bushfire Prone Land

The Planning Proposal site is located in Bushfire Prone Land under section 10.3 of the EP&A Act- **Figure 11**. Thus, the site has been assessed in accordance with Direction 4.3 issued by the Minister for Planning under Section 9.1.(2) of the *Environmental Planning and Assessment Act 1979* and *Planning for Bushfire Protection 2019*.

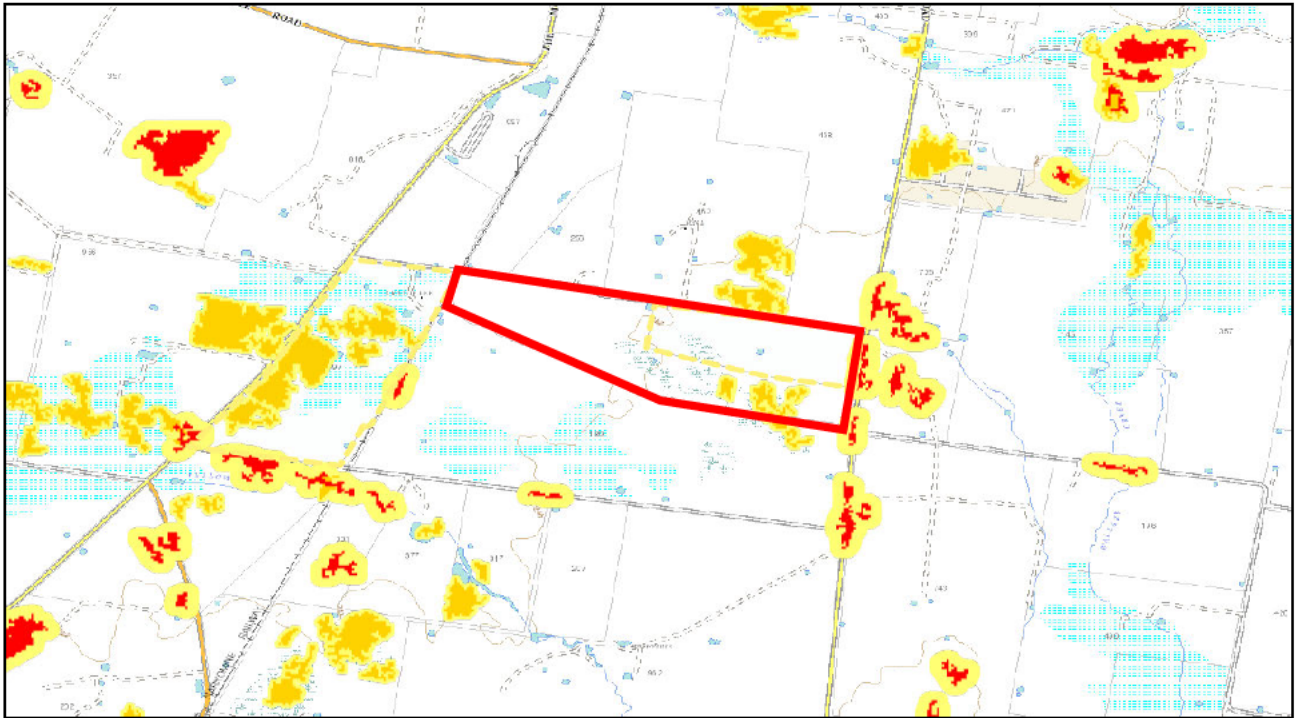


Figure 11: Bushfire Prone Land

Source: Narromine Bushfire Prone Land Map – Edited by Barnson Pty Ltd

Under these directions, planning proposals should follow the objectives:

- to protect life, property and the environment from bush fire, by discouraging the establishment of incompatible land uses in bush prone areas; and
- to encourage sound management of bush fire prone areas. Under Direction 4.4 a relevant authority is required to consult with the NSW Rural Fire Service (RFS) through the preparation of a bush fire assessment.

Barnson had reached out to NSW RFS on the 7th of December 2023, however, no response has yet to be received from NSW RFS in respect to the Planning Proposal.

As part of the preparation of the Planning Proposal Barnson Pty Ltd were engaged to prepare a Strategic Bushfire Study – **Appendix E**. Taking into account the bushfire hazard at the landscape level, which includes the history of infrequent wildfires, smaller fire extent, fragmented continuity of the hazard, and the low likelihood and reduced severity of potential bushfire attack scenarios, the overall risk of bushfires is deemed low. None of the elements of the landscape bushfire risk evaluation suggest that the proposed development in the planning proposal should be considered unsuitable under the Strategic Planning Principles or exclusion criteria within PBP. Additionally, the risk exposure can be decreased even further by implementing the bushfire protection measures discussed in **Section 4** of the report and summarised **Table 5** below.

Table 5: Strategic Bush fire Study

Asset Protection Zones	Section 8.3.1 of PFBP 2019 does not provide for any specific bushfire performance requirements, including Asset Protection zones.
Access	The site has optimum access to both Craigie Lea Lane and Tomingley Road.

Water Supplies	Lead in work will be undertaken to connect the site to water
Electricity supply	Lead in work will be undertaken to connect the site to electricity.
Construction Requirements.	<p>Under the building classification system within the National Construction Code (NCC) Class 5 to 8 buildings (which include offices, factories, warehouses and other commercial or industrial facilities) do not have specific bushfire performance requirements under the NCC and as such building construction standards under AS 3959:2018 (SA 2018) or the NASH standard (NASH 2014) do not apply as a set of deemed to satisfy provisions.</p> <p>New construction shall be in accordance with the general fire safety provisions of the NCC and incorporate the additional ember protection measures listed in Section 4.8.3 of the report.</p>
Landscaping	APZ/Landscaping is to be managed in accordance with PfbP 2019. Detailed Landscaping plans are able to be provided as part of Development Application that details the type of landscaping to be proposed on the site.
Emergency Management Planning	Emergency Management Planning and operation plan is able to be prepared and provided as part of a Development Application that is in accordance with PfbP 2019.

After assessing the Planning Proposal against the bushfire strategic planning requirements of PfbP, the following observations have been made regarding the future development:

- It does not present or encounter an unacceptable risk;
- It does not result in unfavourable development consequences;
- It aligns with the strategic planning principles of PBP;
- Proper bushfire protection measures can be implemented to decrease the residual risk to a suitable level; and
- It does not negatively impact the bushfire risk of current development or neighbouring landowners and their capacity to carry out bushfire management.

Furthermore, the evaluation outlined in this report confirms compliance with PfbP.

Flooding

As part of the preparation of the Narwonah MDC Review of Environmental Factors a Hydrology and Hydraulic Report was prepared by ARTC– **Appendix F**. An examination of the existing technical assessment reveals that the proposed site features relatively flat terrain with a 0.5% grade sloping in a north-westerly direction. The proposal site contains localised depressions and small farm dams. It is noteworthy that the proposal site is situated outside the flood planning area – **Figure 12**. Nevertheless, it is susceptible to temporary overland flood flows during or immediately after substantial rainfall events, often in the form of convective thunderstorms producing intense rainfall across localised catchments within a few hours. These events generate shallow overland flows that

discharge through the site. Although such flooding is likely to be transient and last only a few hours, some ponded run-off may persist in terrain depressions. The existing flood hazard for the 1% AEP and PMF and the depth at both events are shown at are shown in Figures 13 and 14.

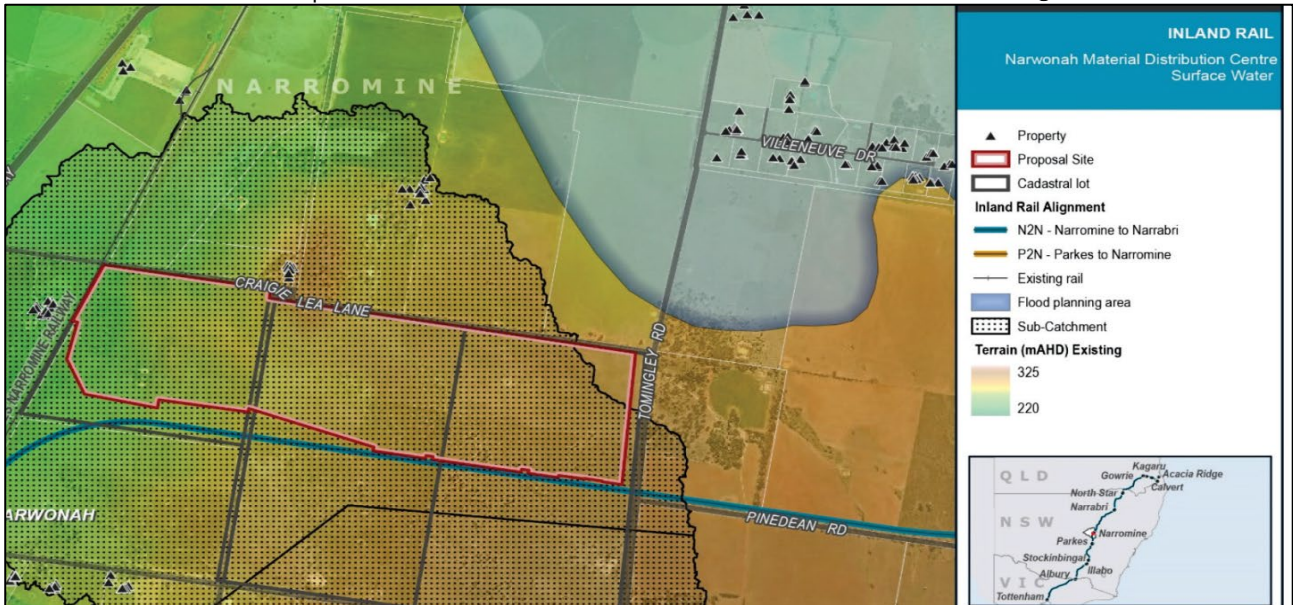


Figure 12: Narwonah Material Distribution Centre – Surface Water
 Source: ARTC In Land Rail – Review of Environmental Factors

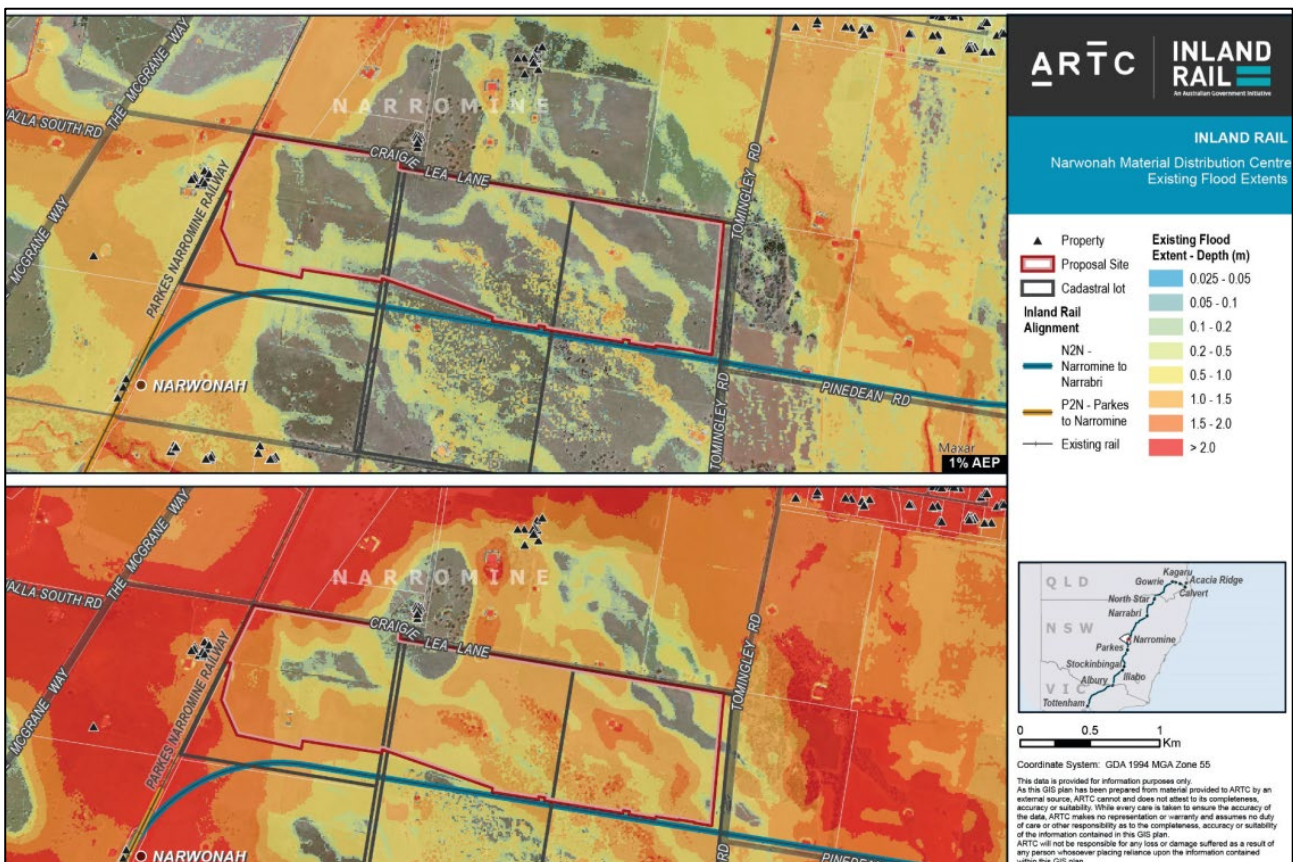


Figure 13: Narwonah Material Distribution Centre – Existing Flood Extent
 Source: ARTC In Land Rail – Review of Environmental Factors

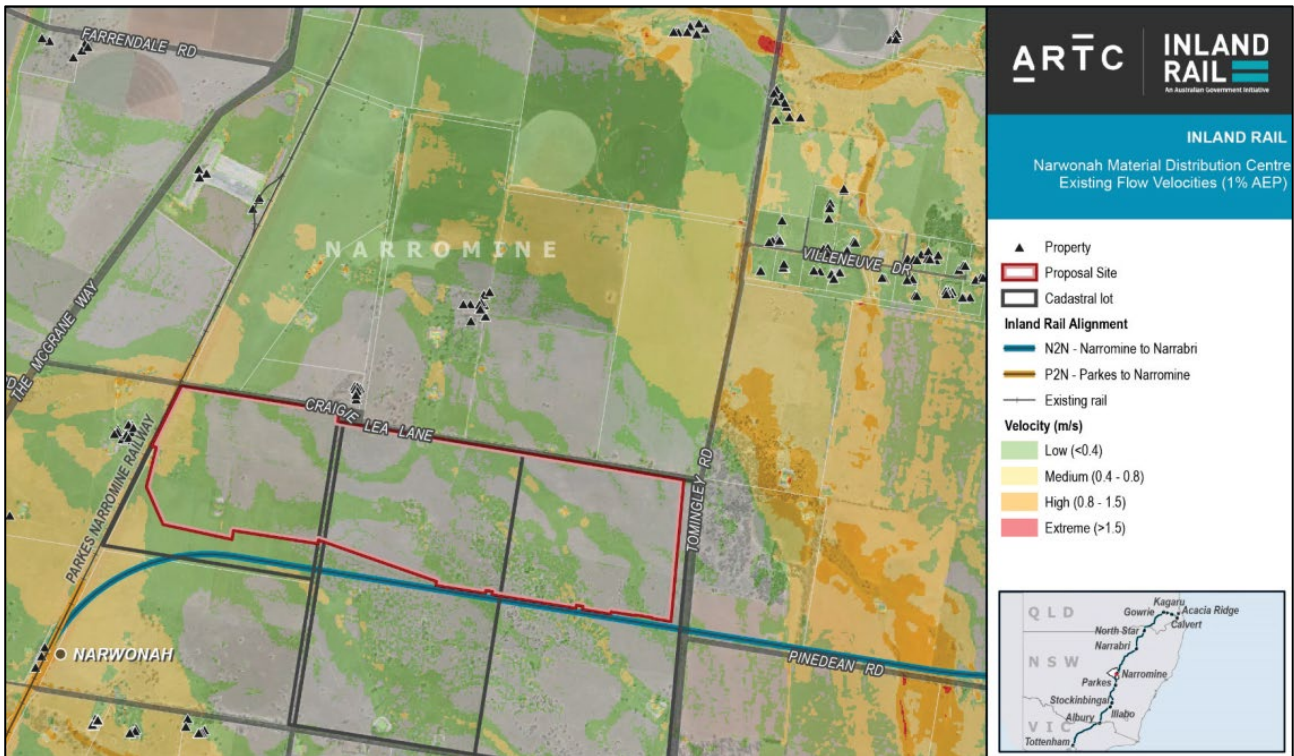


Figure 14: Narwonah Material Distribution Centre – Existing Flow Velocities

Source: ARTC In Land Rail – Review of Environmental Factors

2.8. Land and Soil Capabilities.

Land and Soil

An examination of the Land and Soil Capability mapping in New South Wales was conducted, affirming that the Planning Proposal Area falls within Land and Soil Capability Class 4, as indicated in **Figure 15**. Class 4 denotes land with moderate to severe limitations for certain uses, necessitating careful management to avert soil and land degradation. Specialised management practices, backed by substantial knowledge, expertise, inputs, investment, and technology, can effectively overcome these limitations. Notably, the site is not within the boundary of State Significant Farmland.

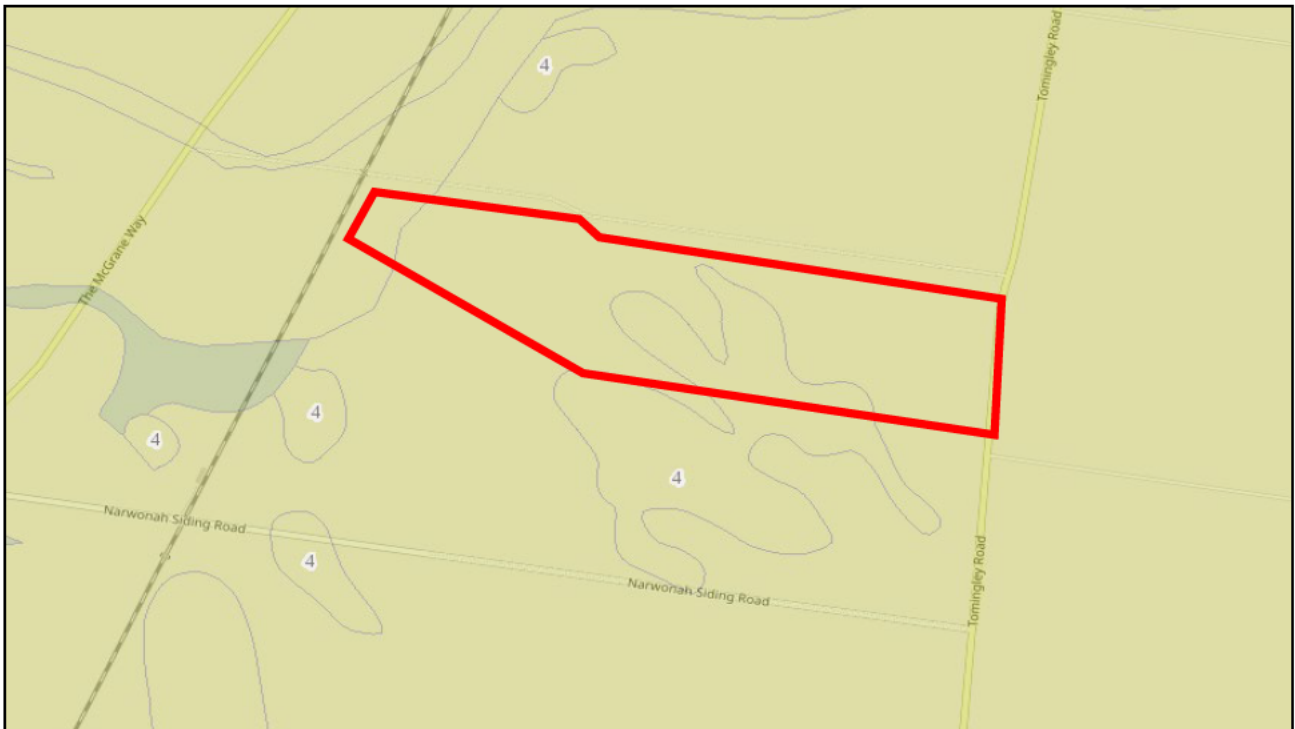


Figure 15: Land and Soil Capability
 Source: NSW Government

Contamination and Sulphate Soils

A Site Contamination Investigation was undertaken by Barnson Pty Ltd- **Appendix G**. A desktop review of information available for the site, and the site in general, identified activities associated with the historical and current use of the site as having a potential to contaminate surface soils. The Subject Site has historically been used for agricultural (pastoral) purposes and the site is currently unoccupied (apart from minor activities associated with MDH) and covered in vegetation (mainly tall pasture grass). The site is separated into several paddocks with steel wire fencing and gates and include several earthen farm dams constructed to collect rain for stock water supply purposes. A portion of the site is covered in a series of small mounds and depressions known as Gilgai. The depressions seasonally fill with water and retains this water as a result of underlying expanding clay soils.

Barnson previously conducted an assessment of potential contamination at the site. The preliminary site investigation report (Barnson, 2021) identified the following as potential sources of contamination:

- Historical livestock farming activities.
- Historical cropping activities
- Storage of demolition waste
- Vehicles and equipment

Considering the potential sources relevant to the subject site, a wide variety of contaminants may be present. With the historical agricultural activities considered the primary potential source of contamination, the residues of agricultural chemicals such as pesticides and fertilisers are accepted as the most likely contaminants. Of interest here are chlorinated organic compounds which historically have been widely used as insecticides, fungicides, herbicides and soil fumigants in agriculture and which are stable enough in the environment (persistent) to remain in soil for extended periods of time. Inorganic compounds that contain heavy metal including arsenic, copper, lead and mercury were also historically used as pesticides, particularly in the control of external

parasites on sheep. The use of fertiliser, although not commonly considered a source of soil contamination, potentially could lead to a build-up of heavy metals such as cadmium in soils in areas where it has been extensively applied.

- The potential presence of fuels and lubricants are further potentially relevant to the on-site storage, maintenance or movement of vehicles and equipment in the operation of the farm.
- Based on this understanding of the site history and activities, the contaminants of potential concern identified for the investigation of the Subject Site include:
- Pesticides (organochlorines, organophosphates);
- Hydrocarbons (mainly fuel and lubricants); and
- Heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn).

The report (Barnson, 2021) involving targeted site sampling see **Figure 16**, concluded that the site investigation conducted to determine the presence and significance of potential contamination associated with the identified sources, revealed that none of the potential sources identified are likely to have contributed significant quantities of contamination to the surface soils of the subject site.

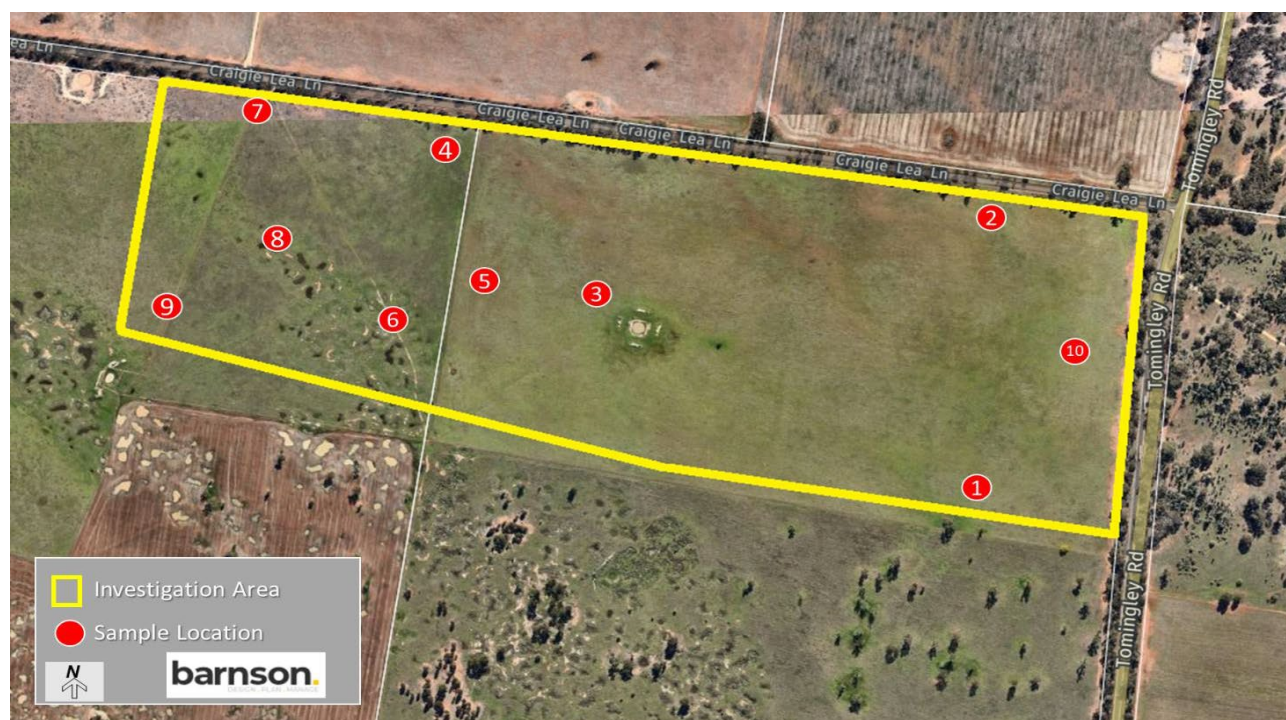


Figure 16: Approximate locations of confirmatory soil samples collected at the Investigation Area
 Source: Barnson – Site Contamination Investigation

Direct comparison of the analytical results presented in Site Contamination Investigation show that the detected metal concentrations in samples collected from the investigation area are well below the health and ecological risk-based criteria values. The general low concentrations of heavy metals detected suggest naturally occurring element abundance and is most likely not related to any of the potential sources of contamination identified for the investigation area.

The samples of soil collected in the high traffic areas contained no elevated concentrations of hydrocarbons or heavy metals, while the samples collected from the Gilgai contained no detectable concentrations of either pesticides or hydrocarbons. These results verify the assertion that the activities previously undertaken at the site did not contribute significant or widespread contamination to the surface soils.

The report concludes that the review of the available historical information, including contaminated sites databases and aerial photographs indicated a low potential for significant environmental contamination to be present across the site. The site investigation conducted to determine the presence and significance of potential contamination associated with the identified sources, revealed that none of the potential sources identified are likely to have contributed significant quantities of contamination to the surface soils of the Investigation Area.

Based on the findings of the desktop review, site investigation and confirmatory sampling and analysis, it is concluded that the site is suitable for the future proposed development and use. The environmental media such as surface soils and surface water at the site are unlikely to present a risk of impact to the health of humans or the environment and further investigation is not required. The report recommend that any material excavated at the site as part of the redevelopment, be classified in accordance with the general solid waste (NSW EPA, 2014) guidelines and appropriately disposed.

2.9. Services

Electricity Services

Narromine Shire Council has enlisted the services of JLE Group to facilitate the formulation of a strategy for establishing electricity connectivity at the site. JLE, representing Narromine Shire Council, has collaborated with Essential Energy (EE) to gain a deeper understanding of the necessary load requirements and network capacities in the vicinity. Despite the availability of services, an ongoing assessment of connection options remains in progress. Notably the site sits adjacent to existing EE services – **Figure 17**.

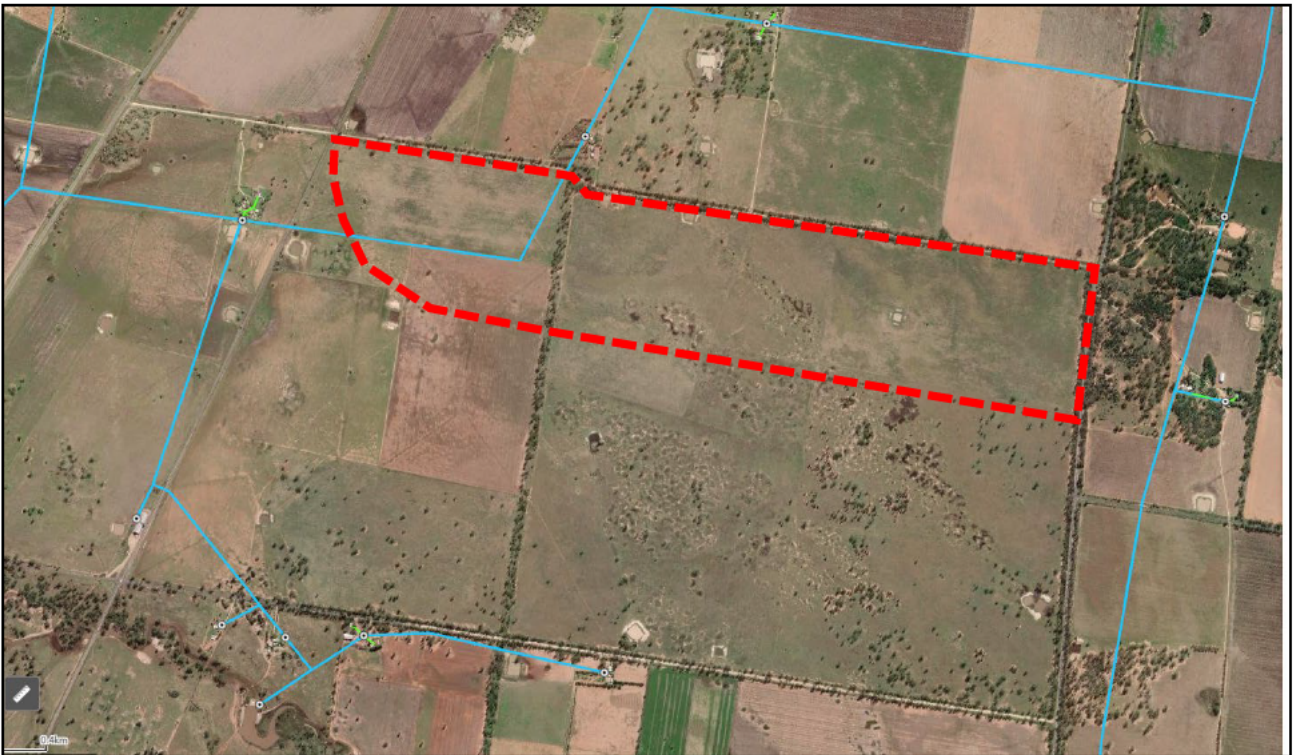


Figure 17: Planning Proposal Area (existing electricity services)

Source: Essential Energy

Sewer

The proposed site does not benefit from an existing or nearby sewer connection, necessitating on-site wastewater management for the planned development. In preparation for the Planning Proposal, Narromine Shire Council enlisted Barnson Pty Ltd to compile an Onsite Effluent Management Report - **Appendix H**. This report outlines the outcomes of a site inspection and geotechnical investigation conducted in the Investigation Area, supporting design recommendations for on-site wastewater management. The assessment considers the limitations of both the Subject Site and Investigation Area to guide the design and placement of a system or systems capable of accommodating wastewater effluent from the proposed development.

Barnson Pty Ltd analysed the proposed on-site waste management system in accordance with the NSW Government-endorsed 'Silver Book' (1998) and the ANZ Standard 1547:2012 'On-site Domestic Wastewater Management.' Additional insights were sought from the NSW Water 'Designing and Installing On-site Wastewater Systems' 2019 guideline and the Narromine Shire Council 'Sewage Management Plan.' Due to variations in soil characteristics, the investigation area is divided into two sections, and calculations involving soil parameters are conducted for each area.

For this specific site, both irrigation and absorption methods are considered for managing treated effluent. However, based on the soil properties in Area B, the placement of absorption-based effluent disposal is not recommended in that area. The calculations presented below for absorption disposal pertain solely to Area A. The assessment of system requirements for managing on-site wastewater from the proposed development was predicated on the assumption that the proposed subdivision could accommodate up to 200 persons, resulting in an estimated maximum total daily flow of 8,600 litres. Upon conducting site-specific measurements using soil samples from the investigation, two distinct areas with different soil properties, labelled as Area A and Area B, were identified. Consequently, the system requirements for each area were determined – **Figure 18**.

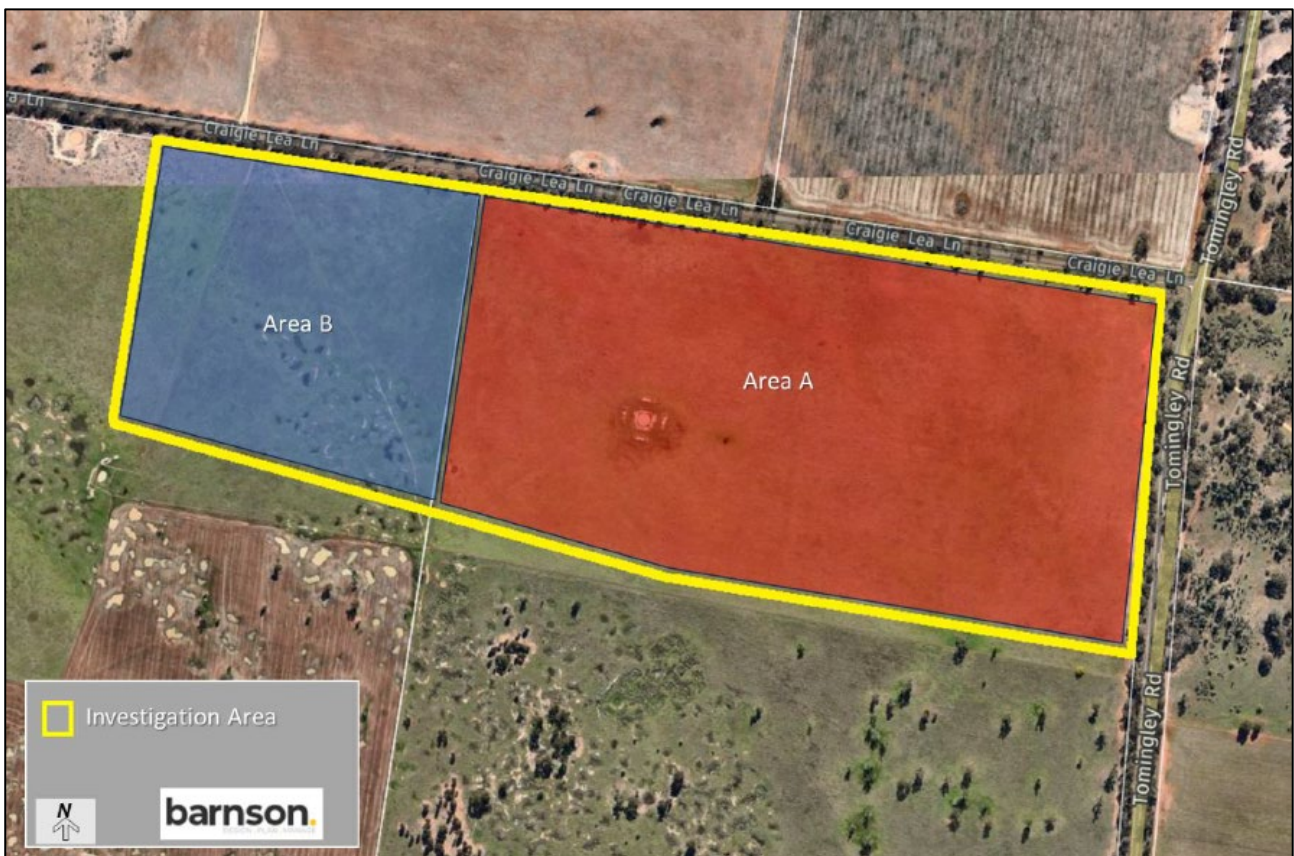


Figure 18: Investigation Area – Onsite Effluent Management Report

Source: Barnson Pty Ltd

Area A - For Area A, the assessment indicated that either a standard septic tank or an aerated wastewater treatment system (AWTS) could be used. A standard septic tank system should have a minimum capacity of 10,150 Litres, with primary treated effluent disposal into absorption beds or trenches covering a total area of 860m². In the case of an AWTS system for Area A, it is recommended to have a surge tank with a minimum capacity of 20,300 Litres, from which the AWTS will pump wastewater for treatment. Secondary treated effluent should be disposed of through drip or spray irrigation fields, although absorption beds may be suitable in areas with more permeable soil.

Area B - For Area B, only systems capable of producing secondary treated effluent are recommended. Drip or spray irrigation fields for effluent disposal should have a minimum area of 3,304m² in Area A and 3,937m² in areas with clay-rich soils (Area B), noting capacity is available for both scenarios.

Figure 19 and the reporting prepared presents a possible servicing approach utilising AWTS for the precinct. During the Development Application phase, a more comprehensive assessment will confirm the most suitable and cost-effective method for the Council to establish a precinct-wide system. Nonetheless, the report highlights that the land is well-suited for on-site effluent management.

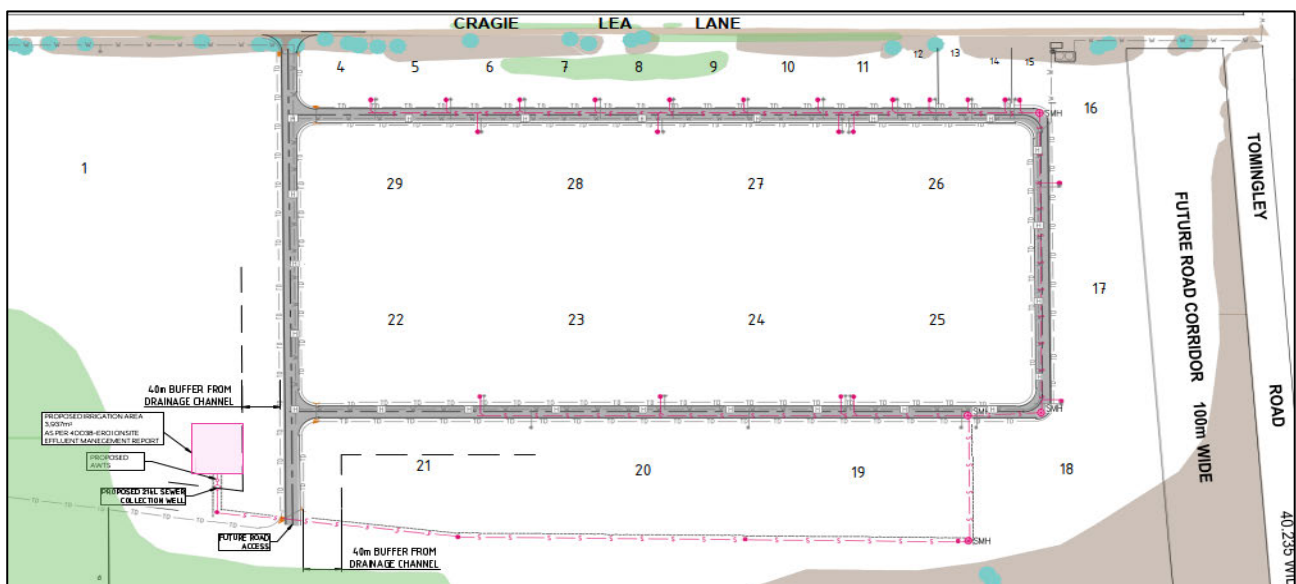


Figure 19: Investigation Area – Onsite Effluent Management Report

Source: Barnson Pty Ltd

Water

The forthcoming development, aligned with the proposed changes in this planning proposal, hinges on securing a potable water connection. Narromine Shire Council is presently in the process of exploring initiatives for potable water infrastructure that will ultimately link the area to an existing water treatment plant. This investigation is ongoing with positive response for the piping of water to an onsite dedicated reservoir which can be boosted and deliver a reticulated supply across the site.

2.10. Access and Traffic

In preparing this Planning Proposal, the Narromine Shire Council has collaborated with the NSW Government agency, Transport for New South Wales. In response, Transport for NSW has requested a comprehensive Traffic Impact Study to thoroughly evaluate the effects of the future Planning Proposal and its subsequent development on the classified road network, local road connections with classified roads, and how the Planning Proposal will enhance public transport. The Traffic Impact Study is currently underway and will be submitted to Transport for NSW as part of the consultation process. McLaren Traffic Engineering and Road Safety Consultants have been engaged by the Council to assist in the study's preparation.

It's important to note that a number of transport and traffic projects are underway in the area, including the upgrade of Craigie Lea Lane and various intersection improvements. Due to the concentration of projects near the subject site, a formal working group has been established to ensure coordination among all ongoing works. This group comprises representatives from Narromine Shire Council, Inland Rail, and Transport for New South Wales, including Project Development Manager, Property Development Manager, Valuations and Acquisitions Manager, Customer Engagement Officer, and Community Technical Partner. The establishment of this working group is a valuable asset to the community, ensuring that the delivery of works proceeds in a logical and coordinated manner. Discussion will be assisted by the Transport Impact Study for this Planning Proposal.

3. EXISTING LEGISLATIVE FRAMEWORK

3.1. Narromine Local Environmental Plan 2011

NLEP 2011 was gazetted on 9th of December 2011. NLEP 2011 adopts the Standard Instrument LEP Template required by the NSW Government.

3.2. Existing Land Use Zoning

The subject site is zoned RU1 – Primary Production. The Tomingley Road and existing railway line are zoned SP2 - Infrastructure pursuant to the NLEP 2011. A copy of the RU1 – Primary Production and SP2 - Infrastructure Land Use Table has been provided below.

Zone RU1 Primary Production

1 Objectives of zone

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*

2 Permitted without consent

Environmental protection works; Extensive agriculture; Forestry; Home occupations; Roads; Water reticulation systems

3 Permitted with consent

Agritourism; Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Bed and breakfast accommodation; Boat launching ramps; Boat sheds; Building identification signs; Business identification signs; Camping grounds; Cellar door premises; Cemeteries; Community facilities; Correctional centres; Depots; Dual occupancies (attached); Dwelling houses; Eco-tourist facilities; Environmental facilities; Extractive industries; Farm buildings; Farm stay accommodation; Flood mitigation works; Freight transport facilities; Heavy industrial storage establishments; Heavy industries; Helipads; Home-based child care; Home businesses; Home industries; Home occupations (sex services); Industrial training facilities; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Jetties; Landscaping material supplies; Mooring pens; Moorings; Open cut mining; Recreation areas; Recreation facilities (major); Recreation facilities (outdoor); Roadside stalls; Rural industries; Rural workers' dwellings; Sewerage systems; Veterinary hospitals; Water recreation structures; Water supply systems

4 Prohibited

Any development not specified in item 2 or 3

Zone SP2 Infrastructure

1 Objectives of zone

- To provide for infrastructure and related uses.
- To prevent development that is not compatible with or that may detract from the provision of infrastructure.

2 Permitted without consent

Roads

3 Permitted with consent

Aquaculture; The purpose shown on the Land Zoning Map, including any development that is ordinarily incidental or ancillary to development for that purpose

4 Prohibited

Any development not specified in item 2 or 3

3.3. Existing Minimum Allotment Size and Subdivision provisions

The NLEP 2011 includes a number of clauses in Part 4 – Principal Development Standards of the LEP that currently govern the subdivision of rural lands. These include:

Clause 4.1 Minimum Allotment Size

Clauses 4.1 of the NLEP applies to subdivision of any land shown on the Lot Size Map and that required for development consent. Pursuant to Clause 4.1 Subclause 3, the size of any lot resulting from a subdivision of land to which this clause applies is not be less than the minimum size shown on the Lot Size Map. Map LSZ_004 of the LEP illustrates a 400ha Minimum Allotment Size over the entire property. This Minimum Allotment Size requirement is the minimum requirement for most land zoned RU1 – Primary Production zoned land within the LGA.

Clause 4.1AA Minimum Subdivision lot size for community title scheme

Clause 4.1AA of the LEP applies to the subdivision of land zoned RU1 – Primary Production under the Community Land Development Act 2021. Similar to Clause 4.1, Subclause 3 of Clause 4.1AA requires lot/s resulting from the subdivision of land, other than the lot comprising the association property within the meaning of the Community Land Development Act 2021 is not to be less than the 400ha Minimum Allotment Size that applies to the property.

Clause 4.2 Rural Subdivision

Clause 4.2 of the LEP applies to the subdivision of land zoned RU1 – Primary Production. Pursuant of Subclause 3 of this clause, a lot less than the 400ha Minimum Allotment Size for the purpose of primary production on the proviso that the lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot and that a dwelling cannot be erected on such a lot.

Clause 4.1C Exceptions to minimum lot sizes for certain split zones

The clause applies to land that contains residential or an employment zones and land in the RU1 Primary Production Zone. This clause requires all of the land zoned RU1 in the original lot to be included with land in a resulting lot that contains residential or employment zone land that meets the applicable min lot size.

3.4. Terrestrial Biodiversity

Clause 6.4 – Terrestrial Biodiversity relates to part of the development of the land (Figure 20 below). Before determining a development application to which the clause applies, the consent authority must consider whether or not the development has an adverse impact on the ecological values of the property, habitat and survival of fauna or if it diminishes the biodiversity structure, function and composition of the land. A development application must demonstrate how the development is sited and will manage significant impact. Notably a large portion of the site is clear of mapped sensitive lands, with the majority of the mapped land generally correlating with the biodiversity values identified in Ozark Environmental Assessment discussed earlier.

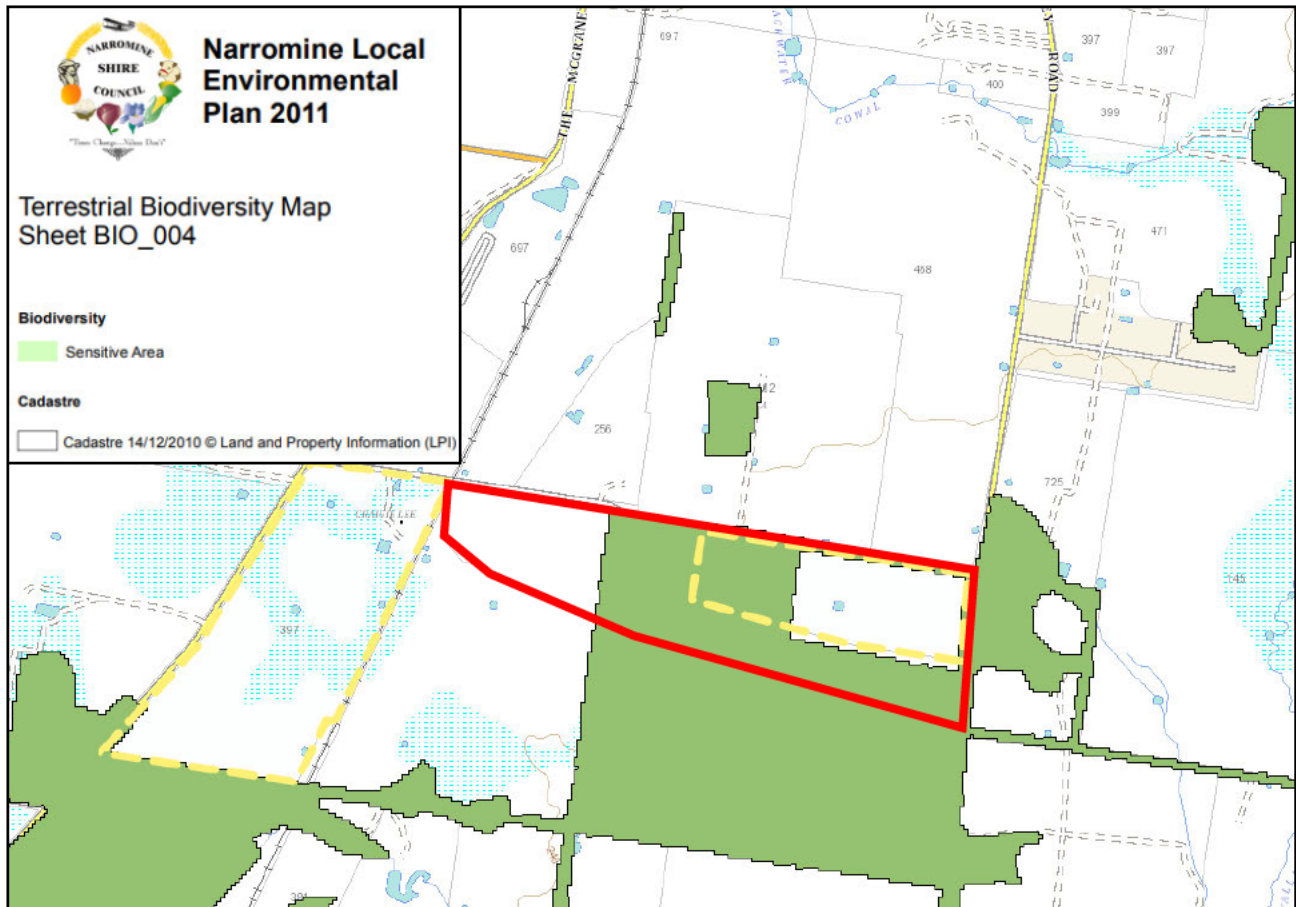


Figure 20: Terrestrial Biodiversity Map

Source: NLEP 2011

4. DEVELOPMENT CONCEPT

4.1. Overview

The Planning Proposal is supported by a concept land subdivision package prepared by Barnson Pty Ltd. The package presents a potential development concept that could be proposed over the property if the Planning Proposal is supported. The package has been prepared in support of the proposed amendment to the LEP proposed within this Planning Proposal. The goal of this proposal is to establish a Heavy Industrial Precinct in close proximity to the upcoming Inland Rail project. This Planning Proposal is accompanied by a potential Subdivision Plan, which correlates with the proposed LEP amendments relating to land zoning and minimum allotment size proposed under this Planning Proposal - **Figure 21 and Appendix I.**

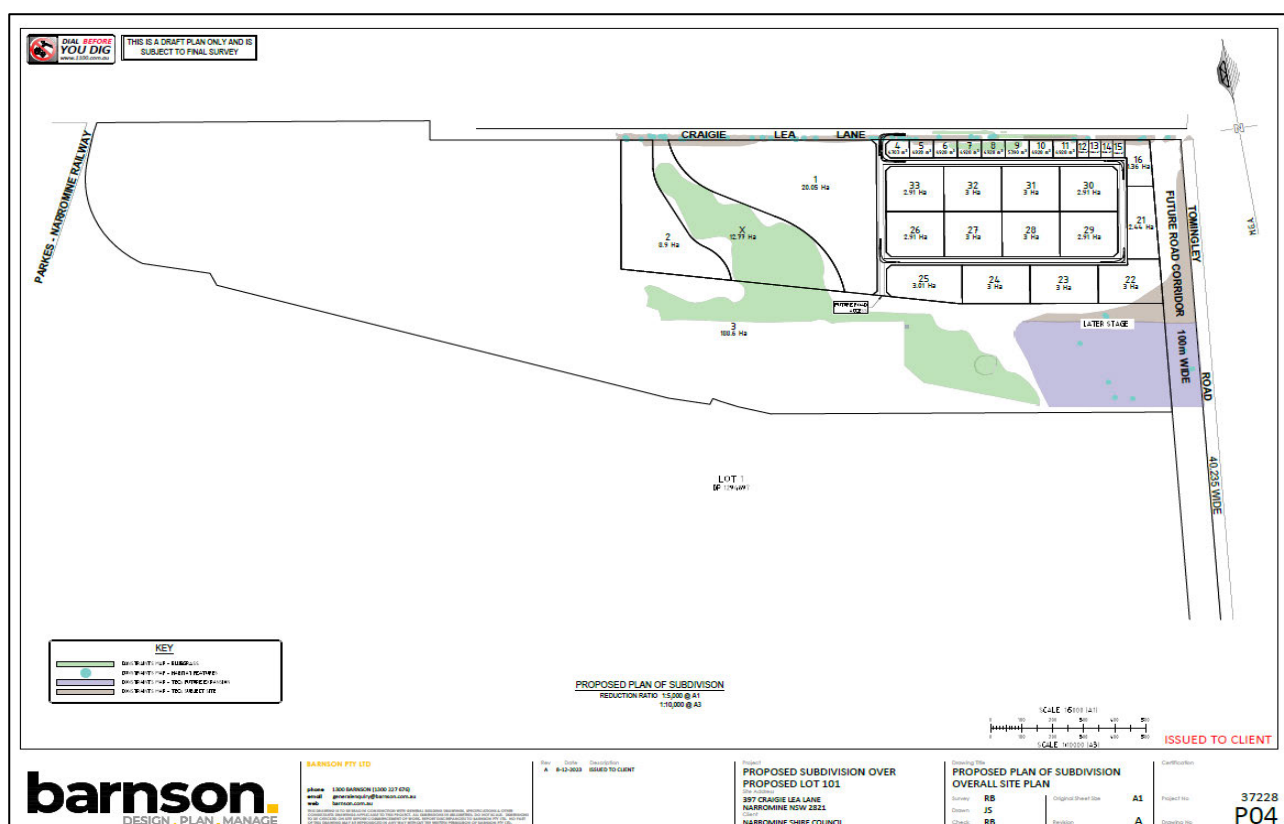


Figure 21: Subdivision Plan

Source: Barnson Pty Ltd

In summary

- The indicative lot layout allows for a mixture of lot sizes from 2,464m² to 20 ha.
- The concept layout allows for the future expansion of the Tomingley Road corridor for the planned road over rail grade separation construction.
- The concept layout also seeks to avoid development of the land with the highest levels of biodiversity. By placing known high environmental values within separate lots or at the rear of lots here they can be preserved.
- A site wide effluent management system would be incorporated into the development.
- Ensures appropriate vehicular access to the precinct without causing adverse effects on the surrounding transportation and traffic network.

5. PLANNING PROPOSAL

5.1. Part 1 – Objectives or Intended Outcomes

The Intention of this Planning Proposal

The Planning Proposal is seeking to facilitate amendments to the Narromine LEP by way of:

- 1. Land Rezoning** - The Planning Proposal aims to revise the existing land zoning of the property by introducing an E5 – Heavy Industrial Land Zone to a specific area within the site.
- 2. Adoption and modification of Land Use Table** - The proposal involves incorporating the E5 – Heavy Industrial Land Use Table into the Local Environmental Plan (LEP) and adjusting the land use table to establish specific objectives and type of development that are permissible in the zone. These objectives are designed to guide the future development of the site in alignment with the strategic vision, which focuses on supporting the agriculture industry and facilitating freight exchange.
- 3. Adjustment Minimum Allotment Size** Adjustment to the current Minimum Allotment Size requirements are proposed to facilitate the future subdivision of E5 – Heavy Industrial Allotments. Additionally, a site-specific pre-conditioning to services will be introduced.
- 4. Amendment to Split Zone Clause** - A modification to the Split Zone Clause (CI4.1C of the LEP) is proposed to enable the creation of single-zoned lots for the original lots that following the introduction of the E5 Heavy Industrial zone, will become split-zoned.
- 5. Address mechanism to subdivide the RU1 land** – The final outcome of achieving separate title to the RU1 land separated by the Parkes to Narromine Railway line (west of the line, with existing dwelling) to the RU1 zoned land (east of the line, containing the Inland Rail's MDC).

The key outcomes of this Planning Proposal

The anticipated outcomes of this project include:

- Boosting employment opportunities to stabilise population growth.
- Create further employment/business land that is located appropriately to support agricultural/rural industry.
- Augmenting the presence of small, medium, and large industrial business in the Region.
- Elevating the value-added processing of agricultural produce into consumer products.
- Capitalising on existing local specialisations while encouraging diversification.

The Planning Proposal includes comprehensive supporting information.

The Planning Proposal includes a suite of supporting plans and reporting to:

- Describe the subject land, its locality, the current zoning.
- Request an amendment to the land zoning and minimum allotment size clause in the LEP as well as introduce precondition of servicing.
- Request an amendment to the split zone clause.
- Address the 'Gateway Determination Assessment' Criteria under Part 3 of the EP&A Act 1979.
- Provide justification for the LEP amendment and demonstrate the net community benefits which follow.

- Demonstrate that the Planning Proposal is consistent with NSW Department of Planning, Housing and Infrastructure and Council broad strategic direction for the locality.

5.2. Part 2 – Explanation of Provisions

5.2.1. Land Rezoning

This Planning Proposal seeks to alter the current RU1 Primary Production Land Use zone over the land to E5 – Heavy Industrial. **Figure 22** below illustrates the Existing Land Zone, taken from the Narromine LEP 2011. Whilst **Figure 23** illustrates the proposed land to be rezoned. **Table 6** provides an understanding of the breakdown of land to be rezoned.

Table 6: Land Zone Breakdown of Lot 2

	Existing (Western)	Existing (Eastern)	Proposed (Eastern)
RU1 – Primary Production	229.7 ha	292.1ha	192.45ha
E5 – Heavy Industrial	-	-	99.65ha

NOTE: Please disregards “proposed” Lot numbers of Figure 22 and 23.

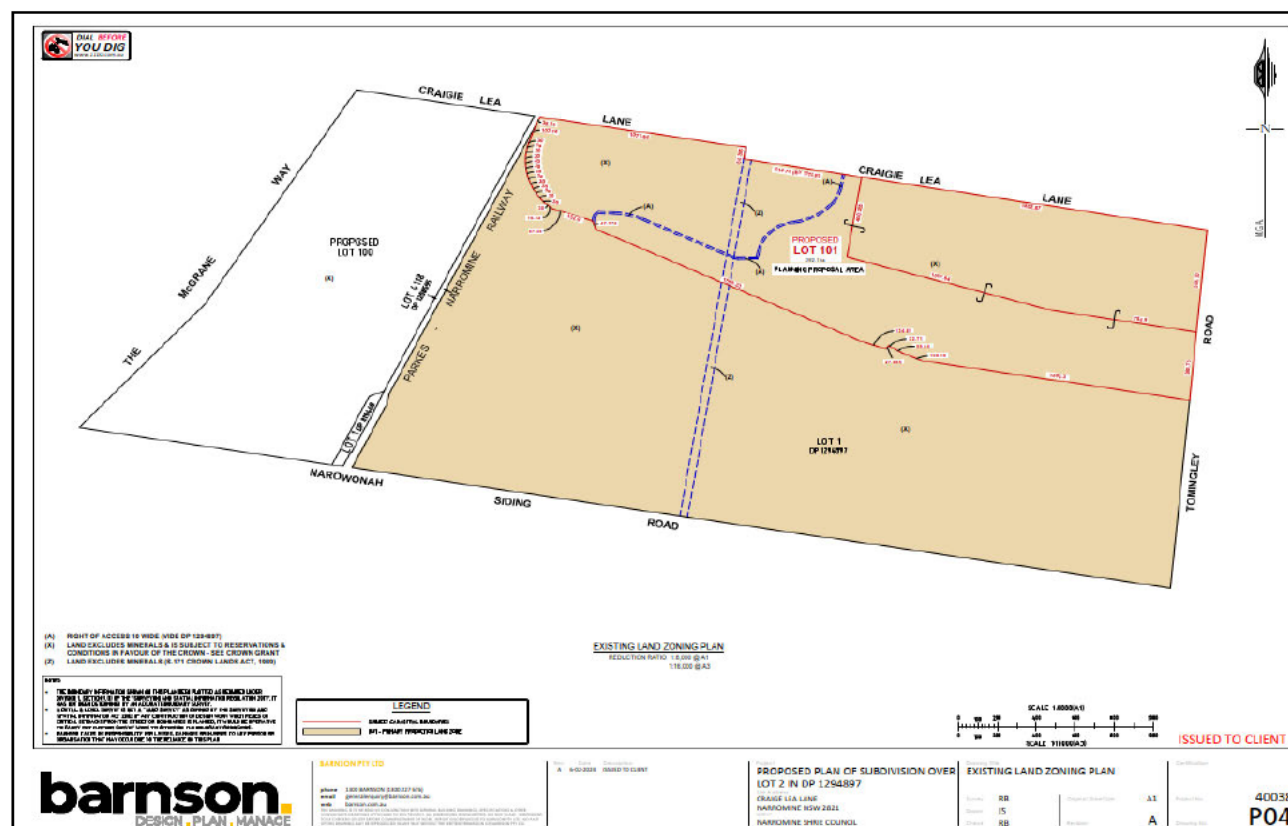
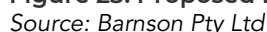


Figure 22: Existing Land Zone Map
 Source: Barnson Pty Ltd



Introduction of E5 - Heavy Industrial Land Use

- *Building Identification Signs, Business Identification Signs and Roads* are all permitted without consent.
- The Standard Instrument for E5 – Heavy Industrial objectives has been adopted, with the inclusion of one additional objective, being: *'To provide opportunities for intermodal freight exchange and related industries'*.
- Rural Industries; Waste or resource management facility; Any other development not specified in items 2 or 4 are permitted development with consent.

The Narromine Shire Council aims to incorporate this additional objective to ensure that forthcoming developments take into account the connection between the Inland Rail, Narwonah MDC, and the prospective growth of the Narromine Heavy Industrial Precinct. This added goal is crucial to guarantee that the future development of the area aligns with and encourages the establishment of value-adding businesses, including agricultural business, in the area that capitalise on the Inland Rail linkage and the Freight Exchange. The inclusion of an objective specific to the Council strategic vision for the area, is unlike the remaining employment areas within the LGA. This specific objective ensures that the development of the precinct differs and is not in competition with the existing employment precincts and encourages development suitable for its intended purpose. Specifically providing an area for industries to be separated from other landuses.

The proposed E5 – Heavy Industrial Land Use Table seeks to allow *Environmental Protection Works, Water Reticulation Systems* to be development permitted without consent. Notably, the Land Use table has adopted the Standard Instrument for those developments permitted with consent, with the inclusion of *Rural Industries; Waste or resource management facility*. The E5 – Heavy Industrial Land Use Table also states that *Any other development not specified in item 2 or 4 of the E5 – Heavy Industrial Land Use Table* is also permitted.

Council have carefully refined the land use table by incorporating a list of development types deemed “prohibited” for areas zoned for heavy industrial use. This strategic decision stems from the need to mitigate potential conflicts in land use, ensuring compatibility between the designated zones and the nature of the proposed developments – see table below:

Zone E5 Heavy Industrial

Direction—

1 Objectives of zone

- *To provide areas for industries that need to be separated from other land uses.*
- *To ensure the efficient and viable use of land for industrial uses.*
- *To minimise any adverse effect of industry on other land uses.*
- *To encourage employment opportunities.*
- *To provide opportunities for intermodal freight exchange and related industries.*

2 Permitted without consent

Building identification signs; Business identification signs; Roads; Environmental protection works; Water reticulation systems

3 Permitted with consent

Data centres; Depots; Freight transport facilities; General industries; Hazardous storage establishments; Heavy industries; Industrial training facilities; Offensive storage establishments; Oyster aquaculture; Tank-based aquaculture; Warehouse or distribution centres; Rural Industries; Waste or resource management facility; Any other development not specified in item 2 or 4

4 Prohibited

Advertising structures; Agriculture; Air transport facilities; Airstrips; Amusement centres; Animal boarding or training establishments; Boat building and repair facilities; Boat launching ramps; Boat sheds; Camping grounds; Caravan parks; Cemeteries; Centre-based child care facilities; Charter and tourism boating facilities; Commercial premises; Community facilities; Crematoria; Eco-tourist facilities; Schools; Entertainment facilities; Exhibition homes; Exhibition villages; Farm buildings; Forestry; Function centres; Health services facilities; Highway service centres; Home businesses; Home industries; Home occupations; Home occupations (sex services); Home-based child care; Information and education facilities; Jetties; Local distribution premises; Marinas; Mooring pens; Moorings; Mortuaries; Passenger transport facilities; Places of public worship; Public administration buildings; Recreation facilities (major); Recreation facilities (outdoor); Registered clubs; Research stations; Residential accommodation; Respite day care centres; Restricted premises; Sex services premises; Stock and sale yards; Tourist and visitor accommodation; Veterinary hospitals; Water recreation structures

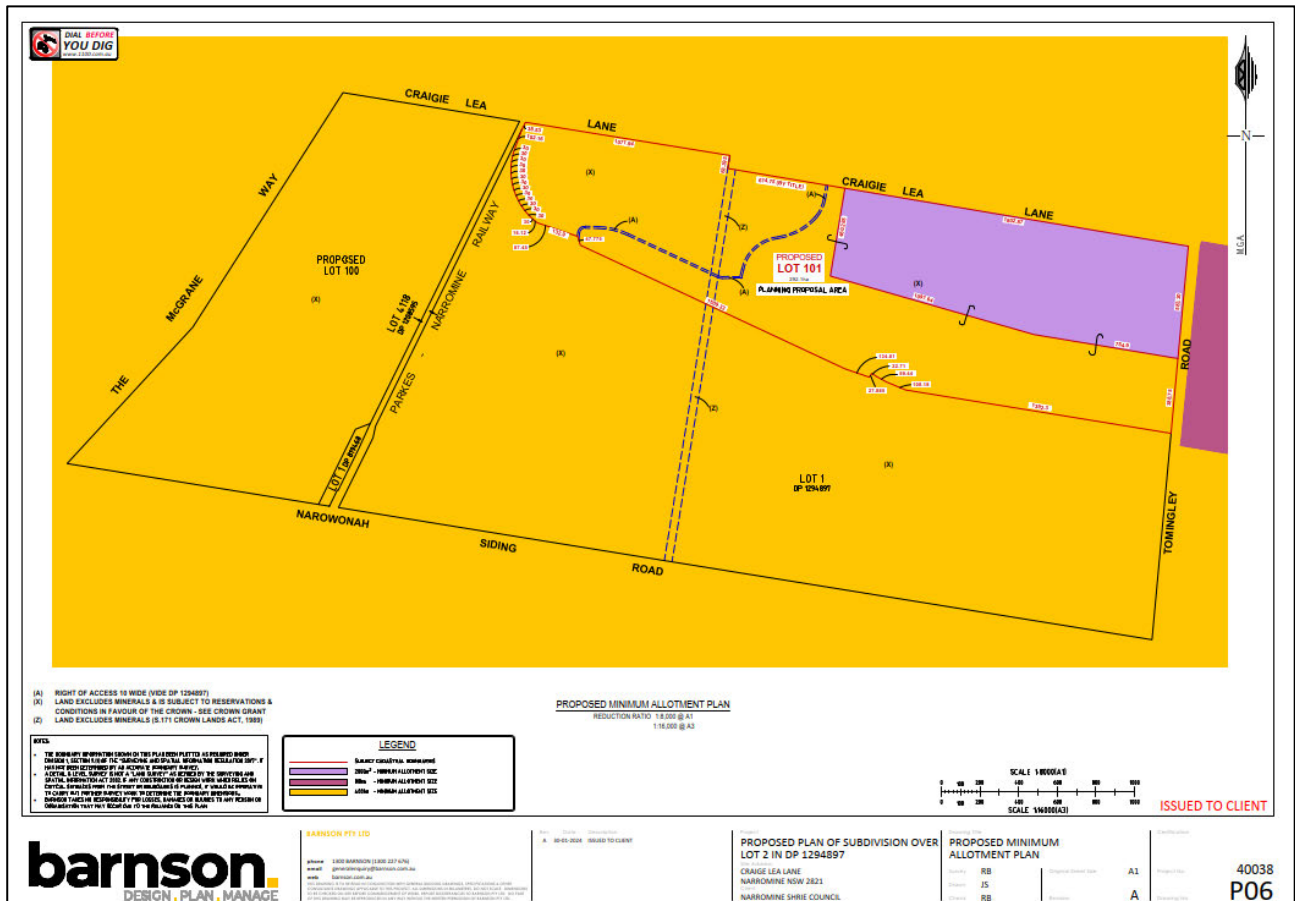


Figure 25: Proposed Minimum Allotment Size
 Source: (Edited by Barnson 5/02/2024)

Minimum Allotment Size (Clause 4.1) for E5 – Heavy Industrial Allotments “Serviced”

The Planning Proposal aims to amend Clause 4.1 by incorporating additional subclause and mapping that mandates servicing as a precondition for the subdivision process. This new subclause is introduced to guarantee that the E5 – Heavy Industrial Lots are linked to the necessary services, promoting the orderly and economic development of the land - **Figure 26**.



Amendment to Clause 4.1C Exception to Minimum Subdivision Lot Sizes for Certain Split Zone Lot.

As per the current development concept, post the Planning Proposal, a total of 422.15 hectares of rural land would emerge across Lot 2. This allocation includes 229.7 hectares for the western portion of Lot 2 and 192.45 hectares for the eastern portion of Lot 2 (i.e., the remaining land not zoned to E5 – Heavy Industrial). Together, the rural land would meet the 400ha Minimum allotment size, however, individually, both parcels would fall short of this requirement. Hence, the Planning Proposal aims to modify Clause 4.1C of the LEP to establish a pathway for creating distinct lots comprising rural-zoned land in the east separately from the rural-zoned land in the west. This is to be achieved without mandating that all RU1 Primary Production zoned land must be within a parcel that also contains E5 land meeting a minimum lot size.

5.3. Part 3 – Justification

5.3.1. Section A – Need for the Planning Proposals

Is the planning proposal a result of an endorsed LSPS, strategic study or report?

Narromine Shire Local Strategic Planning Statement 2020

The Planning Proposal is consistent with the Narromine Shire Local Strategic Planning Statement 2020, specifically it is consistent with the following priorities:

Priority 7 – Development Diversification and sustainability of the local business and industry base

The Planning Proposal aligns with the Priority 7. Its primary focus is on releasing additional employment lands to bolster the agricultural sector. The Proposal strives to support sustainable and efficient practices by guaranteeing direct access to supportive intermodal freight exchange, such as the Inland Rail project and other key freight routes. This strategy facilitates the efficient and effective movement of agricultural goods while also cultivating synergies among different industries, thereby fostering economic growth and resilience within the region.

Priority 8 - Encourage employment and skills development to address industry and grow the regional knowledge base.

The Planning Proposal aligns with the actions under this goal. The Planning Proposal endeavours to refine the Local Environmental Plan (LEP) by creating a new heavy industrial precinct. Strategically aligned with the Inland Rail network and the MDC area, the initiative centres on amplifying employment prospects and nurturing businesses across varying scales. Highlighting the integration of transport infrastructure and related industries, the plan aims to maximize the value-added journey of agricultural produce. By capitalising on local strengths and promoting diversification, the proposal aspires to forge a robust and competitive heavy industrial nucleus that will not directly compete with the existing employment zones within the LGA.

Priority 9 – Manage Natural environments for current and future generations.

The Planning Proposal aligns with Priority 9 of the Local Strategic Planning Statement (LSPS). It aims to rezone land within the proposal area that possesses minimal environmental significance. The Proposal will not have adverse effects on water supply for rural development, and it does not impact low-lying sensitive areas. It is worth noting that further investigation will be undertaken to determine any High Environmental Values within the boundaries of the Planning Proposal and if necessary appropriate strategic planning provisions will be included in the scope of the planning proposal to protect these.

Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

The modification of the LEP to establish a Heavy Industrial Precinct that seeks to support agricultural/rural industry, support employment growth in the region and leverage on the inland rail project is the best means of achieving the intended objectives of the planning proposal.

The Narromine LEP presently encompasses two employment zones, namely E1 – Local Centre and E4 – General Industrial, located within Narromine and Trangie. The details of both land-use tables are provided below for reference. It is noteworthy that, in the analysis presented in **Table 7** below, demonstrates that there is resemblance between the E5 – Heavy Industrial Land Zoning and E4 – General Industrial Land Use Tables. The key differentiation lies in the utilisation of the E5 – Heavy Industrial land zoning, allowing for more intensive land uses while strategically mitigating potential conflicts in land use. This includes imposing limitations on certain development types and incorporating specific objectives to steer development within the area, distinguishing it from established employment precincts. Additionally, the E5 zone is physically segregated from areas susceptible to land use conflicts, further reinforcing its distinct purpose.

The adoption of the E5 – Heavy Industrial Land Zone and proposed Land Use Table is well-aligned with the key objectives of the Planning Proposal by way of:

1. The initiative enhances employment prospects by creating a dedicated precinct for more intensive industries, contributing to job creation and thus stabilising population growth. The strategic location of this zone supports economic expansion, fostering a favourable environment for sustained employment opportunities.
2. By designating a specific area for development types currently unsupported within established employment zones, the plan ensures the creation of additional employment and business land. This not only facilitates the growth of more intensive business and supportive agriculture industries but also optimises the utilisation of resources in a manner conducive to sustainable economic development.
3. The proposed plan promotes inclusivity by accommodating a range of industrial businesses, from small enterprises to larger ones. This diversity within the industrial landscape encourages a balanced economic ecosystem, fostering growth opportunities for businesses of varying scales.
4. The proposal presents opportunities for intermodal freight exchange, particularly with industrial sectors, and other industries such as agriculture. This initiative aims to streamline logistics and enhance collaboration among various sectors.

In summary, the adoption of the E5 – Heavy Industrial Land Zone and proposed Land Use Table not only addresses the outlined outcomes but also brings about additional advantages that contribute to the overall economic vibrancy and sustainability of the region.

Zone E1 Local Centre

1 Objectives of zone

- To provide a range of retail, business and community uses that serve the needs of people who live in, work in or visit the area.
- To encourage investment in local commercial development that generates employment opportunities and economic growth.
- To enable residential development that contributes to a vibrant and active local centre and is consistent with the Council's strategic planning for residential development in the area.
- To encourage business, retail, community and other non-residential land uses on the ground floor of buildings.

2 Permitted without consent

Environmental protection works; Home-based child care; Roads; Water reticulation systems

3 Permitted with consent

Amusement centres; Boarding houses; Centre-based child care facilities; Commercial premises; Community facilities; Entertainment facilities; Function centres; Hotel or motel accommodation; Information and education facilities; Light industries; Local distribution premises; Medical centres; Oyster aquaculture; Places of public worship; Public administration buildings; Recreation facilities (indoor); Respite day care centres; Service stations; Shop top housing; Tank-based aquaculture; Veterinary hospitals; Waste or resource transfer stations; Water recycling facilities; Any other development not specified in item 2 or 4

4 Prohibited

Agriculture; Air transport facilities; Airstrips; Animal boarding or training establishments; Biosolids treatment facilities; Boat building and repair facilities; Cemeteries; Correctional centres; Crematoria; Electricity generating works; Exhibition villages; Extractive industries; Farm buildings; Forestry; Freight transport facilities; Heavy industrial storage establishments; Industrial training facilities; Industries; Open cut mining; Recreational facilities (major); Rural industries; Rural workers' dwellings; Sewage treatment plants; Vehicle body repair workshops; Waste or resource management facilities; Water treatment facilities; Wharf or boating facilities

Zone E4 General Industrial

1 Objectives of zone

- To provide a range of industrial, warehouse, logistics and related land uses.
- To ensure the efficient and viable use of land for industrial uses.
- To minimise any adverse effect of industry on other land uses.
- To encourage employment opportunities.
- To enable limited non-industrial land uses that provide facilities and services to meet the needs of businesses and workers.
- To minimise any adverse effect of industry on the natural environment.

2 Permitted without consent

Environmental protection works; Roads; Water reticulation systems

3 Permitted with consent

Business premises; Depots; Freight transport facilities; Garden centres; General industries; Goods repair and reuse premises; Hardware and building supplies; Heliports; Industrial retail outlets; Industrial training facilities; Kiosks; Landscaping material supplies; Light industries; Local distribution premises; Neighbourhood shops; Oyster aquaculture; Rural supplies; Take away food and drink premises; Tank-based aquaculture; Timber yards; Vehicle sales or hire premises; Warehouse or distribution centres; Any other development not specified in item 2 or 4

4 Prohibited

Agriculture; Air transport facilities; Airstrips; Amusement centres; Camping grounds; Caravan parks; Cemeteries; Centre-based child care facilities; Commercial premises; Eco-tourist facilities; Entertainment facilities; Exhibition homes; Exhibition villages; Extractive industries; Farm buildings; Forestry; Function centres; Health services facilities; Home-based child care; Home businesses; Home occupations; Home occupations (sex services); Information and education facilities; Open cut mining; Public administration buildings; Registered clubs; Residential accommodation; Respite day care centres; Schools; Tourist and visitor accommodation; Wharf or boating facilities

Table 7: Existing and Proposed employment zone comparison

Development Type	E5 – Heavy Industrial	E4 – General Industrial	E1 Local Centre	Comments
Data Centres	Permitted	Permitted captured by Light Industries	- Permitted captured by Light Industries	- Data Centre, type of High Technology Industry, Type of light industry, Type of industry
Depots	Permitted	Permitted	Permitted – captured by “Any other development not specified in Item 2 and 4”	
Freight Transport Facilities	Permitted	Permitted	Prohibited	
General Industries	Permitted	Permitted captured by “Any other development	- Prohibited – only type of Industries that is	The General Industries is a type of Industry

Development Type	E5 – Heavy Industrial	E4 – General Industrial	E1 Local Centre	Comments
		not specified in Item 2 and 4". All type of (General, Heavy and Light) Industries is permitted.	permissible is Light Industries.	
Hazardous Storage Establishments	Permitted	Permitted – captured by "Any other development not specified in Item 2 and 4"	Prohibited, captured by Heavy Industrial Storage Establishment.	Hazardous Storage Establishment is a type of heavy industrial storage establishment,
Heavy Industries	Permitted	Permitted – captured by "Any other development not specified in Item 2 and 4"	Prohibited	Heavy Industry is a type of Industry
Industrial Training Facilities	Permitted	Permitted	Prohibited	
Offensive Storage Establishments	Permitted	Permitted – captured by "Any other development not specified in Item 2 and 4"	Prohibited	Offensive Storage Establishment is a type of Heavy Industrial Storage Establishment
Oyster Aquaculture	Permitted	Permitted	Permitted	
Warehouse or distribution Centres	Permitted	Permitted – captured by "Any other development not specified in Item 2 and 4"	Permitted – captured by "Any other development not specified in Item 2 and 4"	

Development Type	E5 – Heavy Industrial	E4 – General Industrial	E1 Local Centre	Comments
Rural Industries	Permitted	Permitted – All Types	Prohibited	Rural Industry is a type of Industry
Waste or resources management facility	Permitted	Permitted	Prohibited	
Business Premises	Permitted - Prohibited Commercial Premises)	Permitted - Office and Retail Premises Prohibited	Permitted (Retail, Office and Business Premises)	

5.3.2. Section B – Relationship to the strategic planning framework

Will the planning proposal give effect to the objectives and actions of the applicable regional or district plan or strategy (including any exhibited draft plans or strategies)?

Central West and Orana Regional Plan 2041

Central West and Orana Regional Plan 2041 is a 20-year blueprint for the future of the Central West and Orana area and includes five overarching goals. The goals and the Planning Proposals consistency have been addressed below at **Table 8**.

Table 8: Central West and Orana Regional Plan 2041

Part 1 – Region-Shaping Investment	
Objective	Comment
Objective 1 - Deliver the Parkes Special Activation Precinct and share its benefits across the region	The Planning Proposal does not directly impact the Parkes Special Activation Precinct. Nonetheless, the Heavy Industrial Precinct proposed in Narromine is example of local development that has the capability to support and complement one another.
Objective 2 - Support the States Transition to Net Zero by 2050 and deliver the Central West Orana Renewable Energy Zone	The Planning Proposal aligns with the intended objective. It aims to rezone land suitable for upcoming industrial development near freight nodes, ultimately curbing and minimising emissions linked to pertinent industries, such as agriculture.

Objective 3 – Sustainably Manage extractive resources land and grow the critical minerals sector	The Planning Proposal aligns with this objective by aiming to safeguard road, rail, and freight routes from developments that could potentially impact the extractive resources and critical mineral sector. Notably, the Planning Proposal has taken into account the MDC and Inland Rail route, actively pursuing LEP amendments that complement these infrastructure projects.
Objective 4 – Leverage inter-regional transport connections	The Planning Proposal aligns with the objective by endorsing a Heavy Industrial precinct that will ultimately capitalise on the proposed Inland Rail Intermodal hub and MDC which will ultimately connect Narromine and the Heavy Industrial Precinct to the wider NSW and beyond.
Part 2: A sustainable and resilient place	
Objective 5 – Identify, protect and connect important environmental assets	<p>The Planning Proposal is supported by environmental studies that have identified potential environmental values over the land. Notably, the Planning Proposal identifies that these areas are mostly low lying and may not be suitable for development. Further investigation is being undertaken to determine if these areas require strategic planning protection, through the adoption of conservations zones.</p> <p>Nonetheless, it is worth mentioning that the potential environmental values identified on the site, are already protected the Terrestrial Biodiversity mapping and subsequent clause in the LEP, which is not proposed to be altered under this Planning Proposal.</p>
Objective 6 – Support connected and healthy communities	The Planning Proposal is not inconsistent with this objective.
Objective 7 – Plan for resilient places and communities.	The Planning Proposal has examined the site's vulnerability to constraints, including flooding. The Planning Proposal area is susceptible to temporary overland flood flows during or immediately after substantial rainfall events, often in the form of convective thunderstorms producing intense rainfall across localised catchments within a few hours. These events generate shallow overland flows that discharge through the site. Although such flooding is likely to be transient and last only a few hours, some ponded run-off may persist in terrain depressions.
Objective 8 – Secure resilient regional water resources	The Planning Proposal area does not affect any marsh areas or river systems. The region site will have access to secure water systems. The eventual land development will need to comply with any LEP or DCP regulations related to groundwater, as well as meet specified targets for water quality and quantity. The

	Planning Proposal aligns with the current council directives on this issue.
Objective 9 – Ensure site selection and design embraces and respects the regions landscapes, character and cultural heritage.	The Planning Proposal aligns with these objectives as it refrains from endorsing development on land identified for accommodating Aboriginal heritage. Ongoing consultation will be undertaken between Narromine Shire Council and the Local Aboriginal Land Council as part of the Gateway process.
Objective 10 – Protect Australia first Dark Sky Park	The Planning Proposal area is located within 200km of the Sliding Spring Observatory. Narromine LEP has not adopted the Sliding Spring Observatory Clause in the LEP. Nonetheless, the Council will ensure that any further development meets the Dark Sky Planning Guidelines.

Part 3: People, centres, housing and communities

Objectives 11 – Strengthen Bathurst, Dubbo and Orange as innovative and progressive regional cities	The Planning Proposal aims to rezone the land, enhancing support for heavy industrial development in the area. Additionally, it seeks to bolster the agricultural business and foster broader economic growth and diversification throughout the region.
Objectives 12 – Sustain a network of healthy and prosperous centres	The proposed rezoning will ultimately encourage investment, diversify industry, and generate new job opportunities, all of which will be advantageous for both the immediate and broader regional community.
Objectives 13 – Provide well located housing options to meet demand	The Planning Proposal is unrelated to housing. However, it does endorse the growth of employment within the region, ultimately contributing to residential and population expansion.
Objective 14 – Plan for diverse affordable, resilient and inclusive housing	The Planning Proposal is not inconsistent with this objective.
Objective 15 – Manage rural residential development	The Planning Proposal is not inconsistent with this objective.
Objective 16 – Provide accommodation options for seasonal, temporary and key workers.	The Planning Proposal is not inconsistent with this objective.

Objective 17 - Coordinate smart and resilient utility infrastructure	The Planning Proposal is not inconsistent with this objective.
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Part 4: Prosperity, productivity, and innovation

Objective 18 – Leverage existing industries and employment areas and support new and innovative economic enterprises	<p>The Planning Proposal aligns with this objective by advocating for an amendment to the LEP, allowing for the establishment of an additional employment precinct in the form of a Heavy Industry Precinct within Narromine Shire LGA. This new precinct is carefully designed to avoid direct competition with existing employment zones.</p>
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Instead, it introduces a distinct E5 – Heavy Industrial Land Use zone, specifically crafted to prevent potential land use conflicts stemming from heightened development intensity, especially in the context of heavy industrial operations linked to the agriculture, rail and freight industry.

This strategic differentiation ensures the precinct evolves in line with the land use objective, creating a harmonious integration with the intermodal freight exchange and related industries that often involve more intensive activities.

Objective 19 – Protect agricultural production values and promote agricultural innovation, sustainability and value-add opportunities	<p>The main objective of the Planning Proposal is to establish a new employment zone near the inland rail project without compromising agricultural production and values in the region. The choice of this specific land is intentional, as it is adjacent to the MDC and inland rail project and currently affected by these developments. Thus, the selected land serves to optimise project consolidation, minimize land use conflicts, and safeguard valuable agricultural resources.</p>
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Objective 20 – Protect and leverage the existing and future road, rail and air transport networks and infrastructure.	<p>The Planning Proposal does not impact present or future road, rail, or air transport systems. Instead, its focus is on leveraging the inland rail route and the proposed MDC area. Ultimately, the Planning Proposal seeks to rezone land adjacent to the inland rail to further facilitate the growth of agriculture, industrial, and freight industries.</p>
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Objective 21 – Implement a precinct-based approach to planning for higher education and health facilities	The Planning Proposal is not in consistent with this objective.
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Objective 22 – Support a diverse visitor economy	The Planning Proposal is not in consistent with this objective.
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Objective 23 – Supporting Aboriginal aspirations through land use planning

The Planning Proposal aligns with the objective and has proactively collaborated with the Local Aboriginal Land Council (LALC). Extensive studies have been conducted to explore the cultural significance of the site.

Importantly, the findings confirm that the site lacks any Aboriginal heritage significance, relics, or items of importance. Nonetheless, Narromine Shire Council will seek further advice from the Local Aboriginal Land Council in relation to the sites cultural values.

Part 5: Local Government Priorities

Location - Narromine

The Planning Proposal harmoniously corresponds with the established priorities outlined by Narromine Shire Council for the Local Government Area (LGA). In particular, it is well-aligned with the council's emphasis on establishing a freight intermodal hub, specifically geared towards agricultural commodities in conjunction with the Inland Rail. Additionally, the proposal actively supports the council's overarching goal of pinpointing opportunities for the LGA in the evolving regional economy, capitalising on its accessibility to Inland Rail and Dubbo.

Is the planning proposal consistent with a council LSPS that has been endorsed by the Planning Secretary or GSC, or another endorsed local strategy or strategic plan?

Narromine Local Strategic Planning Statement 2020

In the preceding sections of this report, it is explained that the Narromine Local Strategic Planning Statement (LSPS) does not provide explicit details regarding the specific site earmarked for rezoning. Rather, the document highlights the imperative for the creation of additional employment lands to play a supportive role in the agricultural sector while capitalising on the strategic advantage offered by the inland rail infrastructure.

The Planning Proposal, when scrutinised in light of the Narromine LSPS, demonstrates consistency with the overarching objectives articulated by the Council. By aligning with the emphasis on fostering heavy industrial activities and supporting agriculture, the proposal complements the broader vision outlined in the LSPS. In essence, the intended rezoning is strategically positioned to contribute positively to the economic landscape by creating employment opportunities and leveraging the advantages provided by the inland rail network. Consequently, the planning proposal can be viewed as a cohesive and congruent extension of the Council's strategic planning framework.

Narromine Shire Community Strategic Plan 2027

The Planning Proposal is in accordance with the strategic vision articulated in the Narromine Shire Community Strategic Plan 2027. Specifically, it aligns with:

- *Goal 2 Growing our Economy*– by way of fostering economic growth by promoting employment diversity within the shire. This alignment ultimately contributes to the sustainability

and expansion of the local population, while also attracting new industries and development to the area.

- *Goal 3 Protecting and Enhancing our environment* – aiming to preserve the natural and built environment. This entails ensuring that any environmental values are preserved and not compromised within the land slated for rezoning.

The planning proposal is consistent with the Narromine Shire Community Strategic Plan 2027

Narromine Shire Employment Land Strategy 2018

The Planning Proposal aligns with the strategic vision outlined in the Narromine Shire Employment Land Strategy, specifically targeting emerging employment lands. The strategy underscores the potential for leveraging the area's robust agribusiness, strategic transport connections, proximity to Dubbo, and the growing mining sector. In collaboration with various stakeholders, including Council, the aim is to attract industry, create job opportunities, and foster overall growth as proposed in the strategy.

The Plan also advocates exploring development opportunities along the ARTC Inland Rail Project, encompassing an industrial precinct and Freight Exchange. It further emphasizes exploring possibilities along the existing and future corridor for the development of agricultural land, specifically for agriculture-related industries. The Planning Proposal is in line with the Narromine Shire Employment Land Strategy 2018.

Narromine Shire Council – Economic Development Strategy

The Economic Development Strategy of the Narromine Shire Council identifies key industries in the area and proposes actions to sustain and expand existing businesses while also exploring opportunities in emerging sectors. One significant initiative outlined in the strategy is the Inland Rail Project, which aims to create industrial lands supportive of the project's objectives. The Planning Proposal aligns with the strategic goals of the Council's Economic Development Strategy. It is acknowledged that the Planning Proposal may have implications for rural land use and potentially impact the agricultural sector due to rezoning, leading to a reduction in land available for agricultural purposes. This is particularly significant considering the heavy reliance of the Narromine Shire on agriculture. However, the proposal aims to mitigate such impacts and foresees the creation of approximately 200 new full-time jobs, with additional indirect employment opportunities expected, especially in the transport, agriculture value-adding, and warehousing sectors.

The development of the precinct is projected to contribute significantly to the region's economic output, estimated at \$108 million if all 200 jobs are filled within the precinct, with an anticipated \$14.6 million in wages and salaries. Considering the existing constraints on the original property due to the Materials Distribution Centre, amending the LEP to allow for the creation of industrial precinct is deemed highly beneficial due to its strategic location and consistent with the economic strategy.

Is the planning proposal consistent with any other applicable State and regional studies or strategies?

NSW State Infrastructure Strategy 2018-2038

In 2012, the initiation of the first State Infrastructure Strategy and Long-Term Transport Master Plan laid the groundwork for the current implementation of significant projects. This Planning Proposal aligns with several key objectives, including:

- Objective 3.4: A Thriving Regional NSW is Fundamental to the State Environment. The Planning Proposal aims to facilitate community growth by establishing a employment precinct that is

supported by efficient freight and service routes. The emphasis is on leveraging competitive advantages in agriculture and primary resource manufacturing.

- Objective 10.1: Optimise land use where Infrastructure capacity exists. The Planning Proposal is in harmony with this goal, as it primarily focuses on connecting people with employment opportunities, services, and amenities by strategically planning for growth and development around interchange hubs and freight routes.

The Planning Proposal is consistent with the NSW State Infrastructure strategy 2019-2038.

Central Orana Regional Economic Development Strategy 20-Year Economic Vision for Regional

The Planning Proposal is in harmony with the strategy to position Narromine (being part of Central Orana) as an innovative and interconnected business destination. This involves sustaining investments in freight and logistics precincts, as well as intermodal hubs. Given Central Orana's strategic centrality, located between Melbourne and Brisbane and between Sydney and Adelaide, it functions as a crucial transportation crossroads offering diverse transport options. This strategic positioning makes it an ideal site for establishing a heavy industrial precinct, which will be supported by the inland rail network and MDC. The Planning Proposal is in line with the strategy to position Central Orana as a dynamic and interconnected business hub by expanding its employment zones strategically. This expansion aims to bolster local and regional industries while capitalising on nationwide initiatives such as the Inland Rail project.

20-Year Economic Vision for Regional NSW - NSW Freight and Ports Plan

In 2013, the NSW Government unveiled the Freight and Ports Strategy. The NSW Freight and Ports Plan 2018-2023 provided industry stakeholders with the essential continuity and certainty required for impactful, long-term investments. These investments, far-reaching in their effects, not only bolster individual businesses but also sow the seeds for the future growth and prosperity of the entire state. This Planning Proposal is in line with the plan, and specifically:

- *Objective 1 – Economic Growth* – By way of encouraging development in and around government infrastructure.
- *Objective 2: Efficiency, Connectivity, and Access.* Capitalising on the imminent streamlined and interconnected transportation infrastructure that will ultimately bolster the economic prosperity of the region,
- *Objective 3: Capacity.* Orchestrating strategic investments in and around the rail freight network.

The Planning Proposal is consistent with the 20-Year Economic Vision for Regional NSW - NSW Freight and Ports Plan.

Is the planning proposal consistent with applicable SEPPS

Table 9 on the following pages provides a summary of SEPP, their relevant and how the proposed Planning Proposal is consistent with the instrument.

Table 9: State Environmental Planning Policies

SEPP	Comments
SEPP (Housing) 2021	Nothing in this Planning Proposal impacts the operation of this SEPP.
SEPP (Planning Systems) 2021	Nothing in this Planning Proposal impacts the operation of this SEPP.
SEPP (Resource and Energy) 2021)	Nothing in this Planning Proposal impacts the operation of this SEPP.
SEPP (Resilience and Hazards) 2021	<p>Chapter 2 of the SEPP applies to the land. Notably the provisions within this Chapter relate to potential hazardous or offensive development. The proposed Heavy Industrial Precinct and the adopt of the E5 – Heavy Industrial Land Use Table seeks to limit land use conflicts on the land by limiting the type of permitted use. Any further development application may need to consider the provisions of Part 3 of this SEPP.</p> <p>Chapter 4 of the SEPP applies to the land. As part of the preparation of the Planning Proposal a Site Contamination Investigation was undertaken by Barnson Pty Ltd (Appendix G). This investigation revealed no evidence of contamination. Based on the findings of the desktop review and site investigation it can be stated with a reasonable level of confidence that the Investigation Area is suitable for the proposed centre development and associated land use.</p>
SEPP (Transport and Infrastructure) 2021	Consistent - The SEPP is the primary planning instrument addressing the provision and operation of infrastructure across the State. Referral to the NSW Transport for NSW (TfNSW) may be required for certain development. The SEPP would continue to apply to the site.
SEPP (Primary Production) 2021	<p>The Planning Proposal still retains a portion of Rural land zoning. Therefore, the SEPP will still apply to the proposed future development of the land. Notably, the planning proposal is not inconsistent with the SEPP, as it does not impact State Significant agricultural land. As part of the preparation of the Planning Proposal, Narromine prepared a Land Use Conflict Risk Assessment (Appendix J). The report has considered the potential land use conflicts that may arise from the creation of a new Heavy Industrial Precinct, surrounded by rural land. The potential land use conflicts have been considered and discussed in Section 5.3.3 of this report. Notably, the potential land use conflicts are manageable.</p> <p>Narromine Shire Council adheres to the 'Right to Farm Policy', ensuring farmers can practice agriculture without interference. Which will be upheld and not altered as a result of this creation of the new heavy industrial precinct.</p>

SEPP – Biodiversity and Conservation 2021 – Koala Habitat	Chapters 3 and 4 of the Biodiversity and Conservation SEPP aims to encourage the ‘proper conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline’. The Narromine LGA is included in Schedule 2 of the SEPP and hence is subject to the requirements of the SEPP. As the subject site falls on land zoned RU1 – Primary Production within the Narromine Shire Council Local Government Area, the provisions of Chapter 3 of the SEPP apply to any future developments. The Planning Proposal is not inconsistent with the SEPP. The SEPP would continue to apply to the site.
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Is the planning proposal consistent with the applicable Ministerial Directions (Section 9.1)

Table 10 is a list of Directions issued by the Minister for Planning to relevant planning authorities under section 9.1(2) of the Environmental Planning and Assessment Act 1979. These directions apply to planning proposals lodged with the DPHI on or after the date the particular direction was issued and commenced.

Table 10: Ministerial Directions Assessment

Direction	Applicable	Comment
1. Focus Area 1: Planning Systems		
1.1 Implementation of Regional Plans	Yes	The Planning Proposal is found to be consistent with the overall intent of the Central West and Orana Regional Plan 2041.
1.2 Development of Aboriginal Land Council Land	No	The site has not been identified within the Land Application Map of the State Environmental Planning Policy (Aboriginal Land) 2019.
1.3 approval and Referral Requirements	Yes	Noted.
1.4 Site Specific Provisions	Yes	Noted
1.4A	No	N/A
2. Focus Area 1: Planning System – Place based		

Direction	Applicable	Comment
1.5 Parramatta Road Corridor Urban Transformation Strategy	No	N/A
1.6 Implementation of North West Priority Growth Area Land Use and Infrastructure Implementation Plan	No	N/A
1.7 Implementation of Greater Parramatta Priority Growth Area Interim Land Use and Infrastructure Implementation Plan	No	N/A
1.8 Implementation of Wilton Priority Growth Area Interim Land Use and Infrastructure Implementation Plan	No	N/A
1.9 Implementation of Glenfield to Macarthur Urban Renewal Corridor	No	N/A

Direction	Applicable	Comment
1.10 Implementation of the Western Sydney Aerotropolis Plan	No	N/A
1.11 Implementation of Bayside West Precincts 2036 Plan	No	N/A
1.12 Implementation of Planning Principles for the Cooks Cove Precinct	No	N/A
1.13 Implementation of St Leonards and Crows Nest 2036 Plan	No	N/A
1.14 Implementation of Greater Macarthur 2040	No	N/A
1.15 Implementation of the Pyrmont Peninsula Place Strategy	No	N/A
1.16 North West Rail Link Corridor Strategy	No	N/A

Direction	Applicable	Comment
1.17 Implementation of Bays West Place Strategy	No	N/A
1.18 Implementation of Macquarie Park Innovation Precinct	No	N/A
1.19 Implementation of Westmead place strategy	No	N/A
1.20 Implementation of the Camellia Rosehill Place Strategy	No	N/A
1.21 Implementation of South West Growth Area Structure Plan	No	N/A
1.22 Implementation of the Cherrybrook Station Place Strategy.	No	N/A

3. Focus Area 2: Design and Place

This Focus Area was blank when the Directions were made.

4.Focus Area 3: Biodiversity and Conservation

3.1 Conservation Zones	Yes	Currently the Planning Proposal does not propose to include conservation zones within the planning proposal area. However,
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Direction	Applicable	Comment
		ongoing investigation are currently underway to determine if there is a need to strategically include environmental zones over any environmental sensitive lands. Notably, the site does accommodate mapped terrestrial biodiversity lands, which are not proposed to be altered under this proposal.
3.2 Heritage Conservation	Yes	<p>During the preparation of the Planning Proposal, Narromine Shire Council engaged OzArk Environment and Heritage to prepare an Aboriginal Due-Diligence Assessment Report, available in Appendix C.</p> <p>The report concluded that the property being considered in the planning proposal presently displays characteristics of a modified and disturbed area, largely lacking in vegetation. The desktop analysis confirmed the absence of previously recorded Aboriginal sites in the study area, except for the corridors along Craigie Lea Lane, designating the entire study area as "disturbed land."</p> <p>A search conducted on March 17, 2023, using the Aboriginal Heritage Information Management System (AHIMS) within a 5 x 5 km search area (GDA Zone 55 Eastings: 610694–620637, Northings: 6420967–6430960), identified 24 recorded Aboriginal sites within the broader search area. Importantly, none of these sites were found within the specific study area. A visual inspection of the northern boundary of the study area by OzArk Archaeologist Imogen Crome on April 26, 2023, did not reveal any Aboriginal sites or landforms with subsurface archaeological potential. The absence of archaeological potential is attributed to the undifferentiated nature of the landform and the lack of resources, such as water, that would have attracted Aboriginal occupation. While the proposed works are expected to impact the ground surface, it is concluded that no Aboriginal objects or intact archaeological deposits will be harmed.</p> <p>The Planning Proposal aligns with Direction 3.2 – Heritage Conservation of the Ministerial Directions by conducting suitable assessments to ensure the conservation of Aboriginal areas, objectives, places, or landscapes. Notably, the Aboriginal Due Diligence Assessment Report should be forwarded to Narromine Local Aboriginal Land Council as part of the Post-Gateway determination review for additional comments and consideration.</p>
	No	N/A

Direction	Applicable	Comment
3.4 Application of C3 and C3 Zones and Environmental Overlays in Far North Coast LEPs	No	N/A
3.5 Recreation Vehicle Area	No	N/A
3.6 Strategic Conservation Planning	No	Ministerial Direction 3.5 – Strategic Conservation Planning is not relevant to his Planning Proposal as the Planning Proposal area is not mapped to be “avoided land” or “strategic conservation area” under the State Environmental Planning Policy (Biodiversity and Conservation 2021).
3.7 Public Bushland	No	N/A
3.8 Willandra Lakes Region	No	N/A
3.9 Sydney Harbour Foreshores and Waterways Area	No	N/A
3.10 Water Catchment Protection	No	N/A
5. Focus Area 4: Resilience and Hazards		
4.1 Flooding	Applicable	The NSW Flood Plain Development Manual from the Department of Infrastructure, Planning, and Natural Resources (DIPNR) in 2005 defines the flood planning area as the land below the flood planning level, subject to flood-related development control. Flood-labile land, synonymous with flood-prone land, refers to areas susceptible to flooding up to the Probable Maximum Flood (PMF) event, covering the entire floodplain without excluding those below the flood planning level. The Planning Proposal site, depicted in Figure 13 , is not within the flood planning area.

Direction	Applicable	Comment
		<p>However, it is within flood-labile land and, therefore, flood-prone, making Ministerial Direction 4.1 Flood applicable.</p> <p>An analysis of the technical assessment from the Narwonah Material Distribution Centre Review of Environmental Factors, including the Hydrology and Hydraulic Report and current flood studies, indicates the proposed site's relatively flat terrain with a 0.5% grade sloping northwest. Despite being outside the flood planning area the site is susceptible to temporary overland flood flows post-heavy rainfall, typically from convective thunderstorms producing intense rainfall within hours. Although transient, such flooding may persist briefly in terrain depressions.</p> <p>The Planning Proposal has carefully considered the policies under Clause 2 of Direction 4.1, with Narromine Shire Council adopting a Flood Risk Management Plan 2021, specifically the "Narromine Shire Council – Flood Policy for Development in Urban Flood Plains." This policy applies to commercial and industrial development and is generally consistent with the Planning Proposal. It proposes amending the Local Environmental Plan (LEP) to allow industrial development on land above the 2% annual exceedance level plus 500m (consistent with council policy). Most of the site is situated above this level or is able to support development above this level. The Planning Proposal aligns with this direction by considering provisions within flood studies adopted by Narromine Shire, prepared in accordance with the NSW Flood Prone Land Policy and the Floodplain Development Manual 2005.</p>
4.2 Coastal Management	Not applicable	<p>The site is not located within a coastal zone nor is it located within a coastal wetlands and littoral rainforests area, coastal vulnerability area, coastal environment area and coastal use area - and as identified by chapter 2 of <i>State Environmental Planning Policy (Resilience and Hazards) 2021</i>.</p>
4.3 Planning for Bushfire Protection	Yes	<p>The site has been identified and mapped as Bushfire Prone Land under Section 10.3 of the EP&A Act - As outlined in Section 2.9 of this document, As part of the preparation of this Planning Proposal, Barnson Pty Ltd was commissioned to conduct a Bush Fire Study, which can be found in Appendix E of this report. The study has been prepared in accordance with the requirements outlined in the New South Wales Rural Fire Service policy – <i>Planning for Bushfire Protection 2019</i>. It thoroughly examines the bushfire hazard in the vicinity of the Planning Proposal area, focusing specifically on the necessary measures to support the future development of the land. Notably, the Planning Proposal area, particularly the envisioned E5 – Heavy Industrial Precinct, is deemed suitable for development.</p>

Direction	Applicable	Comment
		Consequently, the Bush Fire Study attests that the proposed Planning Proposal aligns with the provisions of Direction 4.3. It specifically illustrates that the planning proposal would facilitate the preparation of a future industrial application capable of adhering to the stipulations regarding Asset Protection Zones, Access, Services, Landscaping, and Building Construction outlined in the Planning for Bushfire Protection 2019 policy.
4.4 Remediation of contaminated land	Yes	<p>The Planning Proposal area has a historical agricultural use, making it subject to Ministerial Directions, specifically Direction 4.4. The historical agricultural activities on the site are detailed in Table 1 of the Contaminated Land Planning Guidelines prepared by the NSW Government.</p> <p>In the preparation of the Planning Proposal, Barnson was tasked with conducting a Site Contamination Investigation (refer to Appendix I). As part of this assessment, a thorough desktop review of available information for the investigation area and the site at large identified activities associated with both historical and current use that have the potential to contaminate surface soils.</p> <p>Following the investigation aimed at determining the presence and significance of potential contamination from identified sources, it was revealed that none of these potential sources are likely to have contributed significant quantities of contamination to the surface soils of the Investigation Area. Based on the comprehensive findings from the desktop review, site investigation, and confirmatory sampling and analysis, the conclusion is drawn that the Investigation Area is suitable for the proposed future development and use. The environmental media, such as surface soils and surface water in the Investigation Area, are unlikely to pose a risk of impact to the health of humans or the environment, obviating the need for further investigation.</p> <p>In light of this, the Planning Proposal is deemed consistent with Direction 4.4, as it aims to modify land zones over areas not considered contaminated, making them suitable for the intended change of use development.</p>
4.5 Acid Sulfate Soils	No	N/A

Direction	Applicable	Comment
4.6 Mine Subsidence and unstable land	No	N/A

5. Focus Area 5 – Transport and Infrastructure

5.1 Integrating land use and transport	TBC	<p>The Ministerial Direction applies to the Planning Proposal as it seeks to alter a zone to E5 – Heavy Industrial, being an employment zone.</p> <p>Narromine Shire Council has engaged with Transport for NSW, who have provided preliminary comments and requirements for TfNSW to consider the proposal further. As such, specialist consultants are engaged to undertake studies in line with this direction. Any specialist studies that will be prepared are to be provided to all authorities as part of the Gateway process.</p>
5.2 Reserving land for public purposes	No	N/A
5.3 Development near regulated airports and defence airfields	No	N/A
5.4 shooting ranges	No	N/A

6. Focus Area 6: Housing

6.1 Residential Zones	No	N/A
6.2 Caravan Parks and Manufactured Home Estates	No	N/A

7. Focus Area 7: Industry and Employment

Direction	Applicable	Comment
7.1 Employment Zones	Yes	<p>Ministerial Direction 7.1 – Employment Zones applies to this Planning Proposal, given its direct association with E5 – Heavy Industrial Land, classified as an employment zone.</p> <p>The Planning Proposal safeguards existing employment land and zones within the Local Government Area (LGA) by retaining E1 – Local Centre and E4 – General Industrial land zones. Simultaneously, it introduces an E5 – Heavy Industrial Land Zoning, modified land use table, and objectives aimed at supporting the agricultural and freight industry. This strategy ensures that future development aligns with and promotes the establishment of value-adding businesses in the Industrial Precinct, leveraging the Inland Rail linkage and the Freight Exchange.</p> <p>Distinct from other employment areas in the LGA, the Planning Proposal includes an objective specific to the Council's strategic vision for the area, guiding the future development in line with the vision for the area and specifically not in competition with the existing employment precincts. The Planning Proposal has the potential to generate a significant number of direct jobs upon completion, representing a net growth for the locality as the site is currently vacant.</p> <p>The Planning Proposal and the proposed amendments align with the Narromine Shire Local Strategic Planning Statement 2020, specifically Action 39, which aims to explore opportunities arising from the Shire's central location, capitalise on value derived from truck and freight movement, and support the shire's agriculture industry. Additionally, these align more broadly with the vision for the region's objectives outlined in Part 4 of the Central West and Orana Regional Plan 2041.</p> <p>The proposed amendments ultimately serve to protect existing employment land and centres while fostering employment growth in a suitable area of Narromine.</p>
7.2 Reduction in non-hosted short term rental accommodation period	(Revoked 18 November 2019)	N/A
7.3 Commercial and Retail Development	No	N/A – not within applicable LGAs.

Direction	Applicable	Comment
along the Pacific Highway, North Coast		

8. Focus Area 8: Resources and Energy

8.1 Mining, Petroleum Production and Extractive Industries	No	N/A – not within applicable precinct.
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9. Focus Area 9: Primary Production

9.1 Rural Zones	Yes	<p>Ministerial Direction 9.1 is relevant to this Planning Proposal intends to change the zoning of existing rural land to employment use. This proposed rezoning contradicts Clause 1(a) of the Direction. However, a Planning Proposal can deviate from the Direction if it is justified by a strategy endorsed by the Planning Secretary. Notably, Narromine Shire Council has not yet adopted a strategic plan pinpointing the specific land covered by the planning proposal.</p> <p>Nevertheless, the Planning Proposal aligns with several Strategic Planning Policies, including the Narromine Local Strategic Planning Statement and Employment Land Strategy. Both strategic highlight a long-term strategic vision centred around the inland rail project, fostering future development around the rail system to complement the agricultural and freight industry. This strategic approach is also broadly supported by the Central West and Orana Regional Plan 2041.</p> <p>The Planning Proposal adheres to the objectives of the Direction, as it does not negatively impact the agricultural production value of rural land. The chosen planning proposal area strategically leverages the proposed inland rail network and the location of MDC, offering a suitable location without potential land use conflicts from the rezoning. The site is situated away from existing sensitive land uses, making it suitable for heavy industrial purposes. Additionally, the site has a Land Soil Capability of Class 4, with no biophysical Strategic Agricultural Land or Drastic State Significant Agricultural Land mapping over it and distanced from Agricultural Intensive Land Uses identified in the Narromine Agriculture Land Strategy 2013.</p>
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Direction	Applicable	Comment
		<p>The Planning Proposal is anticipated to have a positive impact by facilitating direct access to industrial zoned land. It aims to protect and enhance the agriculture industry, promoting its ability to access freight infrastructure.</p>
9.2 Rural Lands	Yes	<p>Ministerial Direction 9.2 is integral to this Planning Proposal, with a primary focus on preserving the intrinsic value of agricultural production within an existing rural zone. The proposal aims to refine the LEP, introducing new heavy industrial zones over a small portion of rural land and establishing a pathway for the creation of rural lots below the Minimum Allotment Size.</p> <p>The Planning Proposal seamlessly aligns with various strategic initiatives endorsed by the Planning Secretary. Notably, although the Narromine Shire Council has yet to adopt a strategic plan delineating the covered land, the Narromine Local Strategic Planning Statement and Employment Land Strategy underscore a visionary perspective. This outlook centres around the inland rail project, fostering prospective development around the rail system to complement the agricultural and freight industry—an approach broadly supported by the Central West and Orana Regional Plan 2041.</p> <p>The focal point of the Planning Proposal is the modification of land zoning for a specific rural area adjacent to the proposed MDC and inland rail network. Deliberate measures are taken to minimize potential conflicts arising from rezoning. This is accomplished by strategically defining the boundaries of the heavy industrial precinct, positioning it in proximity to the mentioned projects and away from sensitive receivers and existing land uses susceptible to future development impacts.</p> <p>Furthermore, the Planning Proposal has considered the natural and physical constraints of the site, encompassing topography, flood and bushfire impact, land capability, accessibility, service availability, and potential conflicts related to rural land use (see LUCRA Report at Appendix J). Despite these constraints, the Planning Proposal confidently concludes that the site is well-suited for future development.</p> <p>The anticipated positive impacts of the Planning Proposal are significant, aiming to not only streamline direct access to industrial-zoned land but also to safeguard and elevate the agriculture industry. The proposal is aligned with sustainable land</p>

Direction	Applicable	Comment
		use practices, promoting accessibility to freight infrastructure while harmonising with the evolving landscape.
9.3 Oyster Aquaculture	No	The site is not located near any Priority Oyster Aquaculture Area
9.4 Farmland of State Regional Significance on the NSW Far North Coast	No	N/A

5.3.3. Section C – Environmental, Social and Economic Impact

Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected because of the proposal?

The Planning Proposal has been supported by a Site Suitability Assessment, prepared by OzArk Environment and Heritage. A copy of the report accompanies this Planning Proposal and is located at **Appendix D** of this report.

Based on the current Proposal the proposal would clear up to approximately 100 ha (including only proposed E5 Land) of vegetation within the subject site belonging to five

Plant Community Types (PCTs):

- PCT 45 – Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion.
- PCT 53 – Shallow freshwater wetland sedgeland in depressions on floodplains on inland alluvial plains and floodplains.
- PCT 82 – Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion.
- PCT 201 – Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion.
- PCT 250 – Derived tussock grassland of the central western plains and lower slopes of NSW.

The most common of these was PCT 250 (96.32 ha), followed by PCT 45 (12.56 ha), PCT 53 (4.07 ha), PCT 82 (2.67 ha), and PCT 201 (0.70 ha).

Two Threatened Ecological Communities (TECs) were positively identified within the subject site and one within the future expansion area:

- BC Act, Endangered: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions
- EPBC Act, Endangered: Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia.

Additional areas of these TECs occur on the northern side of the Cragie Lea Lane road corridor. A greater extent of the BC Act-listed Fuzzy Box Endangered Ecological Community (EEC) occurs on this northern side than within the subject site.

One threatened plant species, Bluegrass (*Dichanthium setosum*), was recorded during the field survey. One small population was recorded within the subject site. This species is listed as vulnerable under the BC and EPBC Acts. As the subject site is located at the southern limit of the known range of this species, this occurrence is likely to constitute an important population. Consequently, impacts to this species may be deemed significant and therefore trigger entry into the Biodiversity Offsets Scheme and/or referral to the Minister under the EPBC Act.

Six threatened fauna species (four birds and two bats) were detected either during the field surveys or by means of recording devices. All six species are listed as vulnerable under the BC Act, while one, the Superb Parrot (*Polytelis swainsonii*), is also listed as vulnerable under the EPBC Act. As these species are highly mobile, they are likely to make use of both the subject site and future expansion area, as well as much of the road corridor.

A total of 175 threatened species or populations are known or predicted to occur within the three IBRA subregions that fall within 10 km of the subject site. Impacts to 81 of these may occur as a result of clearing of the subject site. Clearing of the future expansion area may result in impacts to 67 of these species. Impacts to up to 42 species identified by a Matters of National Environmental Significance search may result from future development within these areas. Tests of significance have not been conducted for these species; consequently, it cannot be stated with certainty whether these impacts would be significant. In the case of many species, particularly marine and migratory species, the impacts are likely to be negligible.

The field survey identified 44 hollow-bearing trees (42 live and two dead) within the subject site and an additional six (all live) within the future expansion area (Figure 5-1). Hollows were classed as either small (< 20 cm diameter) or large (≥ 20 cm diameter) to provide an indication of the species most likely to make use of them. The trees within the subject site contained a total of 28 large and 99 small hollows, as well as one stick nest. Six habitat trees (all live) were recorded within the future expansion area, containing a total of one large and 14 small hollows. Additional habitat trees containing nests and hollows were recorded in the northern side of the road corridor and outside of the western limit of the subject site within the southern road corridor.

The most significant identified constraints associated with any proposal situated in the subject site are the relatively large areas of TEC that would be impacted and the presence of the threatened Bluegrass. Currently, Council have engaged OzArk to undertake seasonal surveys of the site to ground truth the mapping of the Blue Grass habitat. These surveys are currently ongoing and efforts to reduce impacts to these entities will be implemented through adoption of conservation land zoning that will further protect the habitat from future development. This report covers the current form of the proposal and is intended only to assess constraints and limitations within the proposal site. It does not constitute a finalised biodiversity assessment. Notably, a Biodiversity Development Assessment Report is currently being prepared in accordance with the initial feedback provided by Department of Climate Change, Energy, the Environment and Water.

Are there any other likely environmental effects of the planning proposal and how are they proposed to be managed?

The following is a summary of other likely environmental effects as result of the Planning Proposal or any other constraints within the Planning Area.

Constraints	Comments
Servicing	In the preparation of the Planning Proposal, Barnson Pty Ltd conducted an Onsite Effluent Management Report, which included a soil assessment. This assessment aimed to determine the optimal effluent system for supporting the heavy industrial precinct, especially in light of the decision not to proceed with sewer lead-in works. The report, available in Appendix H , outlines two potential systems suitable for precinct-wide effluent disposal.
Noise Impacts	<p>The site is situated approximately 7 kilometres away from the Narromine Central Business District and just 1.5 kilometres from the nearest residential area designated as R5- Large Lot Residential. Surrounded by rural lands dotted with scattered rural dwellings, the site enjoys a considerable distance from these sensitive residential zones, effectively minimizing or eliminating potential noise disturbances in the future.</p> <p>Furthermore, its strategic positioning adjacent to the MDC and inland rail project, as well as its proximity to major arterial road networks, ensures optimal accessibility for freight and road transportation. This advantageous location in the heavy industrial precinct not only facilitates convenient access but also mitigates noise impacts due to its separation from residential areas. In essence,</p>

	the site's locality, shielded from sensitive land uses, guarantees minimal noise disruptions, thus making it an ideal location for industrial operations.
Highest and best use of land	<p>The Planning Proposal has examined the site and the implications of the of the inland road and MDC project on the property and has proposed amendments to the LEP that would allow for the optimal use of the land while safeguarding valuable agricultural resources from loss.</p> <p>Lot 2 currently finds itself intersected by both the ambitious inland rail project and the operational activities of the MDC. This diverse array of use/operations has resulted in the fragmentation of the lot, leaving its rural potential largely untapped and unsupported by the existing statutory planning controls governing the site. Therefore, it becomes imperative to reevaluate these provisions to unlock the full potential of the land, aligning it with the overarching strategic vision for the region.</p> <p>The western expanse of Lot 2 remains relatively untouched by the influences of the inland rail project or the MDC, presenting an opportunity to explore the creation of a distinct rural allotment within this section, separate from the activity of the eastern precinct.</p> <p>Conversely, the eastern portion of the site bears the impact of the inland project and the MDC, necessitating a shift towards a more suitable utilisation, such as the establishment of the heavy industrial precinct. This strategic realignment not only ensures a harmonious separation from sensitive land uses but also leverages its strategic proximity to the inland rail and MDC, supporting intermodal freight exchange and related industries.</p>
Bushfire	<p>As part of the preparation of the Planning Proposal, a Strategic Bushfire Study was prepared by Barnson Pty Ltd which has assessed the Planning Proposal against the relevant provisions within the NSW RFS policy – Planning for Bushfire Protection 2019.</p> <p>A copy of this report has been provided at Appendix E</p>
Site Contamination	<p>As part of the preparation of the Planning Proposal a Site Contamination Investigation was prepared by Barnson Pty Ltd. This investigation revealed no evidence of contamination. Confirmatory soil samples collected at the subject site showed concentrations of all potential contaminants investigated (metal hydrocarbons, PAHs, PCBs and pesticides) were below health risk-based criteria in all surface soil samples. A copy of this report has been provided at Appendix G.</p>
Aboriginal Culture Heritage	<p>As part of the preparation of the Planning Proposal a Aboriginal Due-Diligence Assessment Report was prepared by Ozark Environment and Heritage. The AHIMS recorded no sites within the Planning Proposal Area and the visual inspection did not identify any Aboriginal sites or landforms with subsurface archaeological potential. It was determined that no Aboriginal objects or intact archaeological deposits will be harmed by the Planning Proposal notably, as part of the Gateway process, the Narromine Shire Council will consult with the Local Aboriginal Land Council.</p> <p>A copy of this report has bene provided at Appendix C</p>
Flooding	<p>As part of the preparation of the Planning Proposal, the Narwonah MDC Review of Environmental Factors a Hydrology and Hydraulic Report was reviewed– Appendix F. An examination of the existing technical assessment reveals that</p>

the proposed site features relatively flat terrain with a 0.5% grade sloping in a north-westerly direction. Although such flooding is likely to be transient and last only a few hours, some ponded run-off may persist in terrain depressions. Notably, the land is suitable for further development and future subdivision of built form over the property will be required to consider the applicable control/policies pertaining to development within flood prone land.

**Land
Conflict**

Use As part of the preparation of the Planning Proposal a Land Use Conflict Risk Assessment was prepared by Narromine Shire Council – **Appendix J**. The assessment determined that the major uses at risk are:

- Nearby Rural and Residential areas;
- Grazing and Copping Industries; and
- Material Distribution Centre/Industrial Uses.

Each have been discussed below:

Nearby Residential Areas

The proposed rezoned land is over 500m away from residential areas, with tree coverage in between. The main risk is increased traffic, which could moderately impact the local community, potentially leading to complaints. To address this, Craigie Lea Lane will be upgraded and widened, and the intersection with Tomingley Road will have additional turning lanes. These improvements will reduce dust, noise, and safety concerns for nearby residents.

Grazing and cropping industries

The main risks, such as noise from cropping or industrial activities, are low in a rural setting, with no additional mitigation needed besides maintaining existing tree line buffers. Dust from fields is expected but will be minimized with buffer maintenance.

Narromine Shire Council adheres to the 'Right to Farm Policy', ensuring farmers can practice agriculture without interference. Groundwater contamination risks are low due to absence of bores on the rezoned lot, and any approved industry must mitigate contamination potential. With no nearby irrigated cropping registered on Council systems.

Material Distribution Centre

The Materials Distribution Centre, previously approved and operating south and west of the proposed industrial rezoning, leases land from Narromine Shire Council. Land Use Conflicts are low; thus no specific mitigations are advised. Despite the low risk, the area between the Material Distribution Centre and the rezoning site will be fenced with rural-style fencing and 'no trespassing' signs.

The proposed rezoning is strategically situated to bolster the region's agriculture industry, capitalising on the advantageous location of the precinct in close proximity to the inland rail network and the proposed MDC area. The site selection ensures the safeguarding of sensitive land uses, including the Narromine CBD, residential neighbourhoods, and various industries such as the airport, ensuring that the precinct's location avoids any proximity-related amenity issues.

Significantly, the delineation of planning proposal boundaries is thoughtfully crafted to navigate away from state significant farmland and areas characterised by soil capabilities conducive to more intensive agriculture uses. This conscientious approach serves as a protective measure, safeguarding the region's agricultural productivity. Moreover, the proposed rezoning is

intentionally bounded to mitigate potential adverse effects on adjacent agricultural land uses, promoting a harmonious coexistence with existing operations.

The proposed industrial precinct seamlessly aligns with both state and local strategic planning policies. Consequently, the Planning Proposal advocates for a pertinent amendment to the Local Environmental Plan (LEP), ensuring the realisation of the community's long-term vision for the region. This proposal not only supports the region's agriculture industry but also reflects a forward-looking and community-driven approach in achieving sustainable development.

Has the planning proposal adequately addressed any social and economic effects?

It is anticipated that significant positive economic and social outcomes for Narromine LGA and broader NSW will come about due to the proposed amendment to the LEP and establishment of an heavy industrial precinct in Narromine. These anticipated benefits encompass:

Stimulating Private Investment and Business Expansion:

- Facilitating the growth of the transport, agricultural and warehousing industry, which already constitutes a notable economic specialisation in Narromine.
- Creating additional job opportunities and supporting local businesses, especially in areas like secondary processing of agricultural products.
- Encouraging the establishment of niche manufacturing and industrial enterprises, fostering local entrepreneurship, and diversifying the region's economy.

Increasing Employment Opportunities

- Drawing on experiences from comparable projects in regional NSW, Victoria, and Queensland, the proposal aims to directly create 65-140 long-term jobs for locals, with even higher short-term employment during construction.
- Offering a variety of job opportunities at different skill levels, including unskilled positions, mid-skilled roles, and higher-skilled positions in areas like warehouse management and logistics support. Anticipating a positive impact on the Narromine economy by supporting families and reducing socio-economic disadvantage through increased job availability.

Producing Cost Savings and Enhancing Market Access for Agriculture:

- Providing local farmers with improved access to the Inland Rail, connecting Narromine to the ports of Brisbane and Melbourne.
- Access and reducing transportation costs for the agricultural industry.

Encouraging population growth and youth retention in the area:

- Creating new jobs and fostering entrepreneurship to attract and retain talented young individuals in Narromine.
- Preventing the depletion of the working-age population and preserving the distinctive character of the town.

The suggested amendments to the LEP through the introduction of an additional employment lands precinct in the Narromine Local Government Area (LGA) does not directly compete with the current employment zones in the region. As mentioned earlier in this Planning Proposal, the proposed objectives of introducing the E5 – Heavy Industrial Zone, along with its objectives and land use tables, guide development in the area to accommodate potential land uses that may have manageable impacts but are not suitable for the existing employment-zoned land. The rezoning of land, specifically separating it from sensitive land uses with the aim of supporting the inland rail,

ensures that the proposal does not create competition with existing precincts. Instead, it establishes a suitable precinct capable of accommodating more intensive land uses.

This also applies to the potential impact that the additional precinct may have on neighbouring LGAs, such as the Parkes Special Activation Precinct. Similar to this project, it is situated along the inland road network. However, in contrast to the goals of the current precinct, the Parkes Special Activation Precinct operates as a Master Plan precinct, delineating the adoption of zones to guide development in support of various industries, including freight and agriculture. Nevertheless, unlike the present proposal, the Parkes Special Activation Precinct employs a more flexible land zoning approach, necessitating the incorporation of land use restrictions on potential intensive land uses within its boundaries due to the potential conflicts that could arise and the precinct's proximity to existing sensitive land use.

5.3.4. Section D – State and Commonwealth Interests

Is there adequate public infrastructure for the planning proposal?

The council is currently conducting a comprehensive review of all infrastructure, encompassing electricity and potable water, to identify any necessary upgrades and preparatory work for connecting the precinct to existing services. Additionally, the council has been in communication with service providers such as Essential Energy to explore potential servicing options.

Noteworthy is the examination of situations where certain services, such as sewage infrastructure, will not be connected to the site. Investigations have been carried out to ascertain the most suitable methods for servicing the precinct, and these findings are included in this Planning Proposal.

What are the views of state and federal public authorities and government agencies consulted in order to inform the Gateway determination?

As part of the preparation of this Planning Proposal, Narromine Shire Council undertook consultation with several agencies. **Table 11** below provides a summary of the consultation taken. A copy of the agencies' responses referred to in the table below have been provide at **Appendix K**.

Table 11: Consultation

Agency/Stakeholder	Summary of Actions
Department of Planning, Housing and Infrastructure	<ol style="list-style-type: none"> 1. Narromine Shire Council has introduced the project to the NSW Department of Planning, Housing and Infrastructure in late 2023 and provided a copy of the Scoping Report, which introduced the proposal and its objectives. 2. No formal comments were received from NSW Department of Planning, Housing and Infrastructure, however, general support was given to the Planning Proposal objectives. 3. Ongoing discussion and contact to update DPHI has been undertaken by Council staff (Phil Johnston Director Community and Economic Development). 4. NSW Department of Planning, Housing and Infrastructure did recommended that that earlier consultation with Department of Climate Change, Energy, the Environment and Water, Department of Primary Industries – Agriculture. Transport for NSW, and NSW Rural Fire Service should be undertaken.

Agency/Stakeholder Summary of Actions

	<ol style="list-style-type: none"> Post receiving the advice received from NSW Department of Planning, Housing and Infrastructure, further consultation with those suggested division were undertaken and are detailed below. Council intended to remain available to NSW Department of Planning, Housing and Infrastructure throughout the Gateway process.
Department of Climate Change, Energy, the Environment and Water	<ol style="list-style-type: none"> The Scoping Report was provided to Department of Clemente Change, Energy, the Environment and Water on the 7th of December 2023 A TEAMS Meeting was held on the 15th of December 2023 with Department of Clemente Change, Energy, the Environment and Water. Formal comments been received by Department of Climate Change, Energy, the Environment and Water (dated 21 January 2024), who generally supported the objectives of the Planning Proposal and had recommended further investigation to support the Planning Proposal. Narromine Shire Council is currently undergoing the reengagement of specialist consultants (Ozark) to assist with providing the additional information. This includes ground truthing of habitat and the preparation of a Biodiversity Development Assessment Report and the undertaken of seasonal surveys to confirm the extent of Blue Grass habitat within the subject site.
Transport for NSW	<ol style="list-style-type: none"> The Scoping Report was sent to Transport for NSW on the 7th of December 2023. Further advice on the Planning Proposal was received on the 22nd of December 2023 (provided by Andrew Lisseden A/Team Leader Development Services). Narromine Shire Council has engaged specialist consultants (McLaren Traffic Engineering and Road Safety Consultants) to assist with the development of a Transport Impact Assessment which addressed the agencies queries. Report is currently underway and will be provided to NSW Department of Planning, Housing and Infrastructure and Council upon completion.
DPI Agriculture:	<ol style="list-style-type: none"> The Scoping Report was sent to Department of Primary Industries - Agriculture on the 7th of December 2023. A letter dated the 21st of December 2023 was provided by Nita Scott – Agricultural Land Use Planner. The agency raised concerned that the proposal may be inconsistent with local and regional strategic planning frameworks, including the Central Wets Orana Regional Plan 2041. Notably, this Planning Proposal has provided a detailed analysis of the strategic policies pertaining to the site and how the Planning Proposal has contributed to the strategic direction for the region.

Agency/Stakeholder Summary of Actions

	4. In addition, Narromine Shire Council addressed the concerns raised by agencies by preparing a Land Use Conflict Report. This report evaluates the proposed project in relation to nearby sensitive land uses and suggests potential mitigation measures to manage potential conflicts.
NSW RFS	<ol style="list-style-type: none"> 1. The Scoping Report was provided to NSW RFS on the 7th of December 2023. 2. No further comments have been received. Nonetheless, this Planning Proposal is accompanied by a Strategic Bushfire Study, which has been prepared in accordance with the NSW RFS policy – Planning for Bushfire Protection 2019. 3. As part of the Gateway process, ongoing consultation will be undertaken by Narromine Shire Council.
Local Aboriginal Land Council	<ol style="list-style-type: none"> 1. The scoping report was provided to the Narromine Local Aboriginal Land Council. 2. No comments have been received. Nonetheless, the Planning is accommodated by an Aboriginal Due-Diligence Assessment Report which did not identify any aboriginal items or artifacts within the Planning Proposal area. Nonetheless, Narromine Shire Council will undergo formal consultation with the LALC as part of the Gateway process.

5.4. Part 4 – Mapping

The plans provided in **Appendix I** clearly outline the Planning Proposal and associated likely development requirements. The plans include:

- Land Zoning Map – Proposed amendment to the Land Zoning Map.
- Minimum Allotment Size – Proposed amendment to the Minimum Allotment Size Map.
- Minimum Allotment Size – Amendment to highlight Area A, associated with the pre-condition of servicing to permit the subdivision of land.

5.5. Part 5 – Community Consultation

It is expected that the Planning Proposal would not be a Low Impact Proposal and therefore community consultation would be undertaken in accordance with the requirements set out in *Local Environmental Plan Making Guidelines – Complex Planning Proposal*

The consultation would include:

- Notification in a newspaper that circulates in the area affected by the planning proposal;
- Notification on the website of the RPA; and

- Notification in writing to affected and adjoining landowners, unless the planning authority is of the opinion that the number of landowners makes it impractical to notify them.

5.6. Part 6 -Project Timeline

The following indicative project timeline is provided:

Table 12: Indicative Project Timing

Stage	Timing
Consideration by Council	50 days
Council Decisions	TBA
Gateway Determination	25 Days
Pre-exhibition	TBA
Commencement and completion of public exhibition period	95 Days
Consideration of submission	TBA
Post-exhibition review and additional studies	TBA
Submission to Department for finalisation	55 Days
Gazettal of LEP amendments.	TBA

6. CONCLUSION

Narromine Shire Council has engaged Barnson Pty Ltd to assist with the preparation of a Planning Proposal affecting 397 Craigie Lea Lane, Narromine, legally described as Lot 2 in Deposited Plan 1294897, that seeks to amend the *Narromine Local Environmental Plan 2011* by way of:

1. **Land Rezoning** - The Planning Proposal aims to revise the existing land zoning of the property by introducing an E5 – Heavy Industrial Land Zone to a specific area within the site.
2. **Adoption and modification of Land Use Table** - The proposal involves incorporating the E5 – Heavy Industrial Land Use Table into the Local Environmental Plan (LEP) and adjusting the land use table to establish specific objectives and type of development that are permissible in the zone. These objectives are designed to guide the future development of the site in alignment with the strategic vision, which focuses on supporting the agriculture industry and facilitating freight exchange.
3. **Adjustment Minimum Allotment Size** Adjustment to the current Minimum Allotment Size requirements are proposed to facilitate the future subdivision of E5 – Heavy Industrial Allotments. Additionally, a site-specific pre-conditioning to services will be introduced.
4. **Amendment to Split Zone Clause** - A modification to the Split Zone Clause (CI4.1C of the LEP) is proposed to enable the creation of single-zoned lots, for the original lots that following the introduction of the E5 Heavy Industrial zone, will become split-zoned.
5. **Address mechanism to subdivide the RU1 land** – The final outcome of achieving separate title to the RU1 land separated by the Parkes to Narromine Railway line (west of the line, with existing dwelling) to the RU1 zoned land (east of the line, containing the Inland Rail's MDC).

The strategic decision to review and revise the land's zoning aligns directly with the directions within both state and local strategic policies. These policies, acting as guiding beacons, have mandated the council to amend its Local Environmental Plan (LEP) in sync with the regional agricultural and freight landscape, capitalising on pivotal state initiatives such as the inland rail project. The essence of the Planning Proposal is to execute these strategic visions by rezoning land in Narromine, cultivating an environment conducive to agricultural expansion and seamlessly integrating businesses with vital freight networks.

In architecting the Planning Proposal, the council has introduced a distinctive land zoning, denoted as E5 – Heavy Industrial—a employment zone currently absent from the prevailing employment zones in Narromine. The incorporation of this land zoning, coupled with the proposed land use table and specific precinct objectives, ensures a phased and harmonious evolution of the area, steering clear of conflicts with existing employment zones and strategically designated state employment precincts within and around the Local Government Area (LGA).

In addition to the Planning Proposal, a set of specialised reports accompanies this application, focusing on the site's constraints and acknowledging its development as an emerging employment precinct in Narromine Shire. The overall conclusion drawn from the Planning Proposal and these expert reports strongly confirms the appropriateness of the site for its designated purposes. Therefore, Barnson is of the view that:

- (a) *Support this preliminary Planning Proposal based on the information provided in this report; and*
- (b) *Resolve to refer this Planning Proposal to NSW Department of Planning, Housing and Infrastructure for a Gateway Determination to endorse its public exhibition.*

Pending endorsement by NSW Department of Planning, Housing and Infrastructure, the Planning Proposal will be exhibited in accordance with the criteria outlined in the Gateway Determination. The outcome of the exhibition and referrals to various government departments will be subsequently reported to Council for determination.

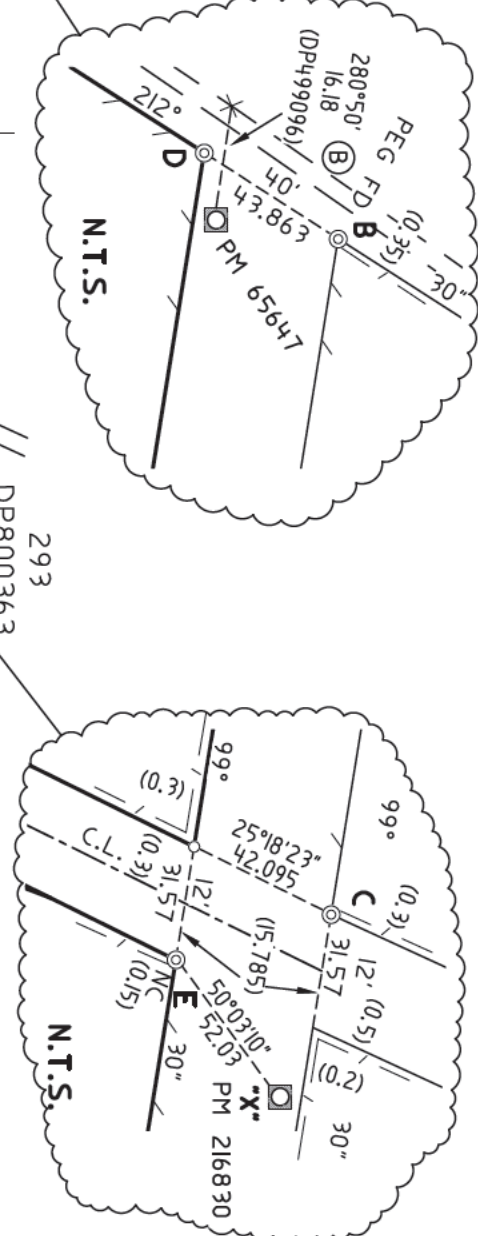


APPENDIX A

Deposited Plan

SCHEDULE OF REFERENCE MARKS			SCHEDULE OF REFERENCE MARKS		
CNR\BEARING	DIST.	FROM	CNR\BEARING	DIST.	FROM
A	94°5'	0.5	GIP	FD	2326-1884
B	14°48'	0.52	GI	ROD	FD DP800365
C	4°5'09"	0.72	GI	ROD	FD DP800365
D	21°3'38"	5.445	PM	65647	BY ME
E	18°3'58"	13.56	GIP		PLACED
F	298°35'	1.635	PLACED		AI1
G	48°58'	15.89	BOX	FD	1991-1884
H	29°33'	6.82	BOX	FD	1657-1884
J	14°10'	3.98	DEAD	PINE	FD
K	107°08'	19.11	BOX	FD	1991-1884
L	185°14'	2.005	GIP		PLACED
M	241°03'	1.88	GIP		PLACED
N	349°33'	4.84	GIP		PLACED
P	5°15'40"	7.865	GI	ROD	FD DP233201
Q	94°01'	7.645	HOLLOW	BOX	FD
R	189°13'	0.92	GI	ROD	FD DP747703
S	188°54'	0.715	GI	ROD	FD DP747703
T	206°18'	1.225	GI	ROD	FD DP747703
U	80°08'	1.225	GI	ROD	FD DP747703
V	28°19'	5.26	LEANING		431-1884
V	BY ME		OAK	FD	PLACED
V	313°47'	5.625	GIP		PLACED
W	26°18'	0.5	GIP	FD	DP819468
Z	296°18'	1.38	GIP	FD	DP819468
AI	230°56'	2.07	GIP		PLACED
A2	135°35'	1.42	GIP		PLACED
A3	24°04'	0.67	GIP	FD	DP819468
A4	143°23'30"	11.36	GIP	FD	DP499096
A5	260°41'50"	8.17	GIP	FD	DP499096

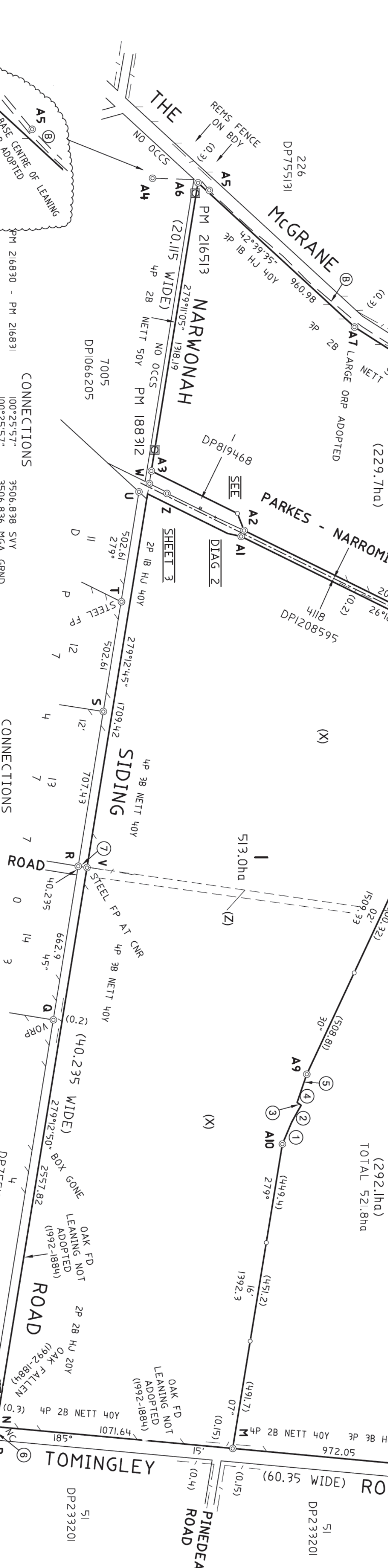
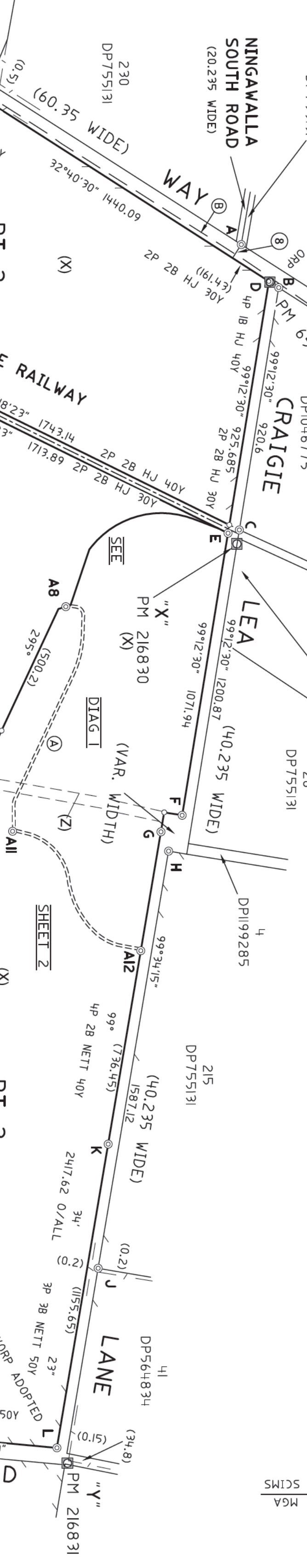
SCHEDULE OF REFERENCE MARKS			SCHEDULE OF REFERENCE MARKS		
CNR\BEARING	DIST.	FROM	CNR\BEARING	DIST.	FROM
A6	68°02'	3.39	GIP		PLACED
A7	111°02'	11.39	GIP		PLACED
A8	313°42'	10.84	GIP		PLACED
A9	14°00'	15.96	GIP		PLACED
A10	197°11'	1.32	GIP		PLACED
A11	270°04'	12.92	GIP		PLACED
A12	180°00'	1	GIP		PLACED



CO-ORDINATE SCHEDULE					
MARK	M.G.A.	CO-ORDINATES	CLASS	PU	METHOD
PM 65647	612124.97	6426918.80	D	N/A	CORSNRK FOUND
PM 188312	618988.910	6424800.122	B	0.02	SCIMS FOUND
PM 216830	613106.482	6426794.527	B	0.02	SCIMS FOUND
PM 216831	616554.374	6426159.698	B	0.02	SCIMS FOUND
PM 199923	616134.38	6424083.10	D	N/A	CORSNRK FOUND
PM 216513	610740.165	6424984.165	D	N/A	CORSNRK PLACED
DATE OF SCIMS CO-ORDINATES : 14/05/2023					
COMBINED SCALE FACTOR : 0.999718					
MGA DATUM : GDA2020					



CNR\BEARING	DIST.	FROM	ORIGIN
A	94°5'	0.5	GIP
B	14°48'	0.52	GI
C	4°5'09"	0.72	GI
D	21°3'38"	5.445	PM
E	18°3'58"	13.56	GIP
F	298°35'	1.635	PLACED
G	48°58'	15.89	BOX
H	29°33'	6.82	BOX
J	14°10'	3.98	DEAD
K	107°08'	19.11	BOX
L	185°14'	2.005	GIP
M	241°03'	1.88	GIP
N	349°33'	4.84	GIP
P	5°15'40"	7.865	GI
Q	94°01'	7.645	HOLLOW
R	189°13'	0.92	GI
S	188°54'	0.715	GI
T	206°18'	1.225	GI
U	80°08'	1.225	GI
V	28°19'	5.26	LEANING
V	BY ME		OAK
V	313°47'	5.625	GIP
W	26°18'	0.5	GIP
Z	296°18'	1.38	GIP
AI	230°56'	2.07	GIP
A2	135°35'	1.42	GIP
A3	24°04'	0.67	GIP
A4	143°23'30"	11.36	GIP
A5	260°41'50"	8.17	GIP



CONNECTIONS	
PM 216830 - PM 216831	100°25'57"
PM 216831 - PM 188312	100°25'57"
PM 188312 - PM 188312	253°43'13"
PM 188312 - PM 216830	253°43'13"
PM 216831 - PM 199923	191°26'02"
PM 199923 - PM 188312	279°36'31"
PM 188312 - PM 216513	279°01'28"
PM 216513 - PM 65647	35°35'42"
PM 65647 - PM 216830	97°12'56"
PM 216830 - CNR E	230°03'10"

CONNECTIONS	
3506.838 SVY	100°25'57"
3506.836 MGA GRND	100°25'57"
4851.289 SVY	253°43'13"
4851.295 MGA GRND	253°43'13"
2332.152 SVY	191°26'02"
2332.155 MGA GRND	191°26'02"
2119.245	279°36'31"
4296.938	279°01'28"
1173.606	35°35'42"
2379.847	97°12'56"
989.629	230°03'10"
52.03	

CONNECTIONS	
PM 216831 - CNR L	235°34'
PM 199923 - CNR N	89°08'40"
PM 188312 - CNR A3	98°39'
CNR V - CNR F	9°11'45"
CNR A5 - PM 65647	0°00'
CNR A4 - CNR A6	36°44'19"
5°46'15"	206.16

CONNECTIONS	
PM 216831 - CNR L	235°34'
PM 199923 - CNR N	89°08'40"
PM 188312 - CNR A3	98°39'
CNR V - CNR F	9°11'45"
CNR A5 - PM 65647	0°00'
CNR A4 - CNR A6	36°44'19"
5°46'15"	206.16

CONNECTIONS	
PM 216831 - CNR L	235°34'
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PM 188312 - CNR A3	98°39'
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CNR A4 - CNR A6	36°44'19"
5°46'15"	206.16

CONNECTIONS	
PM 216831 - CNR L	235°34'
PM 199923 - CNR N	89°08'40"
PM 188312 - CNR A3	98°39'
CNR V - CNR F	9°11'45"
CNR A5 - PM 65647	0°00'
CNR A4 - CNR A6	36°44'19"
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CONNECTIONS	
PM 216831 - CNR L	235°34'
PM 199923 - CNR N	89°08'40"
PM 188312 - CNR A3	98°39'
CNR V - CNR F	9°11'45"
CNR A5 - PM 65647	0°00'
CNR A4 - CNR A6	36°44'19"
5°46'15"	206.16

Surveyor: PHILIP H. SEARL

Date of Survey: 15/05/2023

Surveyor's Ref: 123487-01A

EXN23/009 Report

PLAN OF SUBDIVISION OF LOTS 16, 17, 232 & 233 IN DP755131 & LOT 1 IN DP1198931

LGA: NARROMINE

Locality: NARROMINE

Subdivision No: 2023/701

Lengths are in metres. Reduction Ratio 1:2500

Registered

22/08/2023

DP1294897

SCHEDULE OF REFERENCE MARKS		
CNR,BEARING	DIST.	FROM ORIGIN
C	45°09'	GI ROD FD DP800365
E	183°58'	13.56 GIP PLACED
F	298°35'	1.635 GIP PLACED
G	48°58'	15.89 BOX FD 1991-1884
H	29°33'	6.82 BOX FD 1657-1884
A8	313°42'	10.84 GIP PLACED
A11	270°04'	12.92 GIP PLACED
A12	180°00'	1 GIP PLACED

CNR E - CNR A8 155°36'20" 667.69

CONNECTIONS

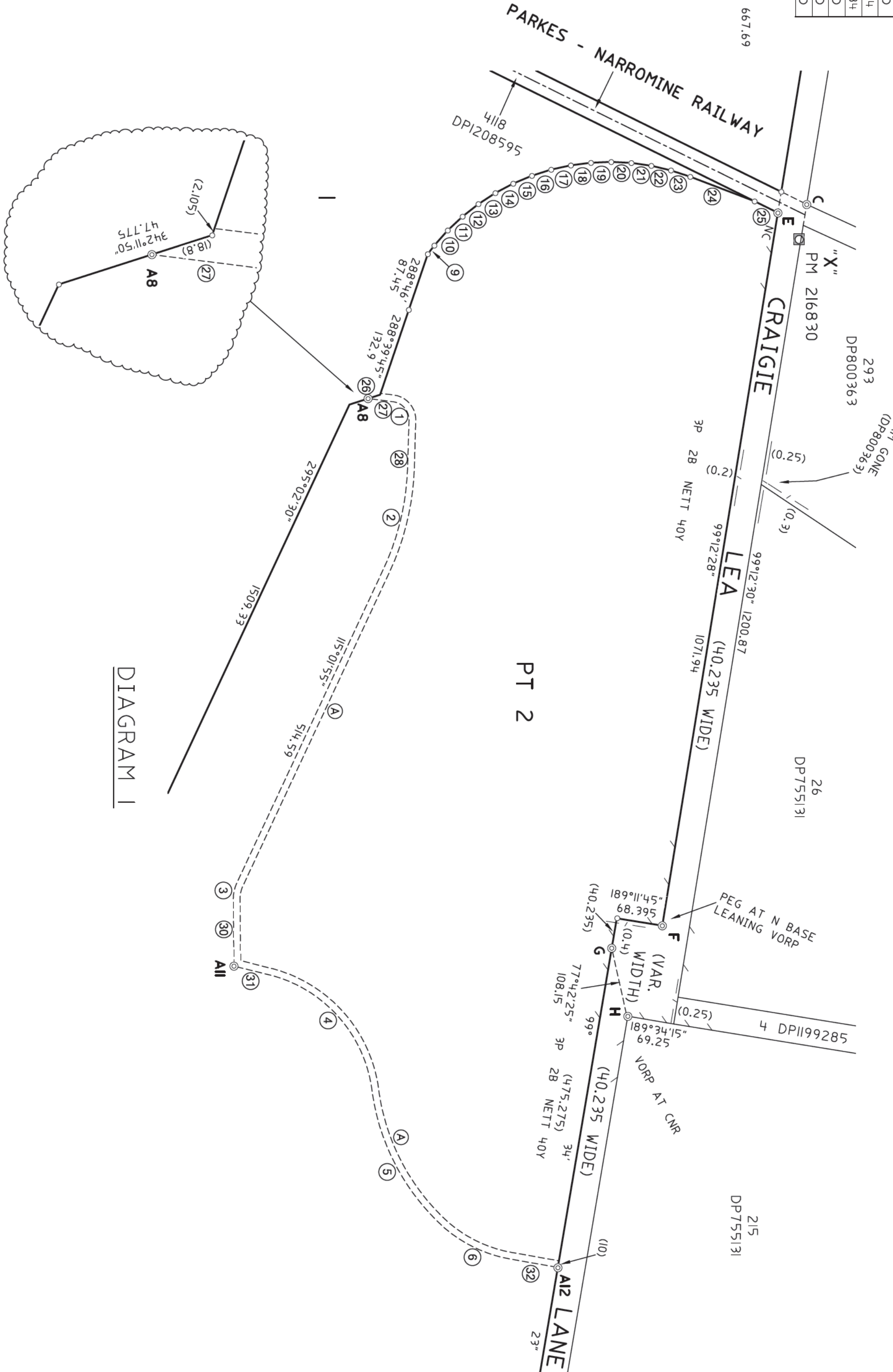


DIAGRAM 1

Number	Chord Bearing	Chord Distance	Arc Length	Radius
1	49°26'45"	36.34	39.86	27.01
2	103°22'45"	155.165	156.24	384.11
3	102°15'20"	23.45	23.645	53.015
4	47°48'20"	241.315	258.27	203.695
5	61°43'	226.42	231.03	332.915
6	25°13'20"	107.58	108.85	205.06

SCHEDULE OF ARCS

Number	Bearing	Distance
9	307°39'50"	16.12
10	311°36'25"	30
11	316°44'20"	30
12	321°52'15"	30
13	327°00'05"	30
14	332°07'50"	30
15	337°15'50"	30
16	342°23'40"	30
17	347°31'25"	30
18	352°39'25"	30
19	357°47'15"	30
20	2°55'	30
21	8°02'55"	30
22	13°10'50"	30
23	18°18'40"	30
24	20°52'35"	102.16
25	26°18'23"	38.53
26	342°11'50"	47.775
27	7°10'	37.485
28	91°43'35"	70.13
30	89°28'45"	99.76
31	14°04'30"	44.83
32	10°00'55"	71.57

SCHEDULE OF SHORT LINES

ORIGINAL PORTION MARKS ARE GONE UNLESS SHOWN

SFP - DENOTES ROUND STEEL FENCE POST AT CORNER

ORP - DENOTES GIN IN OLD ROUND POST AT CORNER

NC - DENOTES NAIL IN CONC. FOOTING AT CORNER

Ⓐ RIGHT OF ACCESS 10 WIDE

Surveyor: PHILIP H. SEARL

Date of Survey: 15/05/2023

Surveyor's Ref: 123487-01A

EXN23/009 Report

PLAN OF SUBDIVISION OF LOTS 16, 17, 232 & 233 IN DP755131 & LOT 1 IN DP1198931

LGA: NARROMINE

Locality: NARROMINE

Subdivision No: 2023/701

Lengths are in metres. Reduction Ratio 1:5000

Registered

22/08/2023

DP1294897

SCHEDULE OF SHORT LINES		
Number	Bearing	Distance
33	42°40'35"	48.23
34	279°12'55"	47.395
35	279°12'55"	57.83
36	26°18'23"	92.295
37	116°18'20"	3.84

SCHEDULE OF REFERENCE MARKS		
CNR	BEARING	DIST.
FROM		
ORIGIN		
T	206°18'	I
U	80°08'	I.225
W	26°18'	0.5
Z	296°18'	1.38
AI	230°56'	2.07
A2	135°35'	1.42
A3	24°04'	0.67
GIP - FD		
DP819468		

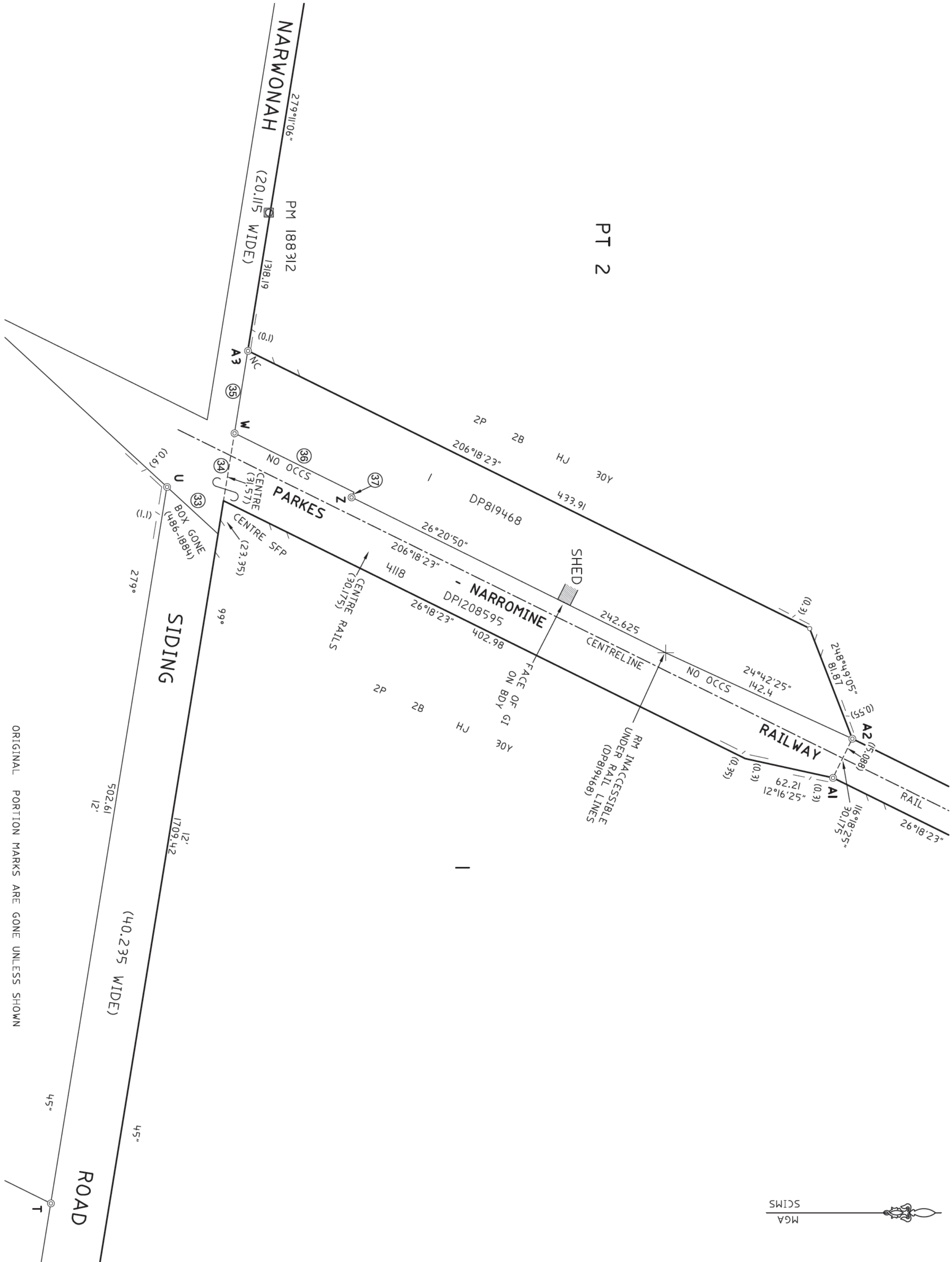


DIAGRAM 2

ORIGINAL PORTION MARKS ARE GONE UNLESS SHOWN
SFP - DENOTES ROUND STEEL FENCE POST AT CORNER
ORP - DENOTES GIN IN OLD ROUND POST AT CORNER
NC - DENOTES NAIL IN CONC. FOOTING AT CORNER


Surveyor: PHILIP H. SEARL
Date of Survey: 15/05/2023
Surveyor's Ref: 123487-01A
EXN23/009 Report


PLAN OF SUBDIVISION OF LOTS 16, 17, 232 &
233 IN DP755131 & LOT 1 IN DP198931

LGA: NARROMINE
Locality: NARROMINE
Subdivision No: 2023/701
Lengths are in metres. Reduction Ratio 1:2000

Registered
22/08/2023














DP1294897

Plan Form 6_Digital (2021)		Deposited Plan Administration Sheet Sheet 1 of 5	
 22/08/2023 Registered Title System TORRENS		DP1294897 LGA NARROMINE LOCALITY NARROMINE PARISH WENTWORTH COUNTY NARROMINE	
Plan of Subdivision of Lots 16, 17, 232 & 233 in DP755131 and Lot 1 in DP1198931		Crown Lands NSW/Western Lands Office Approval I, _____ (Authorised Officer) in approving this plan certify that all necessary approvals in regard to the allocation of the land shown herein have been given. Signature _____ Date _____ File Number _____ Office _____	
Survey Certificate Survey I, Philip Harold Searl of Premise Australia P/L 154 Peisley St Orange 2800, a surveyor registered under Surveying and Spatial Information Act 2002, certify that: The land shown in the plan was surveyed in accordance with the Surveying and Spatial Information Regulation 2017, is accurate and the survey was completed on: 15/05/2023 Urban/Rural Rural Datum Line X-Y Signature _____ Dated 18 Aug 2023 Surveyor Identification No. SU001972 Surveyor registered under the Surveying and Spatial Information Act 2002.		Subdivision Certificate (Check One) <input type="checkbox"/> Authorised Person <input checked="" type="checkbox"/> General Manager <input type="checkbox"/> Registered Certifier I, Jane Redden certify that the provisions of section 6.15 of the <i>Environmental Planning and Assessment Act 1979</i> have been satisfied in relation to the proposed subdivision, new road or reserve set out herein. Signature _____ Consent Authority Narromine Shire Council Date of Endorsement 08/08/2023 Subdivision Certificate Number 2023/701 File Number 007.2023.00000701.001	
Plans Used in the preparation of this survey See Sheet 2 for Plans Used		Statement of intention to dedicate public roads, create public reserves and drainage reserves, acquire/resume land.	
Surveyor's Reference 123487-01A		Signatures, Seals and Section 88B Statements should appear on the following sheet(s)	

Plan Form 6_Digital (2021)		Deposited Plan Administration Sheet	Sheet 2 of 5
Registered	 22/08/2023	OFFICE USE ONLY	DP1294897
Plan of Subdivision of Lots 16, 17, 232 & 233 in DP755131 and Lot 1 in DP1198931		<p>This sheet is for the provision of the following information as required:</p> <ul style="list-style-type: none">• A schedule of lots and addresses – See 60(c) SSI Regulation 2017• Statements of intention to create and release affecting interests in accordance with section 88B Conveyancing Act 1919• Signatures and seals- see 195D Conveyancing Act 1919• Any information which cannot fit in the appropriate panel of sheet 1 of the administration sheets.	
Subdivision Certificate Number			
2023/701			
Date of Endorsement			
8 August 2023			
Plans Used			
DP233201, DP499096, DP564834, DP569413, DP747703, DP800363, DP819468, DP1046775, DP1198931, DP1208595, 1325.1884, 1657.1884, 1767.1884, 1768.1884, 17690.1603, 1991.1884, 1992.1884, 2326.1884, 430.1884, 431.1884, 486.1884, 487.1884, 649.1884, 655.1884, 742.1884, 757.1884, 928.3030			
Surveyor's Reference 123487-01A			

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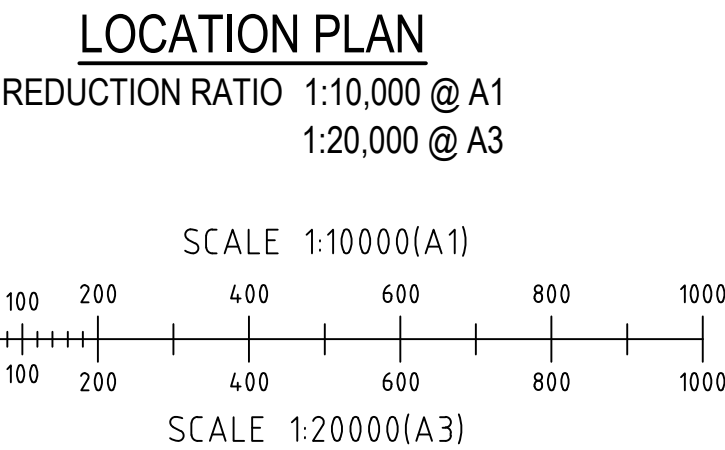
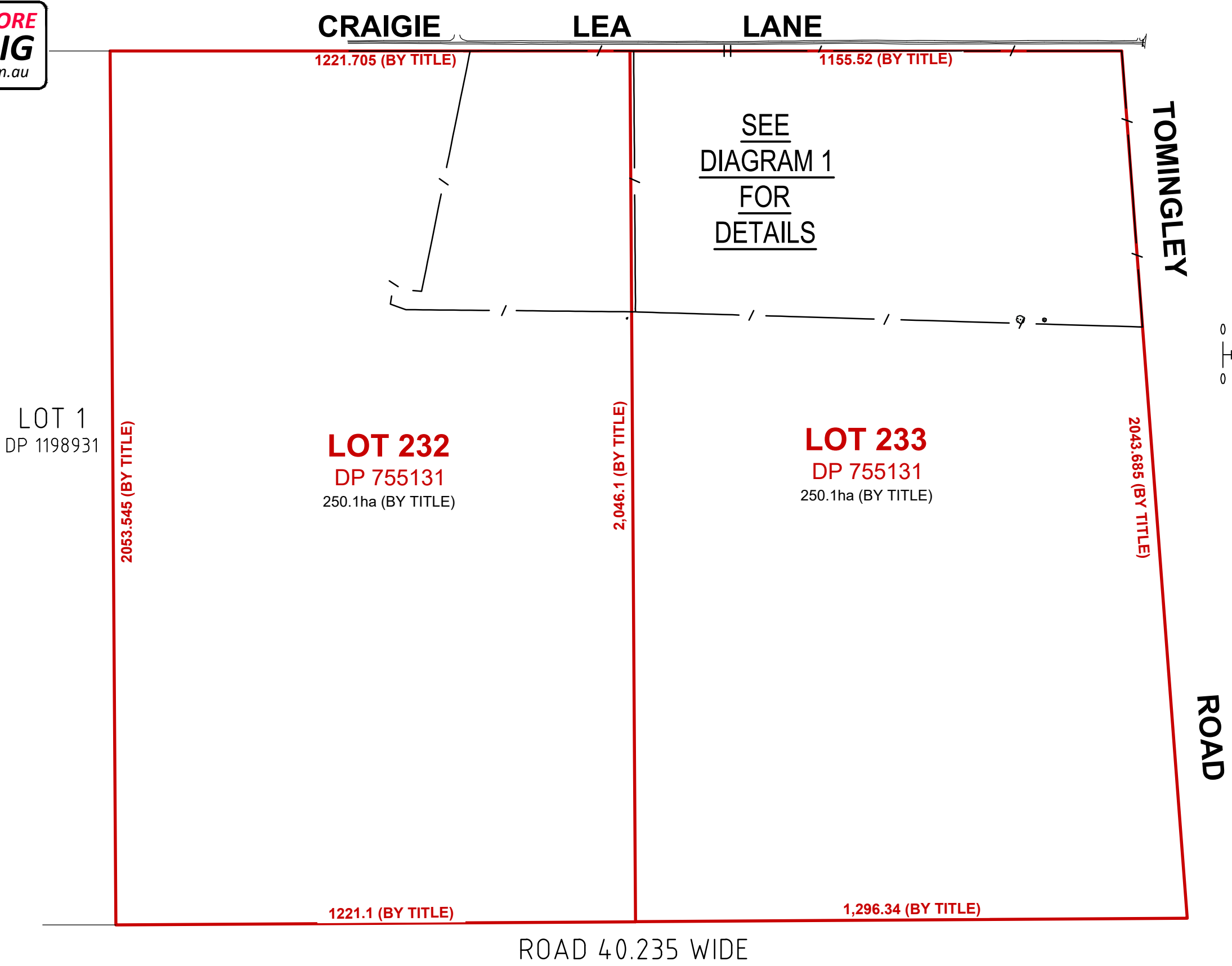
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Plan Form 6_Digital (2021)		Deposited Plan Administration Sheet		Sheet 5 of 5												
Registered	 22/08/2023	OFFICE USE ONLY		DP1294897												
Plan of Subdivision of Lots 16, 17, 232 & 233 in DP755131 and Lot 1 in DP1198931		This sheet is for the provision of the following information as required: <ul style="list-style-type: none">• A schedule of lots and addresses - See 60(c) SSI Regulation 2017• Statements of intention to create and release affecting interests in accordance with section 88B Conveyancing Act 1919• Signatures and seals- see 195D Conveyancing Act 1919• Any information which cannot fit in the appropriate panel of sheet 1 of the administration sheets.														
Subdivision Certificate Number																
2023/701																
Date of Endorsement																
8 August 2023																
<p>Executed on behalf of the Corporation named below by the authorised person(s) whose signature(s) appear below pursuant to the authority specified</p> <p>Company Name:</p> <p>AUSTRALIAN RAIL TRACK CORPORATION LIMITED</p> <p>Company ACN or ABN:</p> <p>75 081 455 754</p> <p>Authority:</p> <p>SEC 127 OF THE CORPORATIONS ACT 2001</p> <table border="0"><tr><td>Signature:</td><td></td><td>Signature:</td><td></td></tr><tr><td>Name:</td><td></td><td>Name:</td><td></td></tr><tr><td>Position:</td><td>DIRECTOR</td><td>Position:</td><td>Company Secretary</td></tr></table>					Signature:		Signature:		Name:		Name:		Position:	DIRECTOR	Position:	Company Secretary
Signature:		Signature:														
Name:		Name:														
Position:	DIRECTOR	Position:	Company Secretary													
Surveyor's Reference 123487-01A																



APPENDIX B

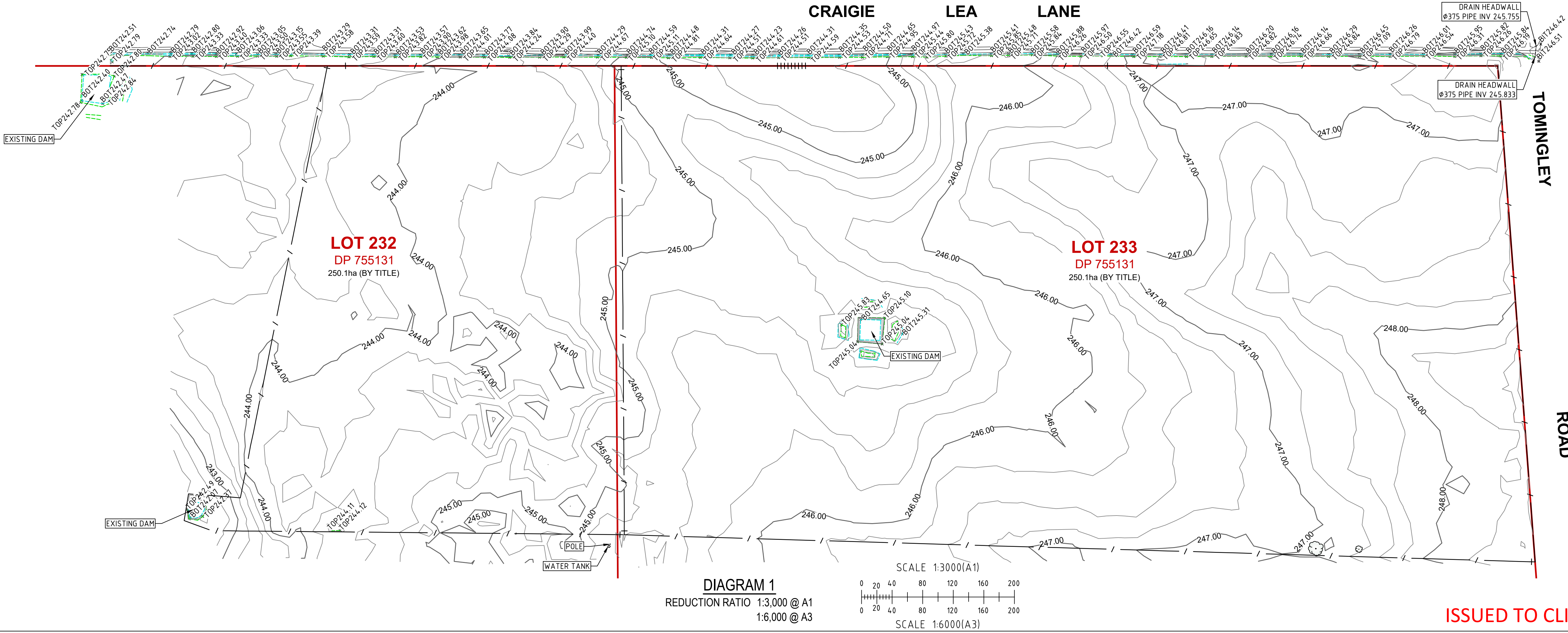
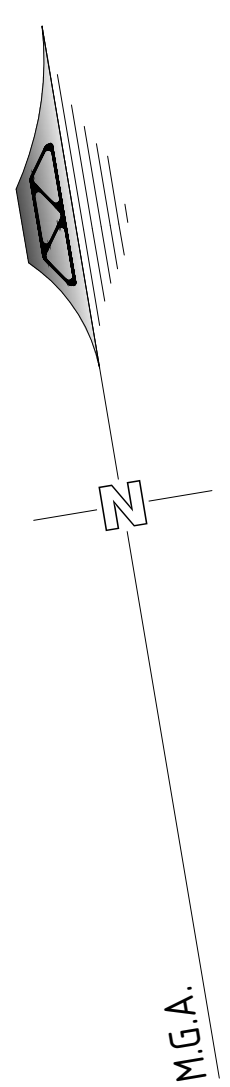
Site Survey



DATE OF SURVEY : 3rd APRIL 2023
SURVEY BY : R. Boylan
DATUM : AUSTRALIAN HEIGHT DATUM (A.H.D.)
ORIGIN : PM 216831 RL 246.421m (S.C.I.M.S.)
MAJOR CONTOUR INTERVAL : 1 METRE
MINOR CONTOUR INTERVAL : 0.25 METRES

- NOTES:
- THE BOUNDARY INFORMATION SHOWN ON THIS PLAN BEEN PLOTTED AS REQUIRED UNDER DIVISION 1, SECTION 9.1(1) OF THE "SURVEYING AND SPATIAL INFORMATION REGULATION 2017". IT HAS NOT BEEN DETERMINED BY AN ACCURATE BOUNDARY SURVEY.
 - A DETAIL & LEVEL SURVEY IS NOT A "LAND SURVEY" AS DEFINED BY THE SURVEYING AND SPATIAL INFORMATION ACT 2002. IF ANY CONSTRUCTION OR DESIGN WORK WHICH RELIES ON CRITICAL SETBACKS FROM THE STREET OR BOUNDARIES IS PLANNED, IT WOULD BE IMPERATIVE TO CARRY OUT FURTHER SURVEY WORK TO DETERMINE THE BOUNDARY DIMENSIONS.
 - THE LOCATIONS AND DEPTHS OF UNDERGROUND SERVICES ARE NOT ASSURED BY BARNSON. SERVICE AUTHORITIES SHOULD BE CONSULTED BEFORE ANY EXCAVATION, DEMOLITION OR CONSTRUCTION COMMENCES.
 - THERE MAY BE UNDERGROUND SERVICES THAT HAVE NOT BEEN SHOWN HEREON.
 - BARNSON TAKES NO RESPONSIBILITY FOR LOSSES, DAMAGES OR INJURIES TO ANY PERSON OR ORGANISATION THAT MAY OCCUR DUE TO THE RELIANCE ON THIS PLAN FOR THE LOCATION OF UNDERGROUND SERVICES.

KEY	
	EXISTING SUBJECT CADASTRAL BOUNDARIES
	EXISTING FENCE LINE
	EXISTING GATE
	TOP OF BANK
	BOTTOM OF BANK
	DRAIN PIPE INVERT Ø375mm



ISSUED TO CLIENT



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Rev	Date	Description
A	11-04-2023	ISSUED TO CLIENT

Reports to Council - Community and Economic Development
Page 101

Project
LEVEL AND DETAIL SURVEY OVER
PART OF LOTS 232 & 233 IN DP 755131
Site Address
397 CRAIGIE LEA LANE
NARROMINE NSW 2821
Client
NARROMINE SHIRE COUNCIL

Drawing Title
LEVEL AND DETAIL SURVEY PLAN

Survey	RB
Drawn	JS
Check	RB

Original Sheet Size	A1
Revision	A

Certification
Project No
Drawing No

40038
L01



APPENDIX C

Aboriginal Due Diligence Assessment Report



View south across the study area.

ABORIGINAL DUE DILIGENCE ASSESSMENT REPORT

NARROMINE FREIGHT HUB

NARROMINE, NSW

MAY 2023

Report prepared by
OzArk Environment & Heritage
for Narromine Shire Council

OzArk

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Client	Barnson	
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Enquiries should be addressed to OzArk Environment & Heritage.		

Acknowledgement

OzArk acknowledge the traditional custodians of the area on which this assessment took place and pay respect to their beliefs, cultural heritage, and continuing connection with the land. We also acknowledge and pay respect to the post-contact experiences of Aboriginal people with attachment to the area and to the Elders, past and present, as the next generation of role models and vessels for memories, traditions, culture and hopes of local Aboriginal people.

EXECUTIVE SUMMARY

OzArk Environment & Heritage (OzArk) has been engaged by Barnson (the client), on behalf of Narromine Shire Council (the proponent) to complete an Aboriginal due diligence heritage assessment for the Narromine Freight Hub (the proposal). The proposal is in the Narromine Shire Council Local Government Area.

The study area is on the “Craigie Lea” property, located approximately nine kilometres (km) south of Narromine in central western NSW. It extends from the corner of Craigie Lea Lane and Tomingley Road 1.8 km west and 650 metres (m) south respectively and includes northern sections of Lot 232 and Lot 233 DP755131.

The desktop component of the due diligence assessment confirmed there are no previously recorded Aboriginal sites within the study area and all the study area, excluding the corridors of Craigie Lea Lane, meet the definition of ‘disturbed land’.

A visual inspection of the study area was along the corridors of Craigie Lea Lane was undertaken by OzArk Archaeologist, Imogen Crome, on 26 April 2023. The visual inspection assessed all mature trees within the corridors for cultural modifications. No landforms with subsurface archaeological potential were identified.

The undertaking of the due diligence process has resulted in the conclusion that the proposed works will have an impact on the ground surface, however, no Aboriginal objects or intact archaeological deposits will be harmed by the proposal. This moves the proposal to the following outcome:

Aboriginal Heritage Impact Permit application not necessary. Proceed with caution. If any Aboriginal objects are found, stop work, and notify Heritage NSW (02) 9873 8500 (heritagemailbox@environment.nsw.gov.au). If human remains are found, stop work, secure the site and notify NSW Police and Heritage NSW.

To ensure the greatest possible protection to the area’s Aboriginal cultural heritage values, the following recommendations are made:

- 1) The proposed work may proceed at the study area without further archaeological investigation under the following conditions:
 - a) All land and ground disturbance activities must be confined to within the study area, as this will eliminate the risk of harm to Aboriginal objects in adjacent landforms. Should the parameters of the proposal extend beyond the assessed areas, then further archaeological assessment may be required.
 - b) All staff and contractors involved in the proposed work should be made aware of the legislative protection requirements for all Aboriginal sites and objects.

- 2) This assessment has concluded that there is a low likelihood that the proposed work will adversely harm Aboriginal cultural heritage items or sites. If during works, however, Aboriginal artefacts or skeletal material are noted, all work should cease and the procedures in the *Unanticipated Finds Protocol* (**Appendix 2**) should be followed.
- 3) Inductions for work crews should include a cultural heritage awareness procedure to ensure they recognise Aboriginal artefacts (**Appendix 3**) and are aware of the legislative protection of Aboriginal objects under the National Parks & Wildlife Act 1974 and the contents of the *Unanticipated Finds Protocol*.
- 4) The information presented here meets the requirements of the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*. It should be retained as shelf documentation for five years as it may be used to support a defence against prosecution in the event of unanticipated harm to Aboriginal objects.

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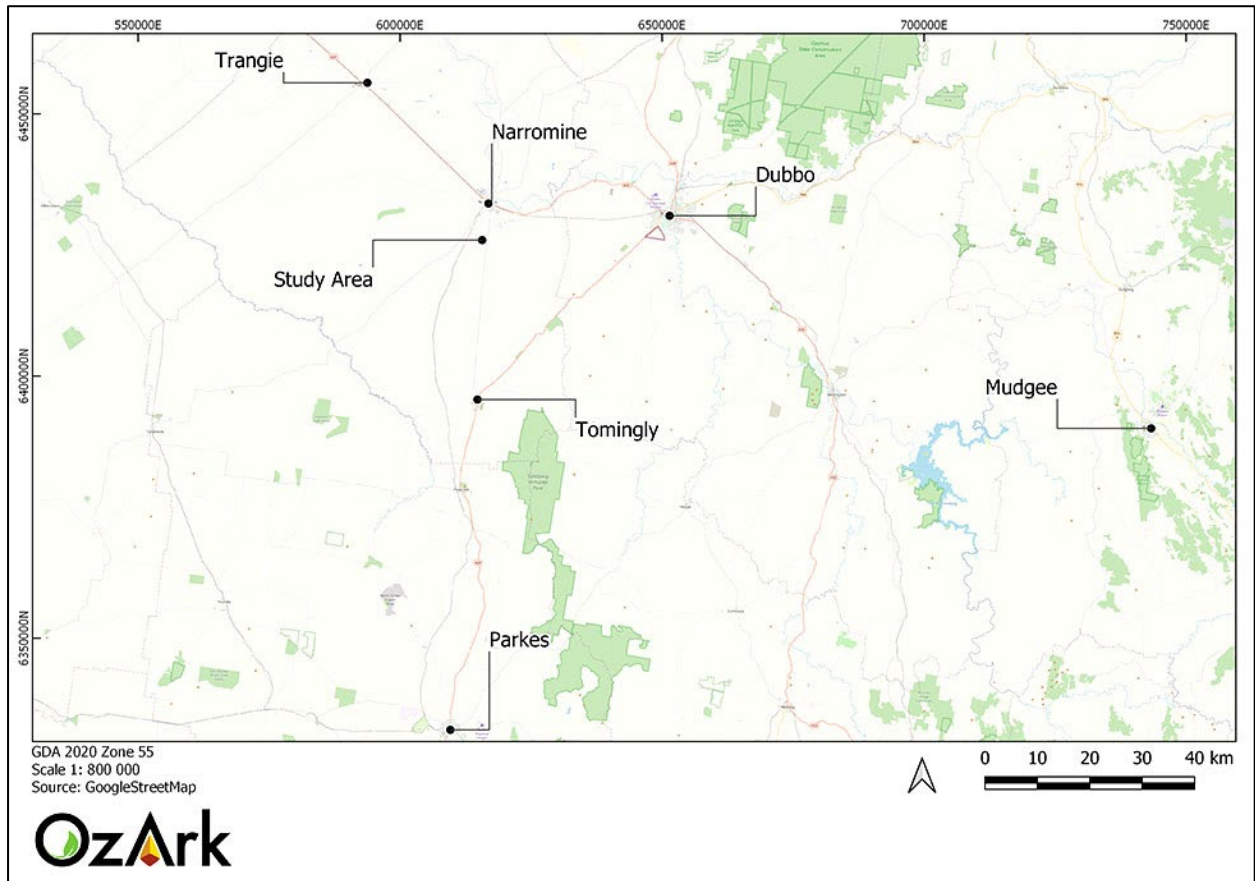
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1 INTRODUCTION

1.1 BRIEF DESCRIPTION OF THE PROPOSAL

OzArk Environment & Heritage (OzArk) has been engaged by Barnson (the client), on behalf of Narromine Shire Council (the proponent) to complete an Aboriginal due diligence heritage assessment for the Narromine Freight Hub (the proposal). The proposal is in the Narromine Shire Council Local Government Area (LGA) (**Figure 1-1**).

Figure 1-1. Map showing the location of the proposal.



1.2 BACKGROUND

In 2021, OzArk completed a preliminary Aboriginal heritage assessment for a rail manufacturing or storage facility. The assessment included Lot 16, 17, 232 and 233 DP755131 (encompassing the current study area). One low density artefact scatter was recorded during the inspection along the southern boundary of Lot 17 DP755131, located 2.2 km from the current study area (OzArk 2021).

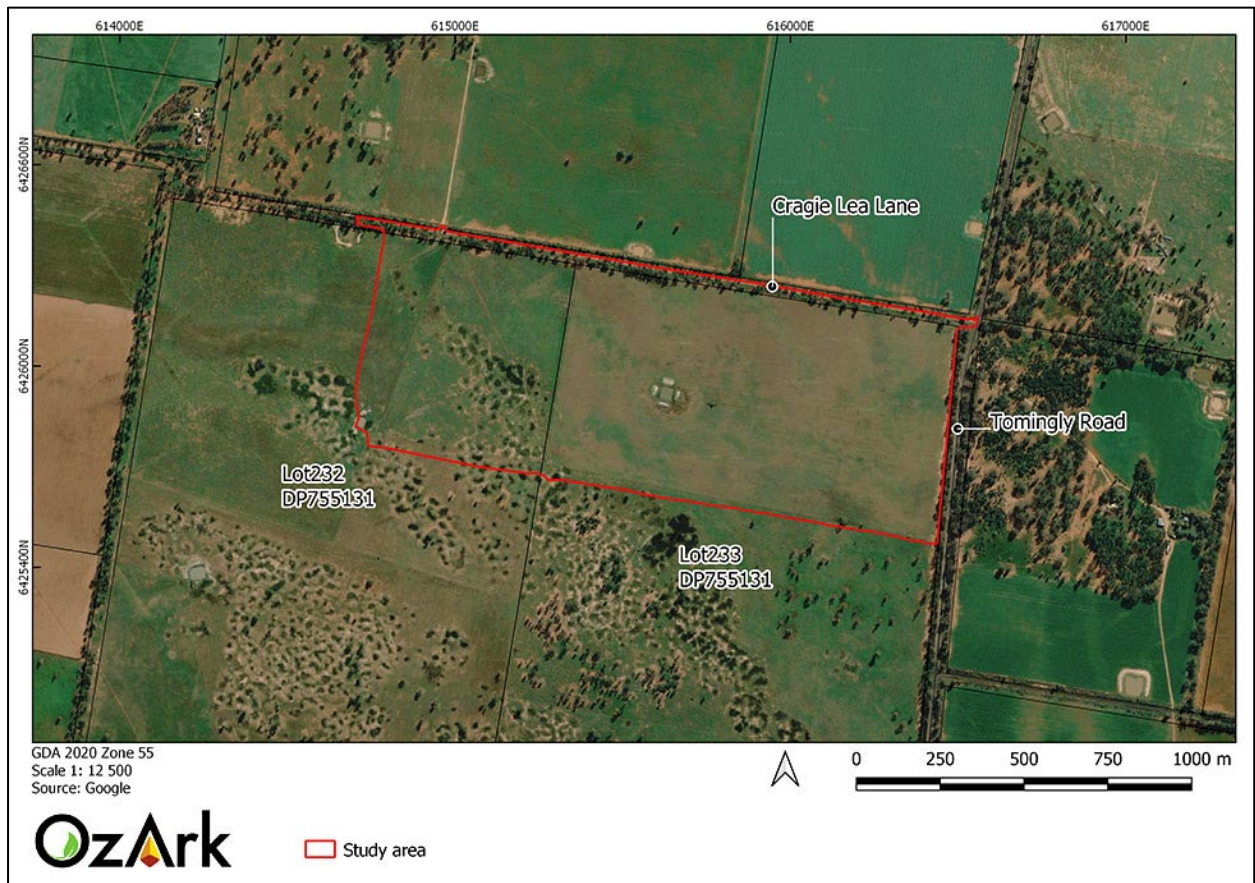
1.3 STUDY AREA

The study area is on the “Craigie Lea” property located approximately nine kilometres (km) south of Narromine in central western NSW. It extends from the corner of Craigie Lea Lane and Tomingly Road, 1.8 km west and 650 metres (m) south respectively and includes the northern

sections of Lot 232 and 233 DP755131. The study area is located approximately 1.8 km east of the north-south Parkes to Narromine (P2N) rail corridor and north of the approved Narromine to Narrabri (N2N) section of Inland Rail.

The study area is shown on **Figure 1-2**.

Figure 1-2: Aerial showing the study area.



1.4 ASSESSMENT APPROACH

The desktop and field assessment of the study area follows the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (due diligence; DECCW 2010).

2 ABORIGINAL DUE DILIGENCE ASSESSMENT

2.1 INTRODUCTION

Section 57 of the National Parks and Wildlife Regulation 2019 (NPW Regulation) made under the *National Parks and Wildlife Act 1974* (NPW Act) advocates a due diligence process to determining likely impacts on Aboriginal objects. Carrying out due diligence provides a defence to the offence of harming Aboriginal objects and is an important step in satisfying Aboriginal heritage obligations in NSW.

2.2 DEFENCES UNDER THE NPW REGULATION 2019

2.2.1 Low impact activities

The first step before application of the due diligence process itself is to determine whether the proposed activity is a “low impact activity” for which there is a defence in the NPW Regulation. The exemptions are listed in Section 58 of the NPW Regulation (DECCW 2010: 6).

The activities of the proponent do not fall under ‘low impact activity’ as earthworks required for the construction of the proposal are not listed in the NPW Regulation. Therefore, the due diligence process must be applied.

2.2.2 Disturbed lands

Relevant to this process is the assessed levels of previous land-use disturbance.

The NPW Regulation Section 58 (DECCW 2010: 18) define disturbed land as follows:

Land is disturbed if it has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable.

Examples include ploughing, construction of rural infrastructure (such as dams and fences), construction of roads, trails and tracks (including fire trails and tracks and walking tracks), clearing vegetation, construction of buildings and the erection of other structures, construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines, stormwater drainage and other similar infrastructure) and construction of earthworks.

Aerial imagery from 1981 shows the portions of the study area within Lot 232 and 233 DP755131 have been cleared and ploughed, although isolated trees were present at this date along the southern boundary of Lot 233 DP755131 (**Figure 2-1**). A dam has also been constructed in the western portion of this lot. As such, these areas have been disturbed in a clear and observable manner and the due diligence process does not need to be applied to this area. Areas of ‘disturbed land’ are shown on **Figure 2-2**.

The northern boundary of the study area has been disturbed by the construction of the Craigie Lea Lane, although trees remain within the road corridors indicating that the land's surface in those corridors have not been changed in a clear and observable manner and the due diligence process must be applied.

Figure 2-1: 1981 aerial showing historic disturbances within the study area.

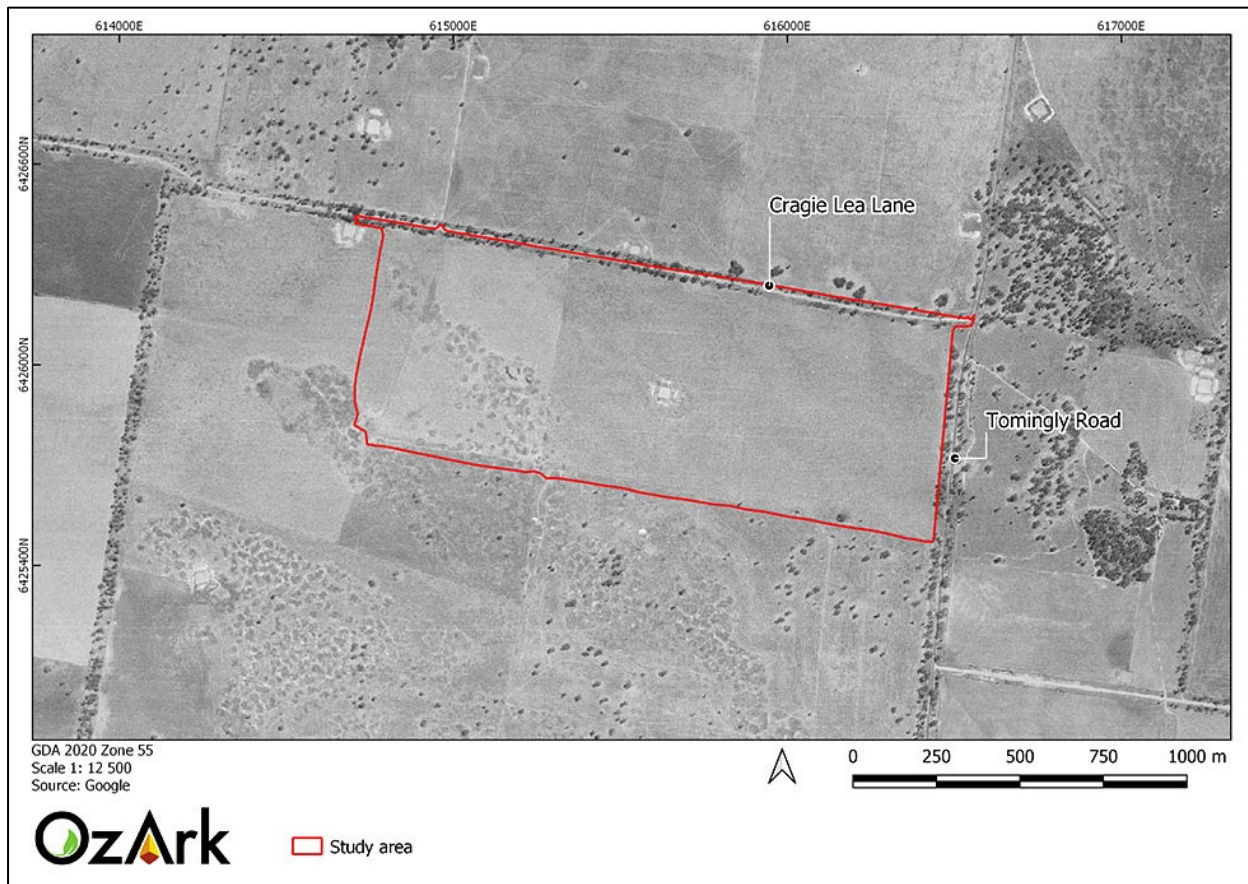
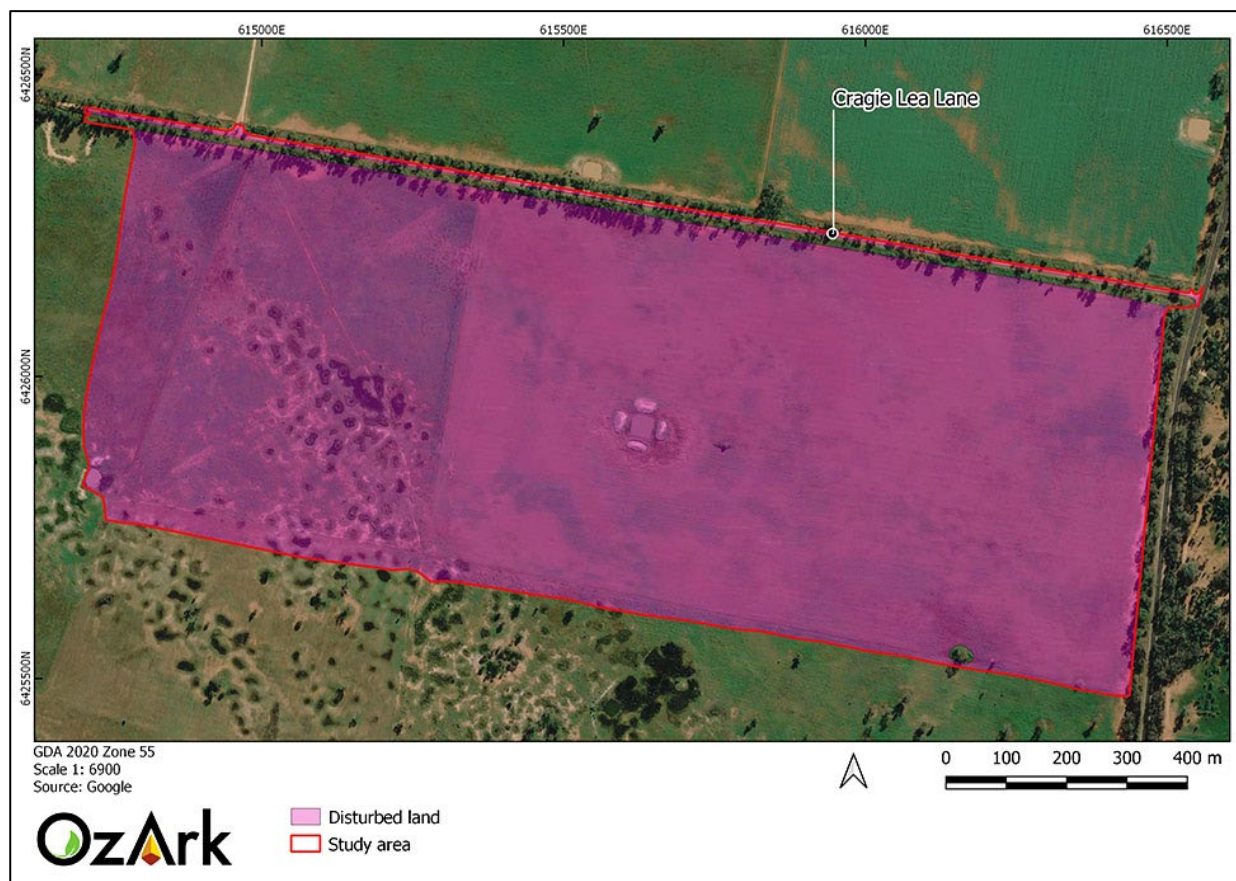


Figure 2-2: Aerial of the study area showing portions defined as ‘disturbed land’.

In summary, it is determined that the proposal must be assessed under the Due Diligence Code of Practice. The reasoning for this determination is set out in **Table 2-1**.

Table 2-1: Determination of whether Due Diligence Code of Practice applies.

Item	Reasoning	Answer
Is the activity to be assessed under Division 4.7 (state significant development) or Division 5.2 (state significant infrastructure) of the EP&A Act?	The proposal will be assessed under Part 5 of the EP&A Act.	No
Is the activity exempt from the NPW Act or NPW Regulation?	The proposal is not exempt under this Act or Regulation.	No
Do either or both apply: Is the activity in an Aboriginal place? Have previous investigations that meet the requirements of this Code identified Aboriginal objects?	The activity will not occur in an Aboriginal place. The study area has been subject to a preliminary Aboriginal heritage assessment by OzArk in 2021.	No
Is the activity a low impact one for which there is a defence in the NPW Regulation?	The proposal is not a low impact activity for which there is a defence in the NPW Regulation.	No
Is the activity occurring entirely within areas that are assessed as 'disturbed lands'?	The proposal is not entirely within areas of high modification.	No
Due Diligence Code of Practice assessment is required		

2.3 APPLICATION OF THE DUE DILIGENCE CODE OF PRACTICE TO THE PROPOSAL

To follow the generic due diligence process, a series of steps in a question/answer flowchart format (DECCW 2010: 10) are applied to the proposed impacts and the study area, and the responses documented.

2.3.1 Step 1

Will the activity disturb the ground surface or any culturally modified trees?

Yes, the proposal will impact the ground surface and may impact culturally modified trees.

The proponent is proposing to construct a freight hub which will allow for the storage and maintenance of rail materials and machinery. The construction of the proposal will therefore require preliminary earthworks which will impact the ground surface.

The corridors of Craige Lea Lane are densely vegetated, therefore the proposal may impact culturally modified trees if mature vegetation is present. One mature tree is present along the southern boundary of Lot 233 DP755131 however this tree was inspected as part of OzArk (2021) and did not contain cultural modification (**Figure 2-2**).

2.3.2 Step 2a

Are there any relevant confirmed site records or other associated landscape feature information on AHIMS?

No, there are no previously recorded sites within the study area.

A search of the Aboriginal Heritage Information Management System (AHIMS) on 17 March 2023 was undertaken over a 5 x 5 km search area (GDA Zone 55 Eastings: 610694–620637, Northings 6420967–6430960). The search returned 24 previously recorded Aboriginal sites within the search area; however, none are within the study area (**Figure 2-2**).

Results from the AHIMS search suggest modified trees (carved or scarred) are the most likely site type to be recorded in the region (n=10, 42.5%), followed by isolated finds (n=5, 21.5%) (**Table 2-1**). Culturally modified trees have been previously recorded along creek or drainage lines or along road corridors where mature trees are more likely to be extant. The AHIMS search shows artefact sites have been predominately recorded on landforms with gilgai and/or along the Macquarie River. The remainder of sites returned within the AHIMS search consist of modified trees associated with burials, artefact scatters and artefact sites with an unspecified quantity (n=3, 12%).

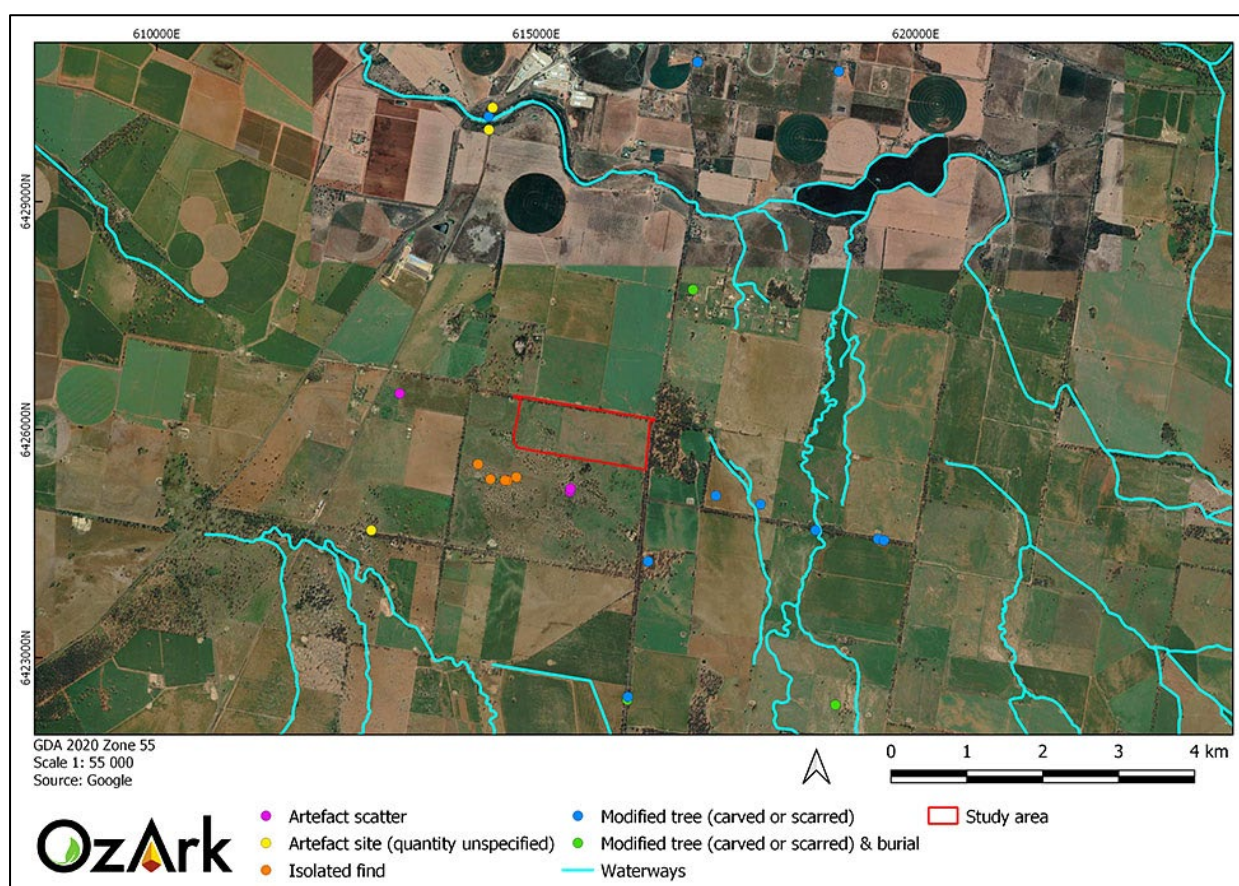
Given the western portion of the study area contains gilgai, there is increased potential for artefact sites (isolated finds or low-density scatters) to be present. Scarred trees, if present, will only be recorded within the road corridors. Due to the previous disturbances across the study area (i.e. ploughing) any artefact sites would be in a secondary context.

A total of five isolated finds (AHIMS #35-3-0292, 35-3-0293, 35-3-0294, 35-3-0295 and 35-3-0296) as well as two artefact scatters (AHIMS #35-3-0297 and 35-3-0298) were recorded by Jacobs for the Narromine South Multi-Function Compound in 2021. OzArk was unable to gain access to information regarding these sites, however it is noted that all seven sites are located approximately 400-500 m south of the study area and will not be harmed by the proposal.

Table 2-2: Site types and frequencies of AHIMS sites near the study area.

Site Type	Number	% Frequency
Modified tree (carved or scarred)	10	42.5
Isolated finds	5	21.5
Modified tree (carved or scarred) & burial	3	12.0
Artefact site (quantity unspecified)	3	12.0
Artefact scatter	3	12.0
Total	24	100

Figure 2-3: Previously recorded sites in relation to the study area.



2.3.3 Step 2b

Are there any other sources of information of which a person is already aware?

No, there are no other sources of information that would indicate the presence of Aboriginal objects in the study area.

2.3.3.1 *Ethnohistoric context*

The proposal is in the northern region of Wiradjuri land (Horton 1996). The Wiradjuri people were first encountered by colonial explorers such as Oxley and Cunningham in the early 1800s (Whitehead 2003). They found that Wiradjuri groups, such as the 'Bultje tribe' comprised of up to 120 individuals and hunted emus, kangaroo, and possum for food. Fishing was also utilised to sustain the population with both mussels and freshwater fish being caught by the women of the tribe who used moveable dams made of grass to direct fish, making them easier to catch (Kass 2003: 6).

2.3.3.2 *Regional archaeological context*

The archaeological investigations summarised below provide baseline data for placing past Aboriginal sites within the regional landscape context.

Koettig 1985

Koettig focussed more heavily on Aboriginal occupation around the town of Dubbo, however the patterns and trends she recorded are still relevant to the Narromine area. She concluded that artefact scatters, culturally modified trees and grinding grooves were the most frequently recorded site type in the region. The location and size of a particular site was determined to be dependent on both social and environmental factors including proximity to water, availability of food and geological formations. Koettig's predictive model concluded that all site types were more likely to be recorded along waterways except scarred trees and 'small' campsites, which did not occur in a predictable manner.

OzArk 2006

An assessment of Aboriginal heritage resources within the then Dubbo LGA to assist Dubbo City Council with planning was undertaken by OzArk (2006). This study aimed to consolidate previous surveys and assessments of Aboriginal heritage; set a baseline for further study; and survey areas zoned for future expansion. Approximately 1,120 ha of land was surveyed within five study areas surrounding the city of Dubbo. During the survey, 26 new Aboriginal sites were recorded, and eight out of 12 previously recorded sites were relocated. A number of the newly recorded site types were similar to those found in previous studies.

Fewer scarred trees were found than expected, likely due to intensive agricultural practices and associated tree clearance around Dubbo city compared to the broader Dubbo LGA. No new grinding groove sites were found, which was probable, given that this site type comprised only 3.6% of previously located sites within the Dubbo LGA. Scarred tree distribution adhered to the predictive model, exclusively following waterways and fence-lines, although this probably reflected land clearing practices more than Aboriginal site patterning.

Isolated finds and open sites followed a similar pattern, largely limited to watercourse edges and elevated terraces within 500 m of the Macquarie River and other permanent to semi-permanent waterways. No significant patterning emerged in terms of site size or quality, perhaps because surface manifestations often do not adequately reflect site size or complexity.

OzArk 2014

The report is the result of the Dubbo LGA Aboriginal cultural heritage study which utilised GIS mapping, community consultation and archaeological resources to gain a more comprehensive understanding of the Aboriginal heritage of the Dubbo area. A total area of 207 square kilometres was surveyed as part of the project.

A total of 679 Aboriginal sites were recorded during the survey. Sites including artefact scatters, hearths, areas of potential archaeological deposit (PAD) and open camp sites, which comprised 57% of all sites located.

Culturally modified trees comprised 39% of recorded sites throughout the LGA. It was concluded that all sites were located within 500 m of waterways, however areas within 200 m are likely to contain more sites.

OzArk 2016

A 2016 study analysing site distribution across the central west region of NSW concluded that most Aboriginal site recordings are situated within Channel and Floodplain landscapes. Within these landscapes, modified trees are the most likely site type to be recorded. The report also found a strong correlation between site location and proximity to water. As the study area is situated within the Boggy Cowal Alluvial Plains landscape unit (Mitchell 2002), the results of OzArk 2016 suggest that there is a decreased likelihood for Aboriginal sites to be present within the study area.

2.3.3.3 Assessments within or near the study area

Jacobs 2020

Jacobs (2020) completed an Aboriginal cultural heritage assessment for the N2N project. This assessment included an east-west corridor through the central portion of the study area. Across the entire assessment from Narromine to Narrabri, a total of 152 Aboriginal heritage sites and 13 areas of PADs were identified. All the identified sites were identified as having high social/cultural significance. None of the recorded sites are located within the study area.

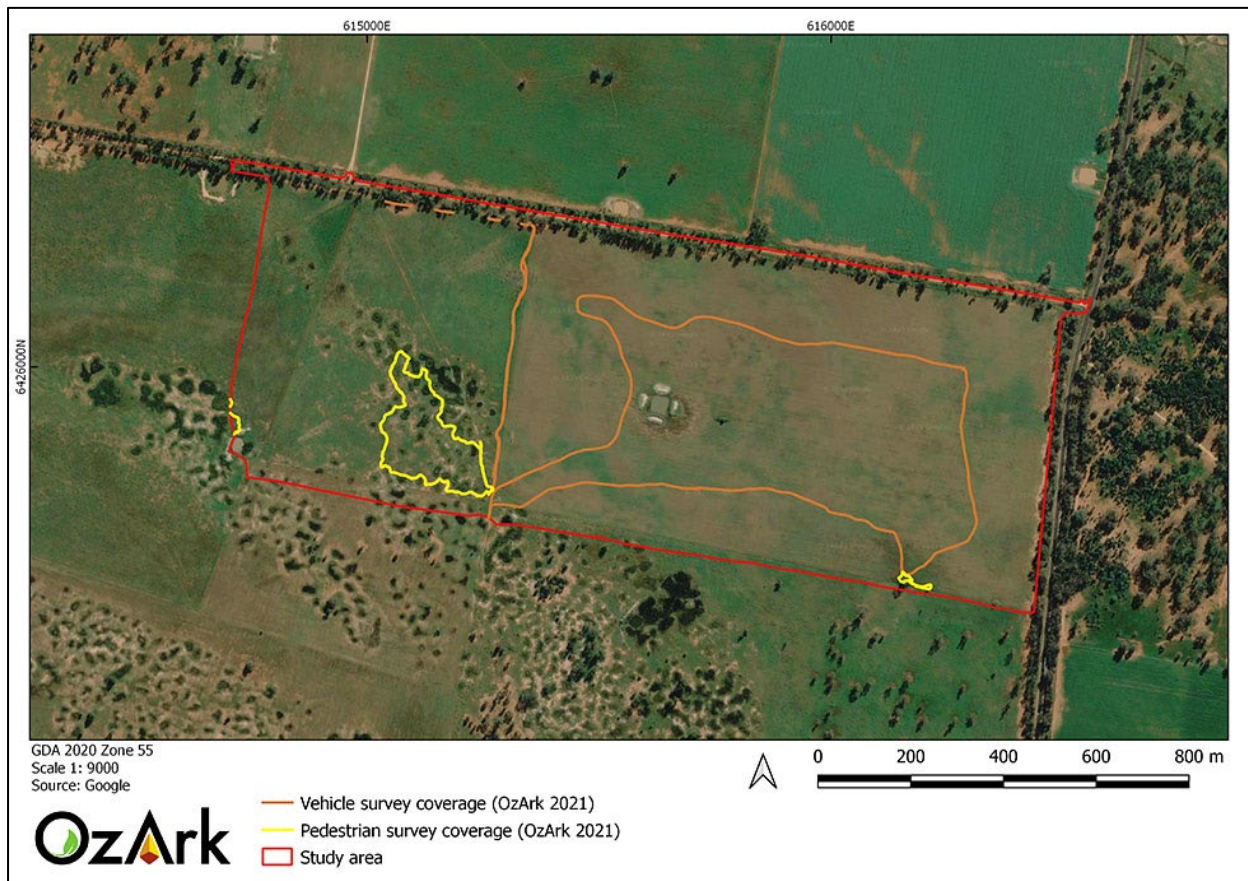
OzArk 2021

In 2021, a preliminary assessment was conducted to assess the viability of Lot 16, 17, 232 and 233 DP755131 (encompassing the current study area) for future development. As part of the preliminary assessment an inspection was undertaken to assess the archaeological potential of

the landforms present and ground-truth levels of disturbance. Areas with remnant mature vegetation were targeted, as well as areas with gilgai, while most other landforms were assessed using vehicular reconnaissance. The pedestrian and vehicle tracks completed as part of this assessment in the study area is shown on **Figure 2-4**.

One previously unrecorded Aboriginal site was recorded during the inspection and is located approximately 2.7 km southwest of the current study area.

Figure 2-4: 2021 survey coverage within the current study area.



2.3.4 Step 2c

Are there any landscape features that are likely to indicate presence of Aboriginal objects?

No, there are no portions of the study area which contain landforms with identified archaeological sensitivity.

The Due Diligence Code of Practice (DECCW 2010) refers to several landscape features which have higher potential to contain Aboriginal objects. These include:

- Within 200 m of waters
- Located within a sand dune system
- Located on a ridge top, ridge line or headland

- Located within 200 m below or above a cliff face
- Within 20 m of or in a cave, rock shelter, or a cave mouth

on land that is not disturbed land.

The study area is situated on a flat plain landform within the Boggy Cowal Alluvial Plains landscape unit which is described as containing swamps and lagoons with river red gum, white cypress pine and grasses in areas of depression (Mitchell 2002: 50).

The study area does not contain any permanent water sources, and the closest named waterway, Backwater Cowal, is located approximately 2.8 km to the north. The western portion of the study area contains gilgai which would have provided resources during periods of high rainfall, however, the areas containing gilgai are on 'disturbed land'.

As such, no landforms with archaeological sensitivity identified in the Due Diligence Code of Practice are present within the study area.

A 'no' answer for Question 2 a-c, results in the following outcome (DECCW 2010: 10):

AHIP (Aboriginal Heritage Impact Permit) application not necessary. Proceed with caution. If any Aboriginal objects are found, stop work, and notify Heritage NSW (02) 9873 8500 (heritagemailbox@environment.nsw.gov.au). If human remains are found, stop work, secure the site, and notify NSW Police and Heritage NSW.

The proponent has however elected to apply the precautionary principle and complete a visual inspection of the trees within the corridor of Cragie Lea Lane in the north of the study area.

2.3.5 Step 3

Can harm to Aboriginal objects or disturbance of archaeologically sensitive landscape features be avoided?

Yes. Landforms with identified archaeological sensitivity will not be impacted by the proposal, nor will any known Aboriginal objects.

As no identified archaeological sensitive landforms or known Aboriginal objects are present within the study area, they will not be harmed by the proposal.

2.3.6 Step 4

Does a desktop assessment and visual inspection confirm that there are Aboriginal objects or that they are likely?

No, there were no Aboriginal objects or sensitive landforms identified during the visual inspection.

The visual inspection of the northern boundary of the study area was undertaken by OzArk Archaeologist, Imogen Crome, on 26 April 2023.

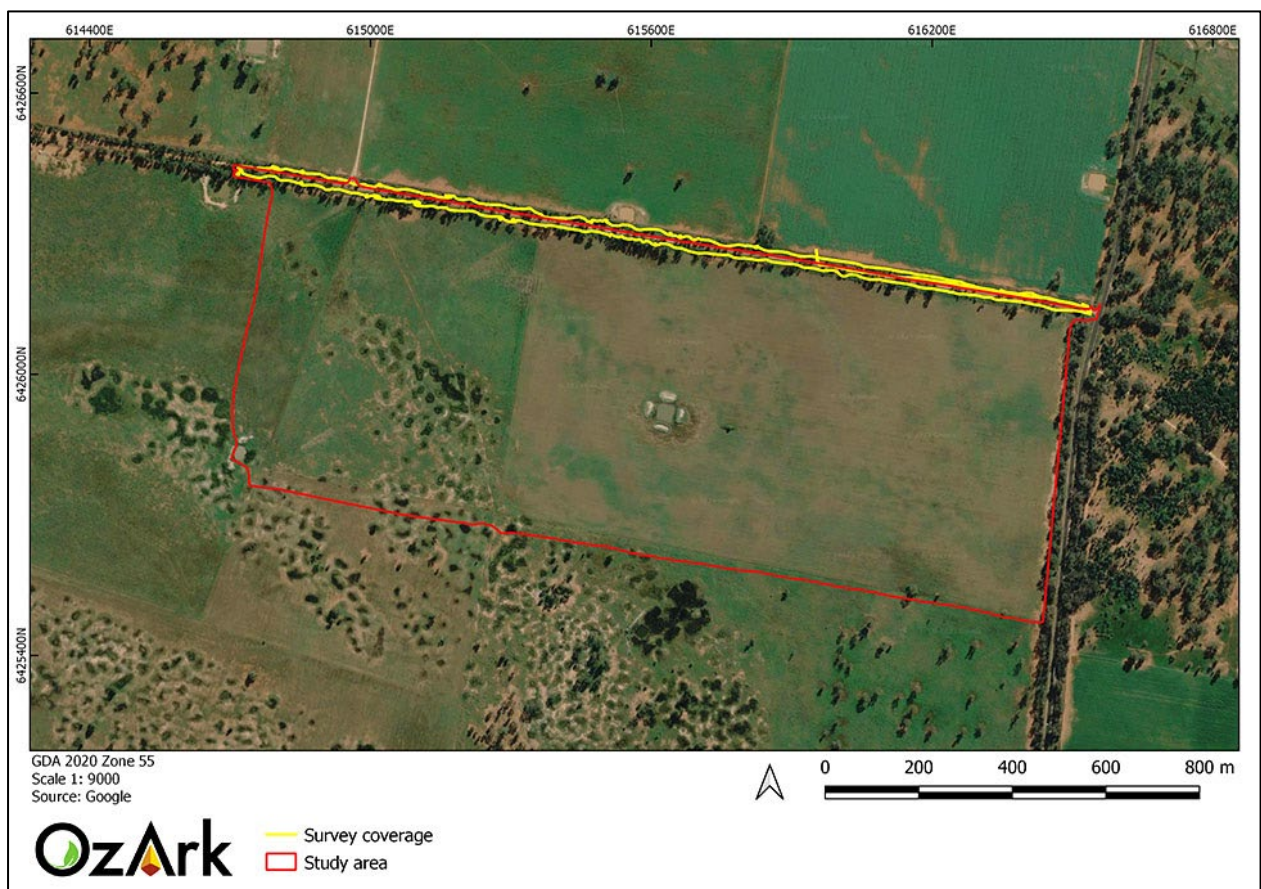
The study area was confirmed as consisting of flat plains landform with remnant mature vegetation (**Plate 1** and **Plate 2**).

Species of grey and Bimble box remain within the road corridor at the northern end of the study area. Many of these trees have been scarred by naturally occurring processes, however no vegetation displayed comprehensive signs of cultural modification (**Plate 3**).

Ground cover consisted of long grasses and weeds which greatly reduced the level of ground surface exposure (GSE) within the study area to around (0-10%). Areas of exposure which had been trampled by wild animals allowed for marginally increased ground surface visibility (GSV) to approximately 10-15% (**Plate 4**).

The visual inspection did not record any Aboriginal sites or landforms with subsurface archaeological potential. The lack of archaeological potential is based on the undifferentiated nature of the landform and lack of resources (i.e. water) which would have attracted occupation by Aboriginal people.

Figure 2-5: Survey coverage along the northern boundary of the study area.



2.4 CONCLUSION

The due diligence process has resulted in the outcome that an Aboriginal Heritage Impact Permit (AHIP) is not required. The reasoning behind this determination is set out in **Table 2-3**.

Table 2-3: Due Diligence Code of Practice application.

Step	Reasoning	Answer
Step 1 Will the activity disturb the ground surface or any culturally modified trees?	The proposed works will disturb the ground surface through earthworks associated with the construction of maintenance and storage facilities. The proposal may impact mature, native vegetation and therefore could harm culturally modified trees if present.	Yes
If the answer to Step 1 is 'yes', proceed to Step 2		
Step 2a Are there any relevant records of Aboriginal heritage on AHIMS to indicate presence of Aboriginal objects?	AHIMS indicated that there are no Aboriginal sites within the study area.	No
Step 2b Are there other sources of information to indicate presence of Aboriginal objects?	There are no other sources of information to indicate that Aboriginal objects are likely in the study area.	No
Step 2c Will the activity impact landforms with archaeological sensitivity as defined by the Due Diligence Code?	Landforms with identified archaeological sensitivity are not present within the study area and will therefore not be harmed by the proposal, however the proponent has elected complete a visual inspection of the trees along the northern boundary of the study area to ensure culturally modified trees are not present.	No
If the answer to any stage of Step 2 is 'yes', proceed to Step 3		
Step 3 Can harm to Aboriginal objects listed on AHIMS or identified by other sources of information and/or can the carrying out of the activity at the relevant landscape features be avoided?	The proposal will not impact landforms with archaeological sensitivity or harm known Aboriginal objects. However, the proponent has elected to proceed to Step 4 to inspect vegetation in the northern boundary of the study area.	Yes
If the answer to Step 3 is 'no', a visual inspection is required. Proceed to Step 4.		
Step 4 Does the visual inspection confirm that there are Aboriginal objects or that they are likely?	The visual inspection recorded no Aboriginal objects, culturally modified trees, or areas of PAD within the study area. Landforms identified at a desk-top level were found during the inspection to have low archaeological potential.	No
Conclusion		
AHIP not necessary. Proceed with caution.		

3 MANAGEMENT RECOMMENDATIONS

The undertaking of the due diligence process resulted in the conclusion that the proposed works will have an impact on the ground surface, however, no Aboriginal objects or intact archaeological deposits will be harmed by the proposal. This moves the proposal to the following outcome:

Aboriginal Heritage Impact Permit application not necessary. Proceed with caution. If any Aboriginal objects are found, stop work, and notify Heritage NSW (02) 9873 8500 (heritagemailbox@environment.nsw.gov.au). If human remains are found, stop work, secure the site and notify NSW Police and Heritage NSW.

To ensure the greatest possible protection to the area's Aboriginal cultural heritage values, the following recommendations are made:

- 1) The proposed work may proceed at the study area without further archaeological investigation under the following conditions:
 - a) All land and ground disturbance activities must be confined to within the study area, as this will eliminate the risk of harm to Aboriginal objects in adjacent landforms. Should the parameters of the proposal extend beyond the assessed areas, then further archaeological assessment may be required.
 - b) All staff and contractors involved in the proposed work should be made aware of the legislative protection requirements for all Aboriginal sites and objects.
- 2) This assessment has concluded that there is a low likelihood that the proposed work will adversely harm Aboriginal cultural heritage items or sites. If during works, however, Aboriginal artefacts or skeletal material are noted, all work should cease and the procedures in the *Unanticipated Finds Protocol* (**Appendix 2**) should be followed.
- 3) Inductions for work crews should include a cultural heritage awareness procedure to ensure they recognise Aboriginal artefacts (**Appendix 3**) and are aware of the legislative protection of Aboriginal objects under the National Parks & Wildlife Act 1974 and the contents of the *Unanticipated Finds Protocol*.
- 4) The information presented here meets the requirements of the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*. It should be retained as shelf documentation for five years as it may be used to support a defence against prosecution in the event of unanticipated harm to Aboriginal objects.

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PLATES



Plate 1: View west across the southern corridor of Craigie Lea Lane.



Plate 2: View east along the southern corridor of Craigie Lea Lane.



Plate 3: View of natural scarring on mature native vegetation (likely caused by birds).



Plate 4: View of low GSV within the study area.

APPENDIX 1: AHIMS SEARCH RESULTS

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 3799

Client Service ID : 764836

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
35-3-0206	GDM 1	GDA	55	614373	6429946	Open site	Valid	Artefact : 1		
	Contact	Recorders	Cultural Heritage Connections Pty Ltd, Mr. Benjamin Street							
35-3-0183	TNWP-ST27	AGD	55	617840	6424831	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Doctor, Jodie Benton							
35-3-0182	TNWP-ST26	AGD	55	618563	6424489	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Doctor, Jodie Benton							
35-3-0296	Narramine South IF5	GDA	55	614735	6425373	Open site	Valid	Artefact : -		
	Contact	Recorders	Jacobs Group (Australia) Pty Ltd - Newcastle, Ms. Alison Lamond							
35-3-0207	GDM 2	GDA	55	614370	6430118	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Cultural Heritage Connections Pty Ltd, Mr. Benjamin Street							
35-3-0013	Wallaby Ranges;	AGD	55	616084	6422257	Open site	Valid	Modified Tree (Carved or Scarred) : - Burial : -	Burial/s, Carved Tree	65
	Contact	Recorders	David Bell							
35-3-0299	MDC AS01	GDA	55	613198	6426474	Open site	Valid	Artefact : -		
	Contact	Recorders	Artefact - Cultural Heritage Management - Pyrmont, Mr. Michael Lever							
35-3-0208	GDM 3	GDA	55	614423	6430236	Open site	Valid	Artefact : 1		
	Contact	Recorders	Ms. Vanessa Hardy, Cultural Heritage Connections Pty Ltd							
35-3-0291	Craigie Lea OS-1	GDA	55	612824	6424674	Open site	Valid	Artefact : -		
	Contact	Recorders	OzArk Environmental and Heritage Management - Dubbo, Miss. Taylor							
35-3-0294	Narramine South IF1	GDA	55	614230	6425544	Open site	Valid	Artefact : -		
	Contact	Recorders	Jacobs Group (Australia) Pty Ltd - Newcastle, Ms. Alison Lamond							
35-3-0298	Narramine South AS7	GDA	55	615441	6425184	Open site	Valid	Artefact : -		
	Contact	Recorders	Jacobs Group (Australia) Pty Ltd - Newcastle, Ms. Alison Lamond							
35-3-0185	TNWP-ST29	AGD	55	616091	6422297	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Doctor, Jodie Benton							
35-3-0186	TNWP-ST30	AGD	55	616357	6424080	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Doctor, Jodie Benton							

Report generated by AHIMS Web Service on 17/03/2023 for Jordan Henshaw for the following area at Datum : GDA, Zone : 55, Eastings : 610694.0 - 620637.0, Northings : 6420967.0 - 6430960.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 24

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 3799

Client Service ID : 764836


SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
35-3-0011	Narramine	AGD	55	616948	6427656	Open site	Valid	Modified Tree (Carved or Scarred) : -, Burial : -	Burial/s, Carved Tree	65
	Contact	Recorders	David Bell, R. Etheridge, T. Elliot, E. Milne, Euromedha Dick							
35-3-0181	TNWP-ST25	AGD	55	619386	6424375	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Doctor, Jodie Benton							
35-3-0297	Narramine South AS6	GDA	55	615449	6425224	Open site	Valid	Artefact : -		
	Contact	Recorders	Jacobs Group (Australia) Pty Ltd - Newcastle, Ms. Alison Lamond							
35-3-0295	Narramine South IF4	GDA	55	614614	6425327	Open site	Valid	Artefact : -		
	Contact	Recorders	Jacobs Group (Australia) Pty Ltd - Newcastle, Ms. Alison Lamond							
35-3-0293	Narramine South IF2	GDA	55	614394	6425347	Open site	Valid	Artefact : -		
	Contact	Recorders	Jacobs Group (Australia) Pty Ltd - Newcastle, Ms. Alison Lamond							
35-3-0292	Narramine South IF3	GDA	55	614586	6425332	Open site	Valid	Artefact : -		
	Contact	Recorders	Jacobs Group (Australia) Pty Ltd - Newcastle, Ms. Alison Lamond							
35-3-0140	N-ST-1	AGD	55	617010	6430650	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	4340
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd							
35-3-0184	TNWP-ST28	AGD	55	617250	6424944	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Doctor, Jodie Benton							
35-3-0145	MD36	AGD	55	618870	6430530	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Navin Officer Heritage Consultants Pty Ltd							
35-3-0012	Wallaby Creek	AGD	55	618826	6422191	Open site	Valid	Modified Tree (Carved or Scarred) : -, Burial : -	Burial/s, Carved Tree	65
	Contact	Recorders	David Bell, R. Etheridge							
35-3-0180	TNWP-ST24	AGD	55	619467	6424356	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Doctor, Jodie Benton							

Report generated by AHIMS Web Service on 17/03/2023 for Jordan Henshaw for the following area at Datum : GDA, Zone : 55, Eastings : 610694.0 - 620637.0, Northings : 6420967.0 - 6430960.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 24

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AHIMS Web Services (AWS)
 Extensive search - Site list report

Your Ref/PO Number : 3799
 Client Service ID : 764036

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	Site Features	Site Types	Reports

**** Site Status**

Valid - The site has been recorded and accepted onto the system as valid

Destroyed - The site has been completely impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There is nothing left of the site on the ground but proponents should proceed with caution

Partially Destroyed - The site has been only partially impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There might be parts or sections of the original site still present on the ground

Not a site - The site has been originally entered and accepted onto AHIMS as a valid site but after further investigations it was decided it is NOT an aboriginal site. Impact of this type of site does not require permit, but if Heritage NSW should be notified

Report generated by AHIMS Web Service on 17/03/2023 for Jordan Howshaw for the following area at Datum: GDA, Zone: 55, Eastings: 610694.0 - 620637.0, Northings: 6420967.0 - 6430960.0 with a Buffer of 0 meters. Number of Aboriginal sites and Aboriginal objects found is 24

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APPENDIX 2: ABORIGINAL HERITAGE: UNANTICIPATED FINDS PROTOCOL

An Aboriginal artefact is anything which is the result of past Aboriginal activity. This includes stone (artefacts, rock engravings etc.), plant (culturally scarred trees) and animal (if showing signs of modification; i.e. smoothing, use). Human bone (skeletal) remains may also be uncovered while onsite.

Cultural heritage significance is assessed by the Aboriginal community and is typically based on traditional and contemporary lore, spiritual values, and oral history, and may also consider scientific and educational value.

Protocol to be followed if previously unrecorded or unanticipated Aboriginal object(s) are encountered:

1. If any Aboriginal object is discovered and/or harmed in, or under the land, while undertaking the proposed development activities, the proponent must:
 - a. Not further harm the object
 - b. Immediately cease all work at the particular location
 - c. Secure the area to avoid further harm to the Aboriginal object
 - d. Notify Heritage NSW as soon as practical on (02) 9873 8500 (heritagemailbox@environment.nsw.gov.au), providing any details of the Aboriginal object and its location; and
 - e. Not recommence any work at the particular location unless authorised in writing by Heritage NSW.
2. If Aboriginal burials are unexpectedly encountered during the activity, work must stop immediately, the area secured to prevent unauthorised access and NSW Police and Heritage NSW contacted.
3. Cooperate with the appropriate authorities and relevant Aboriginal community representatives to facilitate:
 - a. The recording and assessment of the find(s)
 - b. The fulfilment of any legal constraints arising from the find(s), including complying with Heritage NSW directions
 - c. The development and implementation of appropriate management strategies, including consultation with stakeholders and the assessment of the significance of the find(s).
4. Where the find(s) are determined to be Aboriginal object(s), recommencement of work in the area of the find(s) can only occur in accordance with any consequential legal requirements and after gaining written approval from Heritage NSW (normally an Aboriginal Heritage Impact Permit).

APPENDIX 3: ABORIGINAL HERITAGE: ARTEFACT IDENTIFICATION

	
A retouched silcrete flake	A quartz flake
	
Microliths (scale = 1 cm)	Volcanic flakes
	
Flake characteristics (scale = 1 cm)	A mudstone/tuff core from which flakes have been removed



APPENDIX D

Biodiversity Site Suitability Assessment



An example of the gilgai formations common throughout the site



OPPORTUNITIES AND CONSTRAINTS REPORT

SITE SUITABILITY ASSESSMENT – NARROMINE FREIGHT HUB

MAY 2023

Report prepared by
OzArk Environment & Heritage
for Barnson Pty Ltd
and the Australian Rail Track Corporation

OzArk Environment & Heritage

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DOCUMENT CONTROLS

Proponent	Australian Rail Track Corporation (ARTC)		
Purchase order number			
Document description	Narromine Site Suitability Assessment (Biodiversity)		
	Name	Signed	Date
Client's reviewing officer			
Client's representative managing this document	OzArk representative managing this document		
	Dr David Orchard (DO)		
Location	OzArk job number		
S:\OzArk EHM Data\Clients\Barnson\Narromine Freight Hub March 2023\Ecology\Reporting	#3799		
Document status: FINAL	Version	Date	Action
Internal Draft Series	V1.0	19/05/2023	DO to CG
	V1.1	19/05/2023	CG to DO
First Draft for Client Review	V2.0	19/05/2023	DO to Client
Final Report for Client	V3.0	31/05/2023	DO to Client
Prepared for	Prepared by		
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Enquiries would be addressed to OzArk Environment & Heritage Pty Ltd.			

Acknowledgement

OzArk acknowledge Traditional Owners of the area on which this assessment took place and pay respect to their beliefs, cultural heritage, and continuing connection with the land. We also acknowledge and pay respect to the post-contact experiences of Aboriginal people with attachment to the area and to the elders, past and present, as the next generation of role models and vessels for memories, traditions, culture and hopes of local Aboriginal people.

ABBREVIATIONS AND GLOSSARY

AOBV	Areas of Outstanding Biodiversity Value
APZ	Asset Protection Zone
ASL	Above Sea Level
BAM	Biodiversity Assessment Methodology
BAR	Biodiversity Assessment Report
BC Act	NSW <i>Biodiversity Conservation Act 2016</i>
BDAR	Biodiversity Development Assessment Report
CBD	Central Business District
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DPIE	NSW Department of Planning, Industry and Environment
EARs	Environmental Assessment Requirements issued by the NSW Department of Planning, Industry and Environment.
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement. A required document for major projects documenting all potential impacts to the environment, including heritage, that may arise due to the development.
EPA Act	NSW <i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
ESCP	Erosion and Sediment Control Plan
FM Act	NSW <i>Fisheries Management Act 1994</i>
GDE	Groundwater Dependent Ecosystem
ha	Hectares
HBT	Hollow Bearing Trees
KFH	Key Fish Habitat
KTP	Key Threatening Process
LEP	Local Environmental Plan
LGA	Local Government Area
mm/cm/m/m ² /km	Millimetres, centimetres, metres, square metres, kilometres
MNES	Matters of National Environmental Significance
NSW	New South Wales
NPW Act	NSW <i>National Parks and Wildlife Act 1974</i>
NPWS	NSW National Parks and Wildlife Service
OEH	Office of the Environment and Heritage. Former government department
PMST	Protected Matters Search Tool
PCT	Plant Community Type
REF	Review of Environmental Factors
RF Act	NSW <i>Rural Fires Act 1997</i>

RoTAP	Rare or Threatened Australian Plant
SEC	Sedimentation Erosion Control
SEPP	State Environmental Planning Policy
TEC	Threatened Ecological Communities
WoNS	Weeds of National Significance

Term	Description
------	-------------

Areas of outstanding biodiversity	<p>An area of outstanding biodiversity value is:</p> <ul style="list-style-type: none"> ○ an area important at a State, national or global scale, and ○ an area that makes a significant contribution to the persistence of at least one of the following: <ul style="list-style-type: none"> i. multiple species or at least one threatened species or ecological community ii. irreplaceable biological distinctiveness iii. ecological processes or ecological integrity iv. outstanding ecological value for education or scientific research. <p>The declaration of an area may relate, but is not limited, to protecting threatened species or ecological communities, connectivity, climate refuges and migratory species (BC Act).</p>
Cumulative impact	<p>The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Refer to Clause 228(2) of the EP&A Regulation 2000 for cumulative impact assessment requirements.</p>
Direct impacts	<p>Are those that directly affect the habitat of species and ecological communities and of individuals using the study area. They include, but are not limited to, death through predation, trampling, poisoning of the animal/plant itself and the removal of suitable habitat (OEH 2018).</p>
Habitat	<p>The area occupied or used, including areas periodically or occasionally occupied or used, by any threatened species or ecological community and includes all the different aspects (both biotic and abiotic) used by species during the different stages of their life cycle (OEH 2018).</p>
Important population	<p>Is a population that is necessary for a species' long-term survival and recovery; this may include populations identified as such in recovery plans, and/or that are:</p> <ul style="list-style-type: none"> ○ key source populations either for breeding or dispersal

Term	Description
	<ul style="list-style-type: none"> ○ populations that are necessary for maintaining genetic diversity, and/or ○ populations that are near the limit of the species range (DE 2013).
Indirect impact	<p>Occur when project-related activities affect species or ecological communities in a manner other than direct loss within the subject site. Indirect impacts may sterilise or reduce the habitability of adjacent or connected habitats. Indirect impacts can include loss of individuals through starvation, exposure, predation by domestic and/or feral animals, loss of breeding opportunities, loss of shade/shelter, reduction in viability of adjacent habitat due to edge effects, deleterious hydrological changes, increased soil salinity, erosion, inhibition of nitrogen fixation, weed invasion, noise, light spill, fertiliser drift, or increased human activity within or directly adjacent to sensitive habitat areas (OEH 2018).</p>
Invasive species	<p>Is an introduced species, including an introduced (translocated) native species, which out-competes native species for space and resources, or which is a predator of native species. Introducing an invasive species into an area may result in that species becoming established. An invasive species may harm listed threatened species or ecological communities by direct competition, modification of habitat or predation.</p>
Local population (in regards to a threatened species)	<p>Comprises those individuals known or likely to occur in the study area, as well as any individuals occurring in adjoining areas (contiguous or otherwise) that are known or likely to utilise habitats in the study area (DECC 2007).</p>
Mitchell landscape	<p>Landscapes with relatively homogeneous geomorphology, soils and broad vegetation types, mapped at a scale of 1:250,000 (OEH 2018).</p>
Mitigation	<p>Action to reduce the severity of an impact.</p>
Mitigation measure	<p>Any measure that prevents, reduces, or controls adverse environmental effects of a project.</p>
Proposal	<p>Is considered to include 'all activities likely to be undertaken within the subject site to achieve the objective of the proposed development' (DECC 2007).</p>

Term	Description
Study area	Means the subject site and any additional areas which are likely to be affected by the proposal, either directly or indirectly (OEH 2018).
Study region	Is considered to 'include the lands that surround the subject site for a distance of 10 km' (DECC 2007).
Subject site	Means the area directly affected by the proposal. The subject site includes the footprint of the proposal and any ancillary works, facilities, accesses, or hazard reduction zones that support the construction or operation of the development or activity (OEH 2018).
Target species	A species that is the focus of a study or intended beneficiary of a conservation action or connectivity measure.

EXECUTIVE SUMMARY

OzArk has been engaged by Barnson Pty Ltd (client) on behalf of the Australian Rail Track Corporation (ARTC; proponent), to conduct a biodiversity site suitability assessment of the proposed site of a freight hub associated with the east-west greenfield take-off point for the Narromine to Narrabri (N2N) rail corridor, on the property “Cragie Lea” near Narromine, NSW. An area of c. 800 ha of this property was assessed in April 2021 (the “initial assessment area”) as part of the N2N programme. Subsequently, an area in the northeastern corner of this property was earmarked for future development of a freight hub by Narromine Shire Council (NSC) and was subjected to additional assessments in April 2023. This area, c. 118 ha in size and including part of the road corridor in Cragie Lea Lane, was defined as the “subject site” of this study. An additional area was noted by the client as having potential for development in future; this area, located to the south of the subject site, has been designated the “future expansion area.” This report addresses ecological constraints within the subject site, with discussion of the future expansion area and data drawn from the initial assessment area where necessary. The terms “subject site”, “future expansion area,” and “initial assessment area” are used throughout to indicate these zones.

Field assessment of the subject site identified five Plant Community Types (PCTs) with a combined area of 118.04 ha:

- PCT 45 – Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion.
- PCT 53 – Shallow freshwater wetland sedgeland in depressions on floodplains on inland alluvial plains and floodplains.
- PCT 82 – Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion.
- PCT 201 – Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion.
- PCT 250 – Derived tussock grassland of the central western plains and lower slopes of NSW.

The most common of these was PCT 250 (“Derived tussock grassland of the central western plains and lower slopes of NSW”), which accounted for 96.32 ha. This community varied in condition from poor to good but retained a significant native component throughout. PCT 45 accounted for 12.56 ha, PCT 53 for 4.07 ha, PCT 82 for 2.67 ha and PCT 201 for 0.70 ha. PCT 201 occurs wholly within the road corridor. Four PCTs (45, 53, 82, and 250) occurred within the future expansion area, which contained 26.37 ha of native vegetation.

Two Threatened Ecological Communities (TECs) were identified within the subject site and one within the future expansion area:

- *Biodiversity Conservation Act 2016* (BC Act), Endangered: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions. (Subject site: 8.79 ha; Future expansion area: 16.62 ha).
- BC Act, Endangered: Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions. (Subject site: 0.70 ha).

A third TEC is considered likely, though survey guidelines recommend that the assessment be conducted in spring:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), Endangered: Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia. (Subject site: 7.86 ha; Future expansion area: 16.62 ha).

Additional areas of these TECs occur on the northern side of the Cragie Lea Lane road corridor. A greater extent of the BC Act-listed Fuzzy Box Endangered Ecological Community (EEC) occurs on this northern side than within the subject site.

One threatened plant species, Bluegrass (*Dichanthium setosum*), was recorded during the field survey. One small population was recorded within the subject site and one larger population within the future expansion area. Four additional populations were recorded within the initial assessment area during surveys in April 2021. This species is listed as vulnerable under the BC and EPBC Acts. As the subject site is located at the southern limit of the known range of this species, this occurrence is likely to constitute an important population. Consequently, impacts to this species may be deemed significant and could therefore trigger entry into the NSW Biodiversity Offsets Scheme (BOS) and/or referral to the Minister under the EPBC Act.

Six threatened fauna species (four birds and two bats) were detected either during the field surveys or by means of recording devices. All six species are listed as vulnerable under the BC Act, while one, the Superb Parrot (*Polytelis swainsonii*), is also listed as vulnerable under the EPBC Act. As these species are highly mobile, they are likely to make use of both the subject site and future expansion area, as well as much of the road corridor.

A total of 175 threatened species or populations are known or predicted to occur within the three IBRA subregions that fall within 10 km of the subject site. Impacts to 81 of these may occur as a result of clearing of the subject site. Clearing of the future expansion area may result in impacts to 67 of these species. Impacts to up to 42 species identified by a Matters of National Environmental Significance search may result from future development within these areas. Tests of significance have not been conducted for these species; consequently, it cannot be stated with certainty whether these impacts would be significant. In the case of many species, particularly marine and migratory species, the impacts are likely to be negligible.

The field survey identified 44 hollow-bearing trees (42 live and two dead) within the subject site and an additional six (all live) within the future expansion area (**Figure 5-1**). Hollows were classed as either small (< 20 cm diameter) or large (\geq 20 cm diameter) to provide an indication of the species most likely to make use of them. The trees within the subject site contained a total of 28 large and 99 small hollows, as well as one stick nest. Six habitat trees (all live) were recorded within the future expansion area, containing a total of one large and 14 small hollows. Additional habitat trees containing nests and hollows were recorded in the northern side of the road corridor and outside of the western limit of the subject site within the southern road corridor.

The most significant identified constraints associated with any proposal situated in the subject site or future expansion area are the relatively large areas of TEC that would be impacted and the presence of the threatened Bluegrass. Efforts to reduce impacts to these entities are strongly encouraged in order for future development to comply with the requirement to avoid and/or minimise impacts to biodiversity values.

This report covers the current form of the proposal and is intended only to assess constraints and limitations within the proposal site. It does not constitute a finalised biodiversity assessment.

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1 INTRODUCTION

1.1 BRIEF DESCRIPTION OF WORKS

OzArk Environment & Heritage (OzArk) has been engaged by Barnson Pty Ltd (the client), on behalf of Australian Rail Track Corporation (ARTC, the proponent) to undertake a biodiversity site suitability assessment of the proposed site of a freight hub associated with the east-west greenfield take-off point for the Narromine to Narrabri (N2N) rail corridor, on the property “Cragie Lea” near Narromine, NSW. An area of c. 800 ha of this property was assessed in April 2021 (“initial assessment area”) as part of the N2N programme. Subsequently, an area in the northeastern corner of this property was earmarked for future development of a freight hub and was subjected to additional assessments in April 2023. This area, c. 118 ha in size and including part of the road corridor in Cragie Lea Lane, was defined as the “subject site” of this study. An additional area was noted by the client as having potential for development in future; this area, located to the south of the subject site, has been designated the “future expansion area.” This report addresses ecological constraints within the subject site, with discussion of the future expansion area and data drawn from the initial assessment area where necessary.

This assessment was conducted by means of database searches and field surveys. The methodologies employed in conducting this assessment are described in **Section 3**.

1.2 STUDY AREA AND RELEVANT TERMS

The proposal is in the Narromine Local Government Area (LGA). The study area is shown in **Figure 1-1**.

The following terms are used in this report to describe and contextualise the development location (see **Figure 1-1**):

- Search area – the area within a 10 km radius of the subject site. This 10 km buffer has been used to search information sources to establish the landscape context of the subject site.
- Study area – the area within a 1,500 m radius of the subject site.
- Subject site – the footprint of the proposal and the area directly affected by development activities.
- Initial assessment area – an area of approximately 800 ha, comprising the property Cragie Lea east of the existing railway line, that was surveyed by means of a rapid assessment method in April 2021.
- Future expansion area – an area of approximately 30 ha adjacent to the subject site on its southern edge, earmarked for potential future development.

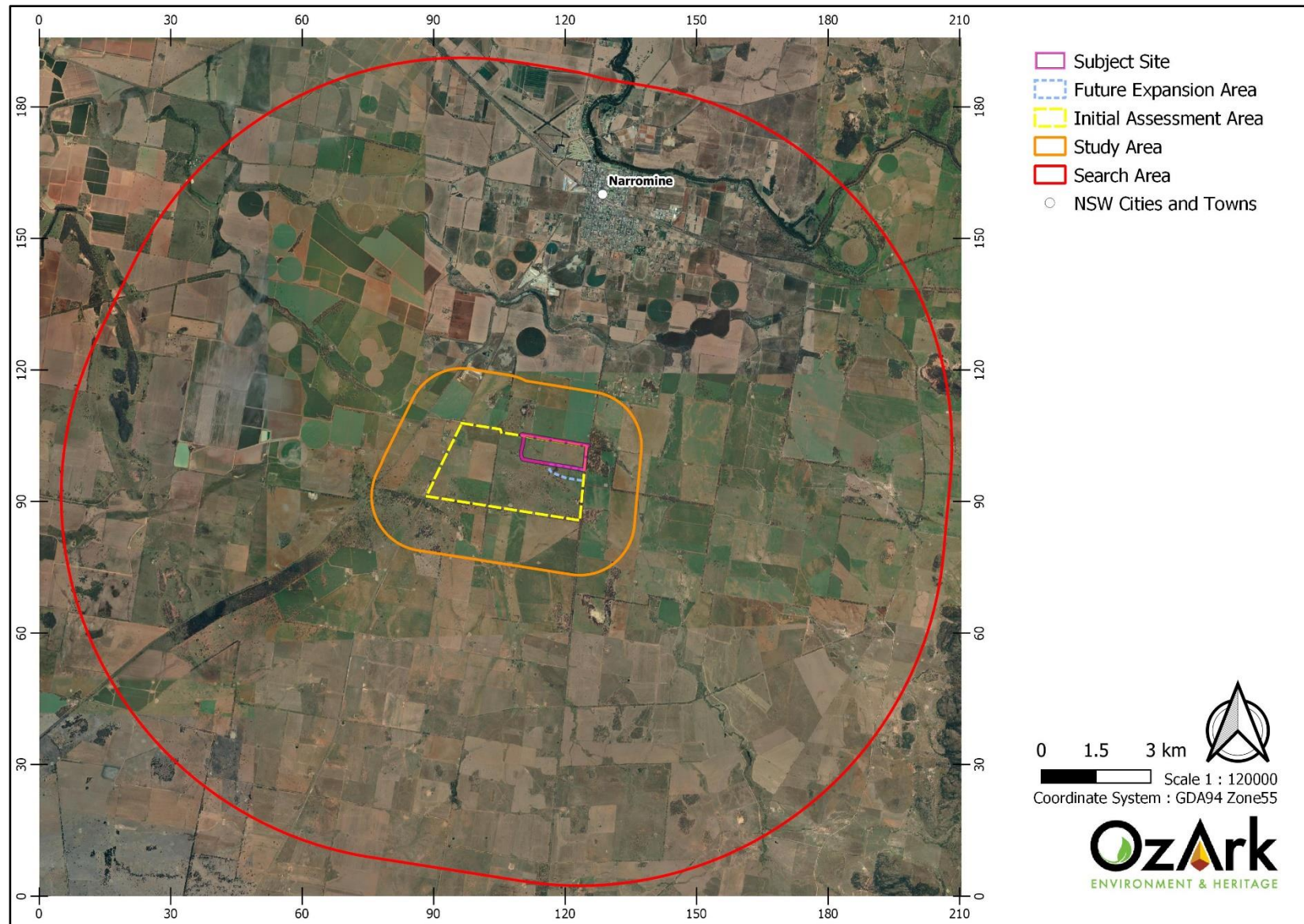


Figure 1-1. Regional location of the subject site and future expansion area.

2 STATUTORY AND PLANNING CONTEXT

2.1 COMMONWEALTH LEGISLATION

2.1.1 Environment Protection & Biodiversity Conservation Act 1999 (EPBC Act)

To assist with assessments of nationally listed matters, the Matters of National Environmental Significance: Significant impact guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1999 (DoE 2013) are followed.

Birds listed in the following international agreements are regarded as migratory birds under the EPBC Act.

- China-Australia Migratory Bird Agreement (CAMBA).
- Japan-Australia Migratory Bird Agreement (JAMBA).
- Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

Matters which fall under this legislation are addressed in **Section 5.6** and **Appendix D**.

2.2 STATE LEGISLATION

2.2.1 Environmental Planning and Assessment Act 1979 (EP&A Act)

The EP&A Act is the principal planning legislation for NSW. It provides a framework for the overall environmental planning and assessment of proposals.

Part 5 of this Act requires that a determination be made as to whether a proposed action is likely to significantly affect threatened species or ecological communities, or their habitats listed on Schedule 1 and 2 of the BC Act. Where found, the assessment criteria under Part 7 Section 7.3 of the BC Act (the 'Assessment of Significance') will be drawn upon to determine whether there would be a significant effect on these species and hence whether a Species Impact Statement or Biodiversity Development Assessment Report is required.

2.2.2 Biodiversity Conservation Act 2016 (BC Act)

The BC Act relates to the terrestrial environment and includes threatened species, ecological communities, key threatening processes and other protected animals and plants.

Section 7.3 of the BC Act contains a five-part test of significance for determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats.

Where a significant impact is likely to occur, the proponent must either opt in to the BOS and prepare a BDAR or prepare a SIS for each significantly impacted BC Act-listed entity.

BC Act-listed communities are addressed in **Section 5.4**. BC Act-listed species are addressed in **Sections 6.1.2.** and **6.1.3.**

2.2.3 Biodiversity Offsets Scheme

Under the BC Act, the Biodiversity Offsets Scheme (BOS) applies to Part 4 developments when clearing thresholds identified in Part 7 of the NSW Biodiversity Conservation Regulation 2017 are exceeded or when a significant impact to a threatened entity is identified. The BOS applies automatically to State Significant Developments (SSDs). For Part 5 activities, entry into the BOS is only triggered if proponents “opt in” to it or if a significant impact to a threatened entity is identified.

The clearing limit that, when exceeded, triggers BOS requirements varies with the minimum lot size associated with the development site. The largest clearing threshold is 2 ha, which applies when the minimum lot size is 1000 ha or more.

If assessed as a Part 4 activity, this proposal would trigger entry into the BOS. If assessed as a Part 5 activity, entry would only be triggered if the proponent opted in, or a significant impact to a threatened species was identified (see **Section 5.4.14** and **Section 5.5**).

2.2.4 NSW Biosecurity Act 2015

The Biosecurity Act aims to manage biosecurity risks from animal and plant pests and diseases, weeds and contaminants in NSW. The Biosecurity Act imposes a general biosecurity duty to ensure that, so far as is reasonably practicable, any biosecurity risk is prevented, eliminated or minimised. The proponent is required to manage the presence of weeds in the study area.

2.2.5 Local Land Services Act 2013

The objects of the Act include ‘to ensure the proper management of natural resources in the social, economic and environmental interests of the State, consistently with the principles of ecologically sustainable development. The Act regulates the clearing of native vegetation.

2.2.6 Fisheries Management Act 1995 (FM Act)

Part 7A of the FM Act and schedules within the Act list threatened aquatic and marine species, populations and ecological communities and key threatening processes which must be considered as part of obligations under Section 5.5 of the EP&A Act.

Section 199 of the FM Act states a public authority must notify the Minister of the NSW Department of Primary Industries – Fisheries (DPI – Fisheries) for any work that constitutes dredging or reclamation in a waterway.

Under section 198A of the FM Act:

"water land" means land submerged by water:

(a) whether permanently or intermittently, or

(b) whether forming an artificial or natural body of water,

and includes wetlands and any other land prescribed by the regulations as water land to which this Division applies.

No impacts to watercourses are expected to result from this proposal (see **Section 4.4**).

2.2.7 Narromine Local Environmental Plan (2011)

A Local Environmental Plan (LEP) is a legal document prepared by Council and approved by the State Government to regulate land use and development. LEPs guide planning decisions for local governments. The plan allows Council to regulate the ways in which all land both private and public may be used and protected through zoning and development controls.

The Narromine LEP (2011) aims:

(aa) to protect and promote the use and development of land for arts and cultural activity, including music and other performance arts,

(a) to encourage economic development through tourism activities, business, employment initiatives and fostering industry growth,

(b) to protect and conserve the natural environment including surface and ground water, soil, air and native vegetation by encouraging sustainable development,

(c) to encourage sustainable agricultural practices, including intensive agriculture, by minimising land use conflicts and facilitating farm adjustments.

The initial assessment area contains large areas mapped as sensitive for terrestrial biodiversity in the LEP (**Appendix A**). The subject site extends in places into these sensitive areas.

2.3 STATE ENVIRONMENTAL PLANNING POLICIES UNDER THE EP&A ACT 1979

2.3.1 State Environmental Planning Policy (Transport and Infrastructure) 2021

The Transport and Infrastructure SEPP aims to facilitate the effective delivery of infrastructure across the state, including for railroads and rail infrastructure facilities. It permits development on any land for the purpose of certain rail or rail infrastructure facilities to be carried out by or on behalf of a public authority without consent.

The proposal is not located on land reserved under the *National Parks and Wildlife Act 1974* and does not require development consent or approval under *SEPP (Resilience and Hazards) 2021*, *SEPP (Precincts - Regional) 2021* or *SEPP (Planning Systems) 2021*.

2.3.2 State Environmental Planning Policy (Biodiversity and Conservation) 2021

The *State Environmental Planning Policy (Biodiversity and Conservation) 2021* (Biodiversity and Conservation SEPP) consolidates, transfers and repeals provisions of 11 SEPPs, the following of which are the relevant to the current assessment:

- *State Environmental Planning Policy (Koala Habitat Protection) 2020*, and
- *State Environmental Planning Policy (Koala Habitat Protection) 2021*.

Chapters 3 and 4 of the Biodiversity and Conservation SEPP aims to encourage the 'proper conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline'. The Narromine LGA is included in Schedule 2 of the SEPP and hence is subject to the requirements of the SEPP. As the subject site falls on land zoned RU1 – Primary Production within the Narromine Shire Council Local Government Area, the provisions of Chapter 3 of the SEPP apply to any future developments. This requires a consideration of whether the site constitutes potential or core Koala habitat. Potential Koala habitat is defined as areas of native vegetation in which trees listed in Schedule 1 of the SEPP make up 15% or more of the total number of trees. This is likely to apply to certain occurrences of PCT 82 within the road reserve of Cragie Lea Lane, which contain one listed tree, Poplar Box (*Eucalyptus populnea* subsp. *bimbi*). Core Koala habitat refers to areas with extant populations of the Koala, as evidenced by 'breeding females, being females with young, and recent sightings of and historical records of a population.' One historical record (dating to 2004) occurs within the 10 km search area, located c. 1.4 km north of the subject site. It is unlikely that this would be taken to represent evidence of a resident population within the subject site; however, assessments of any future development should involve consideration of the potential impacts of any proposal on the Koala.

3 METHODS

The ecological assessment was carried out in three principal stages:

1. Desktop searches and a review of ecological databases and information to identify threatened species, populations or ecological communities listed in the BC, FM and EPBC Acts that have the potential to occur in the study area.
2. Field surveys of the subject site to collate species lists for the purposes of identifying the vegetation communities present and target predicted threatened species and ecological communities. Where a threatened species or community or habitat feature was identified, the nature and extent of the protected matter was documented and its 'viable local population' or occurrence described.
3. Preparation of this opportunities and constraints report to describe the potential impacts of the proposed activity on native vegetation, protected species, and threatened species, populations, and ecological communities, and provides recommendations to avoid, minimise and mitigate these impacts.

3.1 PROJECT PERSONNEL

OzArk Environment and Heritage Pty Ltd (OzArk) operates under NSW Scientific Research License 101908, and NSW Department of Primary Industries (DPI) Accreditation of a corporation as an animal research establishment Ref No. AW2022/012.

The initial field survey in April 2021 was completed by OzArk Ecologist Dr David Orchard and former OzArk Ecologist Maddy Walsh. Subsequent field surveys (April 2023) and reporting components were completed by Dr David Orchard, with quality control provided by Senior Ecologist Dr Crystal Graham. Key details of personnel are provided in **Table 3-1**.

Table 3-1. Project Personnel.

Name	Position and role	CV Details
Dr Crystal Graham	Senior Ecologist <ul style="list-style-type: none"> Quality control 	<ul style="list-style-type: none"> BAM-accredited Assessor #BAAS22024 Postdoctoral Fellow – Smithsonian Tropical Research Institute Doctor of Philosophy (Biology) – University of Sydney Honours in Biology – University of Sydney Bachelor of Advanced Science – University of Sydney 4WD Training First Aid Training WH&S Induction Training for Construction Work Worker at Heights Training
Dr David Orchard	Ecologist <ul style="list-style-type: none"> Initial and subsequent surveys Reporting 	<ul style="list-style-type: none"> BAM-accredited Assessor #BAAS21028 Doctor of Philosophy (Agriculture) – Charles Sturt University Graduate Diploma in Science (Botany) – University of New England Bachelor of Arts (Honours)– Australia National University

		<ul style="list-style-type: none"> • First Aid Training • WH&S Induction Training for Construction Work • Rail Industry Worker Card
Madeline Walsh	Ecologist <ul style="list-style-type: none"> • Initial survey 	<ul style="list-style-type: none"> • Bachelor of Environmental Biology – University of Technology Sydney • Honours – Ecology – University of New South Wales • First Aid Training • WH&S Induction Training for Construction Work

3.2 BACKGROUND RESEARCH

Preliminary assessments drew on local experience, previous reporting and information held in government databases and archives. Results of database searches were used to assist in identifying distributions, suitable habitats and known records of threatened species to increase the effectiveness of field investigations. Information sources reviewed included the following:

- NSW Government online aerial imagery (www.maps.six.nsw.gov.au).
- Critical habitat register available on the OEH website at <http://www.environment.nsw.gov.au/criticalhabitat/CriticalHabitatProtectionByDoctype.htm>
- NSW Government Biodiversity Values Map which identifies land with high biodiversity value, as defined by the Biodiversity Conservation Regulation 2017 (<https://www.lmbc.nsw.gov.au>).
- Flora and fauna records and profiles contained in the NSW Threatened Species Database, EPBC Protected Matters Search Tool and DPI threatened fish distribution maps.
- BioNet (www.bionet.nsw.gov.au) Wildlife Atlas and Plant Community Type (VIS) databases.
- Flora of NSW (Harden 1991-2002) and Flora NSW Online (www.plantnet.rbgsyd.nsw.gov.au).
- Regional Scale State Vegetation Map: Central West/Lachlan V1.4. (OEH, 2016)
- Prior assessments of relevant sections of N2N (ARTC 2020)

Database searches were undertaken before the field assessment to identify species known or predicted to occur in the subject site, including those with prior public records within 10 km. The results of these searches led to the identification of key species for field survey effort and targeted searches. Results of the database searches are provided in **Appendix A**.

A series of other background searches were performed to comply with legal standards (**see Table 3-2**).

Table 3-2. Desktop Survey Results

Environmental Considerations	In the study area?
Land identified on the Biodiversity Values Map under the <i>NSW BC Act 2016</i>	Within Study Area but not Subject Site
Area of Outstanding Biodiversity Value (AOBV) under the <i>NSW BC Act 2016</i>	No
Critical habitat nationally?	No
An area reserved or dedicated under the <i>National Parks and Wildlife Act 1974</i> ?	No
Is the proposal located within land reserved or dedicated within the meaning of the <i>Crown Lands Act 1989</i> for preservation of other environmental protection purposes?	No
A World Heritage Area?	No
Environmental Protection Zones in environmental planning instruments?	No
Lands protected under SEPP (Biodiversity and Conservation) 2021	Yes
Lands protected under SEPP Sydney Drinking Water Catchment?	No
Land identified as wilderness under the <i>Wilderness Act 1987</i> or declared as wilderness under the <i>National Parks and Wildlife Act 1974</i> ?	No
Aquatic reserves dedicated under the <i>Fisheries Management Act 1994</i> ?	No
FM Act listed Threatened Ecological Community?	No
Wetland areas dedicated under the Ramsar Wetlands Convention?	No
Land subject to a conservation agreement under the <i>National Parks and Wildlife Act 1974</i> ?	No
Land identified as State Forest under the <i>Forestry Act 1916</i> ?	No
Acid sulphate area?	No
Protected riparian habitat?	No
Mapped Key Fish Habitat?	No

3.3 HABITAT ASSESSMENT

The results of the desktop review and the field assessment were collated and reviewed in the context of local ecological knowledge to determine the likelihood of occurrence of threatened species and ecological communities, and potential impacts of the proposal (**Section 6** and **Appendix D**). For instance, some threatened species may be predicted to occur locally but, on assessment of the site, key habitat elements or conditions are not present, in which case the species would not be present or impacted. Species known or considered to have a moderate-high likelihood of occurring at the site, were then considered as to whether the extent and type of development would be likely to impact on them.

3.4 FIELD SURVEY

The initial field survey was conducted on April 22 and 23, 2021. The survey was conducted between the hours of 0830 and 1530 on April 22 and between the hours of 0900 and 1300 on

April 23. A third site visit was conducted on May 10 to collect the data recorders. This visit took place between the hours of 1430 and 1600 and entailed minor additional survey work.

Additional surveys were conducted in April 2023 to provide more detailed information regarding the proposed site of a freight hub and the associated road corridor. These surveys were conducted on April 3 between 1230 and 1530 and on April 26 between 1300 and 1530.

The objectives of the field survey were to:

- Identify native species and vegetation communities present.
- Identify the presence of any hollow-bearing habitat trees.
- Describe the quality and value of the vegetation and the flora and fauna habitat at the development site.
- Determine if species, populations or ecological communities listed as threatened under the BC Act or EPBC Act are/may be present.
- Determine the significance of impact to any threatened entities present or likely to be present.

3.4.1 Vegetation Community Survey

Vegetation communities were identified in accordance with the online NSW Master Plant Community Type Classification (OEH, 2018a), which is the current state-wide vegetation classification system for PCTs. This classification system is used for vegetation mapping, development assessment and site planning purposes. It describes over 1,500 PCTs across the state, and groups the vegetation communities into vegetation Class and Formation / Sub-formation as per Keith (2004).

In this study PCTs were identified on the basis of the following inputs:

- Regional scale State Vegetation Map: Central West / Lachlan V1.4. (OEH, 2016), which provides predictive mapping of PCTs in and around the subject site. This mapping is indicative only. It is not necessarily accurate at a fine scale for the purposes of the current study.
- State Vegetation Type Map C1.1.M1.1 (DPE, 2022). More recent mapping published after the initial survey. Similar caveats concerning the accuracy of the mapping apply to this dataset.
- Professional ecological knowledge about locally occurring vegetation types and landscape, soil and topographic patterns, including transitions from one community to another and potential for intergrades between plant communities.
- Field survey results confirming the flora species present, vegetation structure, landscape position and soil type at the subject site and the extent and condition of native vegetation.

- Reference to the BioNet Vegetation Classification database, this being used to identify the candidate vegetation communities likely to be present based on the site conditions (flora species present, vegetation structure, bioregion, and landscape position and soil type) and to access the relevant published PCT descriptions.

If any of the PCTs were identified as having potential to be part of a TEC, the relevant identification guidelines (NSW Scientific Committee listing criteria and Commonwealth identification guides) were consulted to determine the status of the vegetation community present on the subject site. These guidelines provide the identification criteria used to positively identify the community as being part of the TEC. The criteria include location, species present, overstorey species, weed cover, number and type of native species including whether certain 'important' native species are present.

Plant identification followed nomenclature in the Royal Botanic Gardens PlantNET online database (Royal Botanic Gardens and Domain Trust, 2023).

3.4.2 Vegetation Survey Methodology

The vegetation survey was conducted according to the following methodology:

- A 20 x 20 m plot was surveyed at each putative PCT location. Single plots were employed for small communities and multiple plots were employed where communities occupied larger areas. Plot size was adjusted to suit the extent of each PCT remnant.
- A total species list was compiled at each plot location.
- The dominant species within each stratum were recorded so as to aid in defining the community type.
- General notes were made at each plot relating to the following traits:
 - Vegetative age class.
 - Level of invasion by exotic species.
 - Leaf litter density.
 - Presence of rock outcrops.
 - Presence of fallen timber.
 - Culverts.
 - Traces and signs of fauna.
 - Soil erosion.
 - Impacts by fauna such as grazing.
- The PCT examples were located within or adjacent to the subject site and their GPS locations recorded (GDA 94 / MGA Zone 55).

- Vehicular and pedestrian traverses were used to determine the boundaries or transition points between PCTs and to record any additional plant species not observed in the survey plots.

3.4.3 Fauna Surveys

Those fauna species present within or close to the subject site were recorded while conducting the botanical survey and while traversing the areas of likely impact searching for habitat trees. Areas of potential habitat, such as rocks, loose bark and coarse woody debris, were examined for cryptic species. Areas of exposed earth and other sites that supported suitable substrate were searched for animal tracks. Other evidence of fauna presence on the subject site, such as scats, feathers and sloughed skins, were also recorded. Two song meters and two bat detectors were used to identify additional species making use of the subject site. These recording devices gathered data between April 22 and May 10, 2021. These recorders were located in the initial assessment area and not within the subject site that has since been assigned. Analysis of data from these recording devices was carried out by Lesryk Environmental. The location of the recorders is indicated in **Figure 3-1** below.

3.5 LIMITATIONS

This report is based upon the species data available at the time of the study, and the environmental conditions, season, and time constraints imposed by the project for the field survey. Specific limitations on this study include the following:

- All surveys were conducted in April, at which time many plant species are unlikely to be in flower and may not produce aboveground material for identification. Thus, flora lists should not be regarded as comprehensive.
- Certain specific fauna survey techniques (e.g. trapping and frog surveys) were not undertaken.
- The field survey was undertaken in the subject site and initial assessment area only and plant community type extents outside of the study area were not confirmed.

To overcome some of these limitations, a 'precautionary approach' for species presence has been adopted where required. If suitable habitat for a particular threatened species is present on the site or known to occur in the study area, then the species is assumed to also be present. The above-mentioned constraints were also considered when preparing the recommendations of avoiding, minimising, and mitigating potential impacts.

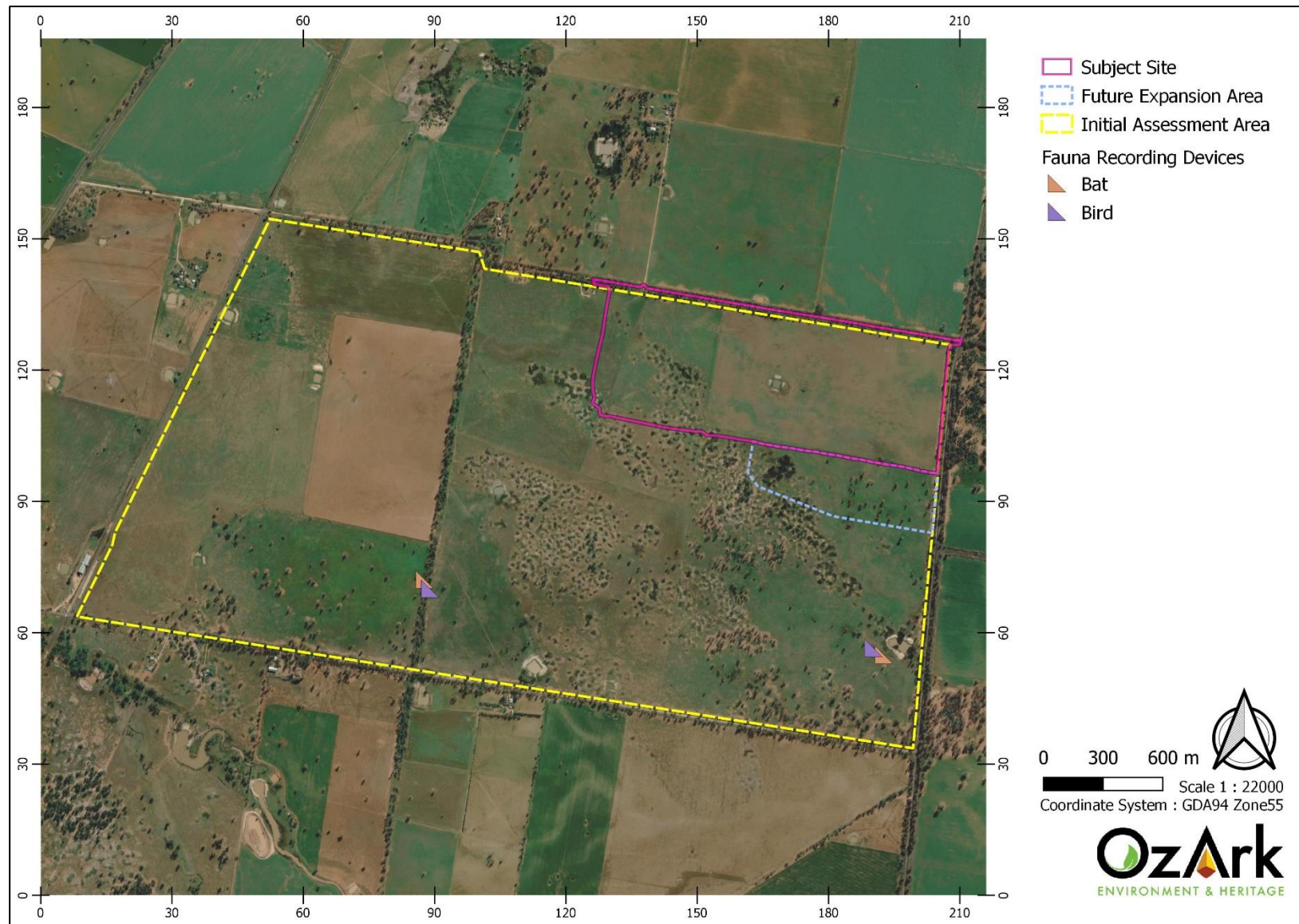


Figure 3-1. Location of bird and bat recording devices within the initial assessment area.

4 EXISTING ENVIRONMENT

4.1 BIOREGION

Under the current Interim Biogeographic Regionalisation of Australia (IBRA 7.0; Thackway & Cresswell, 1995), the search area falls principally within the Bogan-Macquarie Subregion of the Darling Riverine Plains Bioregion. A small area of the Pilliga subregion of the Brigalow Belt South Bioregion occurs in the north of the search area and two small areas of the Inland Slopes Subregion of the NSW South Western Slopes Bioregion occur in the east of the search area. The study area and subject site are wholly within the Bogan-Macquarie Subregion. These subregions are characterised by geology, landforms, soil types and vegetation as described in **Table 4-1**.

Table 4-1. Bioregion and subregion details.

Bioregion	Subregion	Geology	Landform	Soils	Vegetation
Darling Riverine Plains	Bogan-Macquarie	Bogan and Macquarie River alluvial fans of Quaternary age. Western margin is bedrock of the Cobar bioregion. Alluvial sediments from mixed Palaeozoic bedrock bury basement rock to 100m. Underlying sediments of Cretaceous and Jurassic age form part of the Great Artesian Basin	Channels, floodplains, and through flow swamps of past and present river systems.	Grey and brown clays on the plains and depressions with texture contrast soils on the low rises of former levees and channels.	River red gum and river cooba on the channels. White cypress pine and poplar box on coarser levees. Black box, belah, myall and lignum on floodplains. Complex patterns of common reed, cumbungi, and water couch depending on water levels in marshes. Poplar box woodland with wilga, budda, white pine, grey box, yellow box and Blakely's red gum on red soils on fan margins.
NSW South Western Slopes	Inland Slopes ¹	Upper slopes: Ordovician to Devonian folded and faulted sedimentary sequences with inter-bedded volcanic rocks and large areas of intrusive granites. Lower slopes: As for the Upper Slopes but with larger areas of Tertiary and Quaternary alluvium.	Upper slopes: Steep, hilly and undulating ranges and granite basins. Occasional basalt caps, confined river valleys with terrace remnants. Lower slopes: Undulating and hilly ranges and isolated peaks set in wide valleys at the apices of the Riverina alluvial fans.	Upper slopes: Shallow stony soils on steep slopes, texture contrast soils grading from red subsoils on upper slopes to yellow subsoils on lower slopes. Alluvial sands, loams and clays. Lower slopes: Similar to the Upper Slopes but with more extensive red-brown earths on undulating plains and more extensive grey clays on alluvium.	Upper slopes: Open forests and woodlands. Red stringybark on upper slopes with black cypress pine, kurrajong, red ironbark, white gum, white box, yellow box and Blakely's red gum on lower slopes. Merging west to yellow box, grey box and white cypress pine. Rough-barked apple on flats with river oak on upper tributaries and river red gum on lower and larger streams. Lower slopes: Dwyer's gum on granite, red ironbark on sedimentary rocks Hill red gum, white cypress pine and red

					stringybark in the ranges. Grey box woodlands with yellow box, white cypress pine and belah on lower areas. Poplar box, kurrajong, wilga and red box in the north, limited areas of bull mallee, blue mallee, green mallee and congoo mallee in the central west. Myall, rosewood and yarran on grey clays, yellow box, polar box, and belah on alluvial loams. River red gum on all streams with black box in the west with some lignum and river cooba.
Brigalow Belt South	Pilliga	Horizontal Jurassic quartz sandstones, limited shales, Tertiary basalt caps and plugs plus the sediments derived from these rocks.	Stepped sandstone ridges with low cliff faces and high proportion of rock outcrop. Long gentle outwash slopes intersected by sandy stream beds and prior stream channels. A few patches of heavy clay. Includes the spectacular mountain landscape of volcanic domes, plugs and dykes in the Warrumbungles.	Shallow black earths and red loams on basalts. Extensive harsh texture contrast soils, linear patterns of deep yellow sand, stony red brown earths.	White Box with White Cypress Pine and Kurrajong on the basalt hills. Blue-leaved Ironbark, White Gum, black cypress pine, whitewood, and rough-barked apple on stony sandstone plateau and streams. Narrow-leaved ironbark, white cypress pine, red stringy bark, patches of mallee and broom heath on gentler sandstone slopes. Pilliga box with grey box, poplar box, fuzzy box, bull oak, rosewood, wilga and budda on heavier soils in the west and north. River red gum lines all streams.

¹Note that a formal description of the Inland Slopes Subregion is not currently available. The description provided here relates to an earlier division of the New South Wales South Western Slopes Bioregion into two subregions, Upper Slopes and Lower Slopes.

4.2 NSW (MITCHELL) LANDSCAPES

The landscapes of NSW, often known as Mitchell Landscapes, were mapped in 2002 to provide a framework for reporting reserve establishment and for determining over-cleared landscapes (Mitchell, 2002). These landscapes broadly describe areas of similar topography, geology, soils and vegetation. The subject site is wholly contained within the Boggy Cowal Alluvial Plains, while the study area spans the Boggy Cowal Alluvial Plains and Narromine Hills landscapes (**Figure 4-1**). The characteristics of these landscapes are described in **Table 4-2**.

Table 4-2. NSW (Mitchell) Landscapes Within the Survey Area

Landscape	Geology and soils	Landform	Vegetation	Clearing Status
Boggy Cowal Alluvial Plains	Pleistocene fluvial sediments of backplain facies of the Carrabear Formation associated with the Boggy Cowal distributary stream system. Medium to heavy grey cracking clays with extensive gilgai. Carbonate nodules common in the subsoil and worked to gilgai crests,	Local relief to 2 m.	Extensive grasslands with scattered stands of myall (<i>Acacia pendula</i>), bimbale box (<i>Eucalyptus populnea</i>), black box (<i>Eucalyptus largiflorens</i>) and belah (<i>Casuarina cristata</i>).	Overcleared. (82% cleared)
Narromine Hills	Low rounded hills standing above the alluvial plain on Ordovician and Devonian quartz sandstone, siltstone, chert and phyllite.	General elevation 240 to 290 m, local relief 40 m. Red-brown texture-contrast soils thicker on the western aspects	Woodlands of grey box (<i>Eucalyptus microcarpa</i>), yellow box (<i>Eucalyptus melliodora</i>), Dwyer's mallee gum (<i>Eucalyptus dwyeri</i>), and white cypress pine (<i>Callitris glaucophylla</i>) with wilga (<i>Geijera parviflora</i>), yarran (<i>Acacia homalophylla</i>) and other shrubs.	Overcleared. (89% cleared)

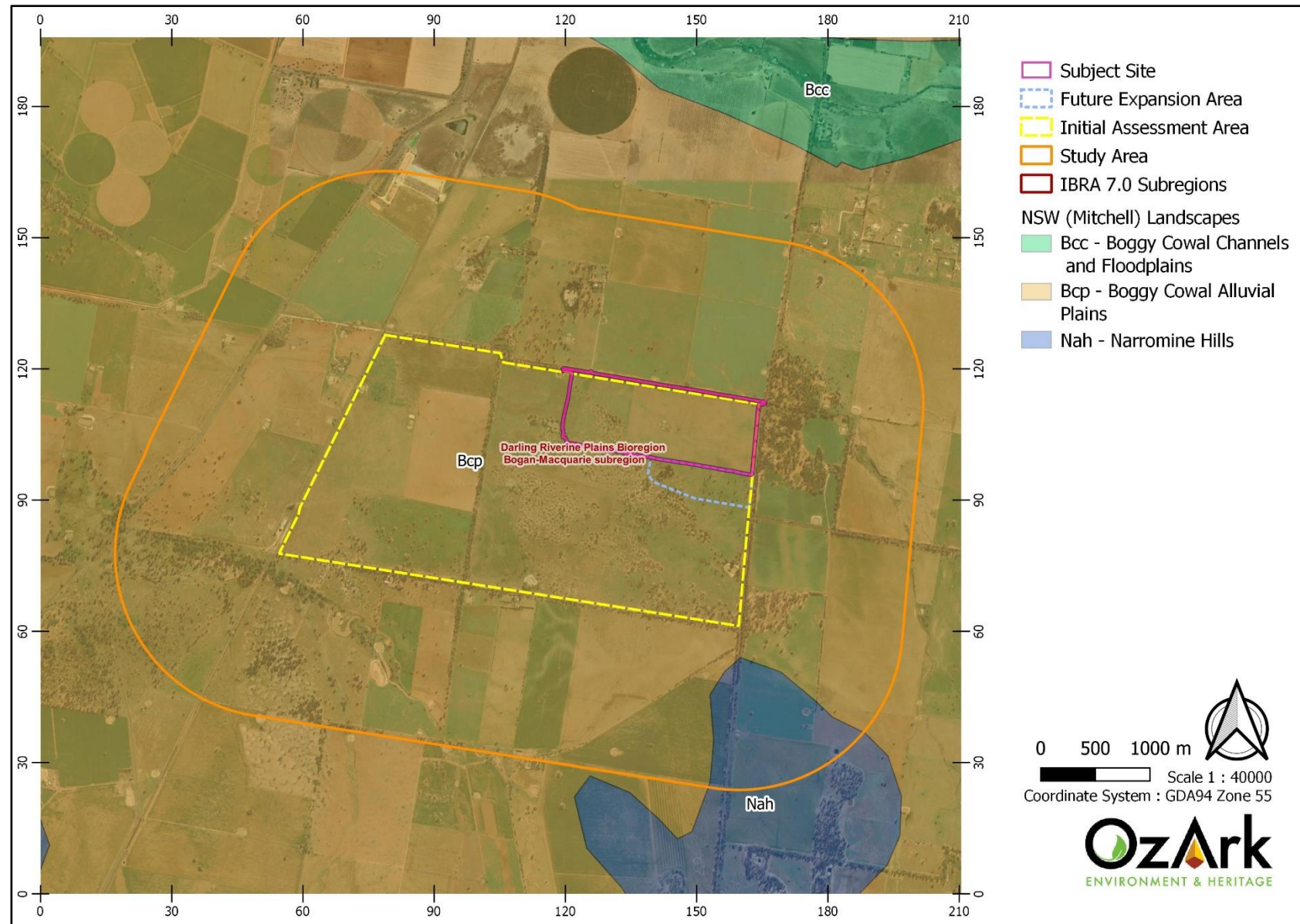


Figure 4-1. IBRA Subregions and Mitchell Landscapes within the study area.

4.3 CLIMATE

The Dubbo Airport automatic weather station (065070) is the closest rainfall and temperature data collection point to the subject site (approximately 32.4 km from site). Climate statistics have been recorded here since 1993.

The study area experiences warm summers, with a mean minimum temperature of 18.4°C and a mean maximum temperature of 33.6°C in January, the warmest month. Winters are cool, with temperatures in the coolest month (July) ranging from a minimum of 3.0°C to a mean maximum of 15.7°C (Bureau of Meteorology, 2023). Climate statistics are given in **Figure 4-2**.

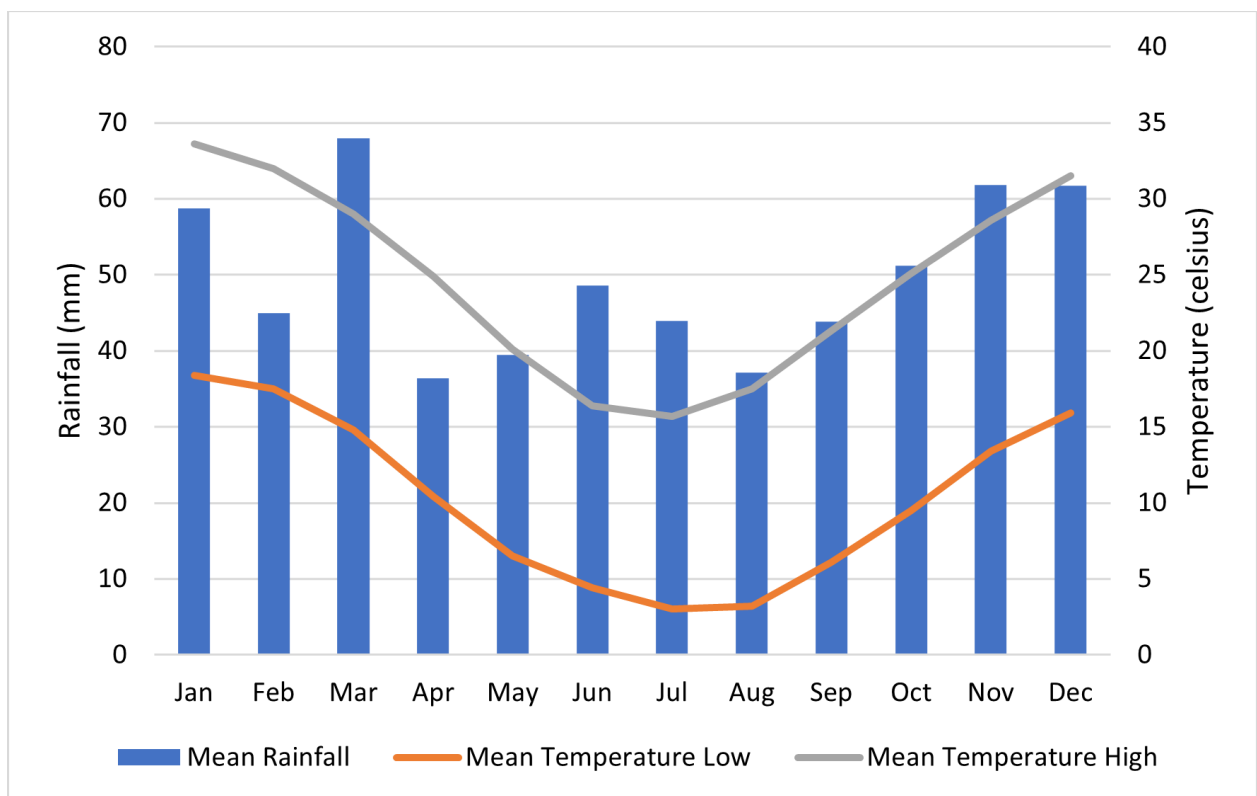


Figure 4-2. Climate statistics for Dubbo Airport (station 065070; BOM, 2023)

During the field surveys the prevailing weather conditions were fine, with no rainfall recorded and mild temperatures. Prior to the initial survey in April 2021, a total of 301.6 mm had been recorded in the region in the preceding two months, well above the combined means for February and March of 113.3 mm. By contrast, in the two months preceding the April 2023 surveys, the site experienced below-average rainfall, recording a total of 74.2 mm of rain during this period.

4.4 WATERCOURSES

No mapped watercourses occur within the subject site. Six mapped watercourses occur within the broader study area (**Figure 4-3**). According to the Strahler ordering system, these consist of:

- Four Strahler 1st order unnamed, minor, non-perennial watercourses.

- One Strahler 2nd order unnamed, minor, non-perennial watercourse.
- One Strahler 3rd order minor, non-perennial watercourse (Yellow Creek).

Note that one of the mapped Strahler 1st order streams is a braided stream, which diverges and then reunites. This is treated as a single stream in this report.

None of the watercourses within the study area are mapped as Key Fish Habitat (KFH) by the Department of Primary Industry – Fisheries or Protected Riparian Land (PRL) by the Department of Planning and Environment, and no impacts to biodiversity in nearby watercourses is expected. While most 3rd order streams are considered KFH, Yellow Creek has not been mapped as such. Assessments referring to Part 7A Division 12 Section 221ZV of the FM Act, or any further considerations of this legislation, are therefore not required.

4.5 GROUNDWATER DEPENDENT ECOSYSTEMS (GDEs)

Groundwater plays an important ecological role in directly and indirectly supporting terrestrial and aquatic ecosystems. Groundwater sustains terrestrial and aquatic ecosystems by supporting vegetation and providing discharge to channels, lacustrine and palustrine wetlands, and both the estuarine and marine environment. Aquifer ecosystems are inherently groundwater dependent (QLD Department of Environment and Heritage Protection, 2017).

The Bureau of Meteorology Atlas of GDEs does not identify any areas of potential GDE within the subject site or future expansion area (**Figure 4-3**; Bureau of Meteorology, 2017). Small areas of low-probability GDE occur in the wider landscape. No impacts to these areas are anticipated.

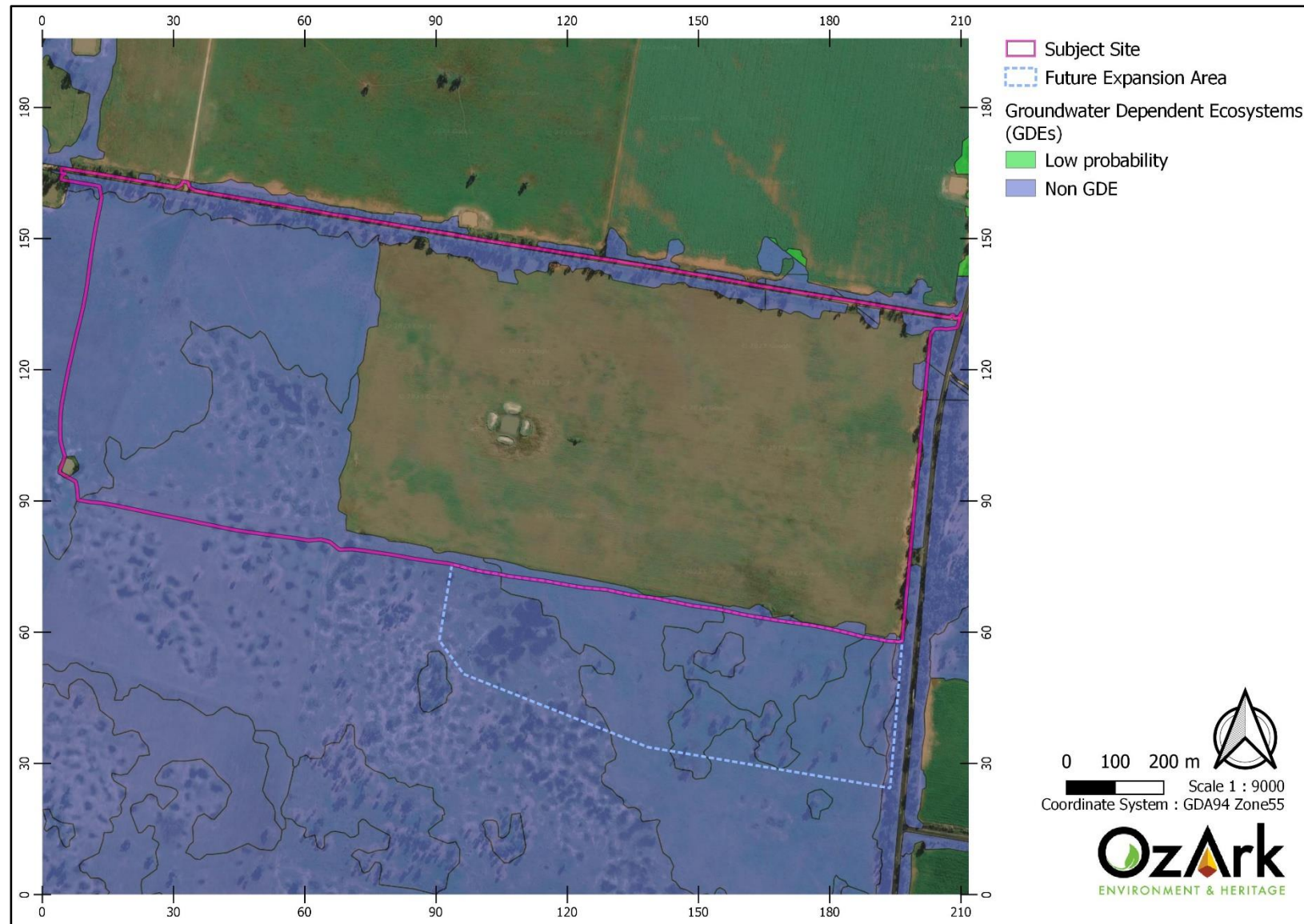


Figure 4-3. Watercourses and Groundwater Dependent Ecosystems (GDEs) within the subject site and future expansion area

5 RESULTS

5.1 FIELD SURVEY

5.1.1 Flora

In total, 208 plant species were recorded during the field surveys in April of 2021 and 2023, of which 149 (71.63%) are native and 59 (28.37%) introduced (**Appendix C**). Of these, 145 species were recorded within the current subject site, comprising 102 native species (70.34%) and 43 introduced species (29.66%). The remaining species were recorded within the wider initial assessment area. This should not be interpreted as a comprehensive list of all species present within the site. Owing to the large size of the subject site, it is likely that additional species are present within the site that could not be detected during the site visit. Additionally, as all surveys were conducted in April, many species would not have had aboveground material to allow for detection and identification.

5.1.2 Weeds

Under the *Biosecurity Act 2015*, “all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated, or minimised, so far as is reasonably practicable.”

Twelve significant weeds were detected during the survey (**Table 5-1**). These are species listed as either high-threat exotic species (HTE) under the BAM, Weeds of National Significance (WoNS), or priority weeds for the Narramine LGA (PW).

Table 5-1. Significant Weeds Recorded within the Subject Site

Scientific Name	Common Name	HTE	WoNS	PW
<i>Alternanthera pungens</i>	Khaki Weed	Yes	No	No
<i>Bidens subalternans</i>	Greater Beggar's Ticks	Yes	No	No
<i>Carthamus lanatus</i>	Saffron Thistle	Yes	No	No
<i>Cenchrus ciliaris</i>	Buffel Grass	Yes	No	No
<i>Cyperus eragrostis</i>	Umbrella Sedge	Yes	No	No
<i>Eragrostis curvula</i>	African Lovegrass	Yes	No	No
<i>Heliotropium amplexicaule</i>	Blue Heliotrope	Yes	No	Yes
<i>Lycium ferocissimum</i>	African Boxthorn	Yes	Yes	Yes
<i>Phyla canescens</i>	Lippia	Yes	No	No
<i>Paspalum dilatatum</i>	Paspalum	Yes	No	No
<i>Xanthium spinosum</i>	Bathurst Burr	Yes	No	No

5.1.3 Fauna

In total, 62 fauna species were recorded during the field surveys, either by active (field survey) or passive detection (bird and bat loggers). This comprised 46 birds (all native), 15 mammals (12 native and three introduced), and one reptile (native). One detected bat could only be identified to genus level (*Nyctophilus* sp.). All detected fauna species are included in **Appendix C**. As with the flora survey results, this should not be considered a comprehensive list of all fauna species likely to occur within or make use of the subject site. It is worth noting that the bird and bat detectors were not located in the current subject site but instead were positioned in the wider initial assessment area (**Figure 3-1**). However, as bird and bats are wide ranging, it is very likely that those species recorded on the loggers also occur within the subject site.

5.1.4 Habitat features

The field survey identified 44 hollow-bearing trees (42 live and two dead) within the subject site and an additional six (all live) within the future expansion area (**Figure 5-1**). Hollows were classed as either small (< 20 cm diameter) or large (\geq 20 cm diameter) to provide an indication of the species most likely to make use of them. The trees within the subject site contained a total of 28 large and 99 small hollows, as well as one stick nest. Within the future expansion area, the habitat trees contained a total of one large and 14 small hollows. Additional nests were recorded in the northern side of the road corridor and outside of the western limit of the subject site within the southern road corridor.

5.2 PLANT COMMUNITY TYPES

The State Vegetation Type Map C1.1.M1.1 (SVTM; DEP, 2022) predicts that two PCTs occur within the subject site, one (PCT 45) within the paddock and one (PCT 82) largely confined to the corridor of Cragie Lea Lane:

- PCT 45 – Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion.
- PCT 82 – Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion.

The field survey confirmed the presence of these PCTs within the subject site, though the actual location and extent of the two communities was found to differ from the predictive mapping. The SVTM models much of the paddock as non-native; however, field surveys determined that this area is occupied almost entirely by native groundcover species, with the exception of minor areas of disturbance, and consequently it has been mapped here as a derived grassland community (PCT 250). It was also noted that the area modelled as containing PCT 45 also hosted numerous gilgai-associated wetlands. These were mapped as a separate ephemeral wetland community (PCT 53). The survey also recorded patches of a Fuzzy Box (*Eucalyptus conica*)-dominated community within the road corridor (PCT 201), intergrading with PCT 82. Minor occurrences of a

narrow-leaved eucalypt consistent with Pilliga Box (*E. pilligaensis*) or of a hybrid between Pilliga Box and Grey Box (*E. microcarpa*) were noted in the road corridor. These occurred within PCT 82 and did not appear to form a distinct community. These individuals were mapped to PCT 82.

In total, therefore, five PCTs were recorded within the subject site. The extent of each PCT within the subject site is given in **Table 5-2** and within the future expansion area in **Table 5-3**. Vegetation communities within the site are mapped in **Figure 5-2**.

Vegetation within the site was found to consist of a mosaic of derived and/or natural grasslands, small ephemeral wetlands, isolated remnant trees, and, in the road corridor, remnant woodland communities. The boundaries between certain communities – particularly between PCT 45 and PCT 250, and between PCT 53 and the surrounding grasslands – are likely to vary according to seasonal conditions. The extent of each community mapped within the site is based on conditions at the time of the surveys.

Table 5-2. Confirmed Extent of Each Plant Community Type (PCT) within the Subject Site

PCT ID	PCT Name	Extent within Subject Site (ha)
45	Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion	12.56
53	Shallow freshwater wetland sedgeland in depressions on floodplains on inland alluvial plains and floodplains	4.07
82	Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Penepine Bioregion	2.67
201	Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion	0.70
250	Derived tussock grassland of the central western plains and lower slopes of NSW	96.32
Non-native vegetation, dam surfaces, existing roads or tracks, and bare ground		
Total		118.04

Table 5-3. Confirmed Extent of Each PCT within the Future Expansion Area

PCT ID	PCT Name	Extent within Subject Site (ha)
45	Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion	5.05
53	Shallow freshwater wetland sedgeland in depressions on floodplains on inland alluvial plains and floodplains	2.43
82	Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Penepplain Bioregion	4.04
250	Derived tussock grassland of the central western plains and lower slopes of NSW	14.83
Dam surface		0.02
Total		26.37



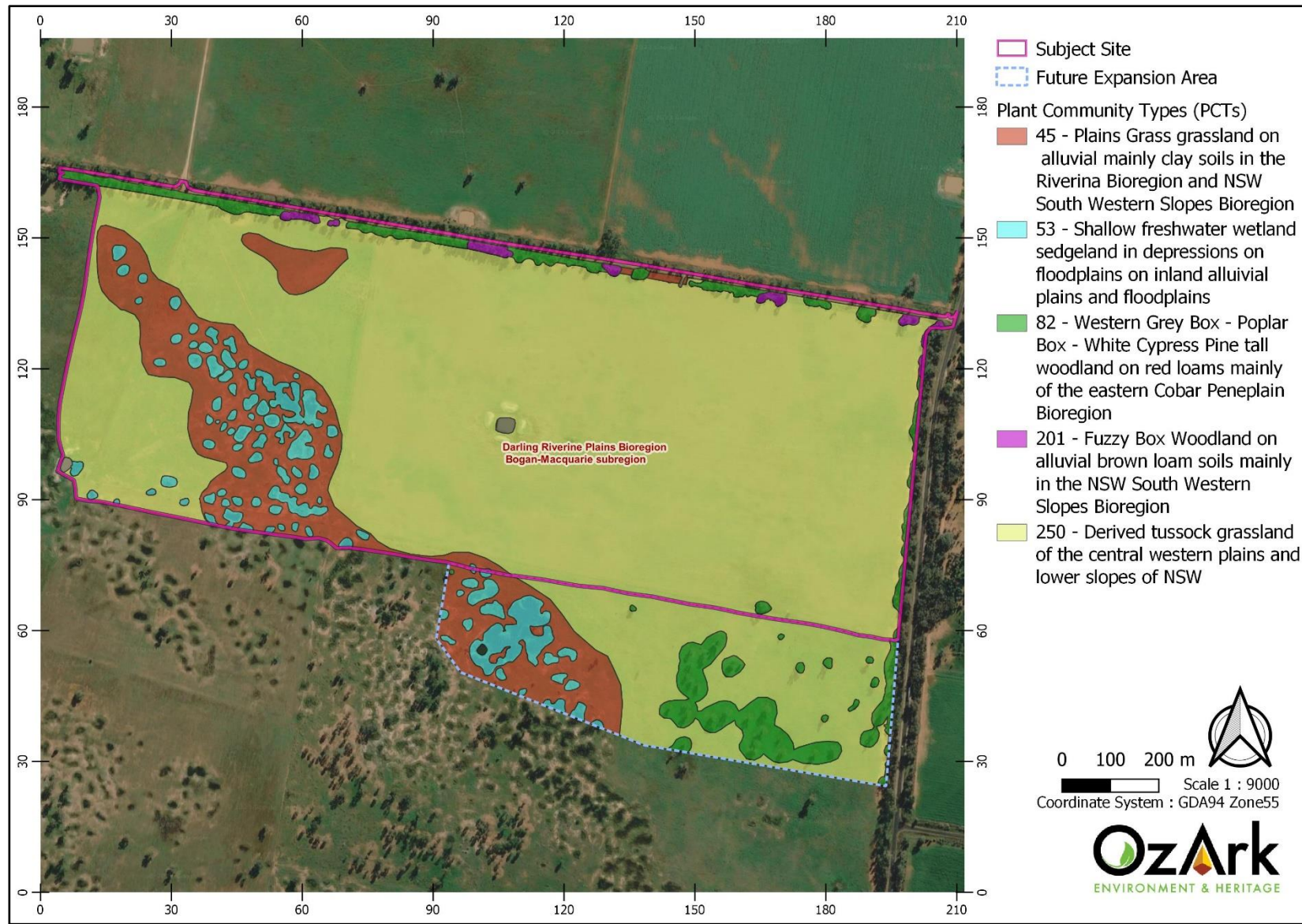


Figure 5-2. Plant Community Types (PCTs) mapped within the subject site and future expansion area.

5.3 THREATENED ECOLOGICAL COMMUNITIES

According to the BioNet Vegetation Classification Database, all PCTs detected within the subject site are associated with Threatened Ecological Communities (TECs). Additionally, several BC Act- and EPBC Act-listed TECs were identified that overlapped in structure or composition with the vegetation recorded within the subject site but were not listed in the BioNet Database. A full list of TECs potentially occurring within the subject site is given in **Table 5-4** below.

Table 5-4. Threatened Ecological Communities (TECs) Associated with Recorded PCTs

PCT ID	PCT Name	Associated TECs
45	Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion	BC Act, CE: Artesian Springs Ecological Community in the Great Artesian Basin.
53	Shallow freshwater wetland sedgeland in depressions on floodplains on inland alluvial plains and floodplains	BC Act, CE: Artesian Springs Ecological Community in the Great Artesian Basin.
82	Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion	BC Act, E: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions. EPBC Act, E: Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia.
201	Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion.	BC Act, E: Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions.
250	Derived tussock grassland of the central western plains and lower slopes of NSW	BC Act, CE: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. EPBC Act, CE: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions. BC Act, E: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions. EPBC Act, E: Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia.

Field survey results for each community were assessed against composition and condition thresholds for each associated TEC. As each PCT occurred in a range of conditions within the subject site, an attempt was made to determine which areas of each mapped PCT might qualify as the associated TEC. Given that the surveys were of only short duration and took place in autumn, it was not possible to assess every patch of each PCT according to the TEC guidelines.

Note that formal guidelines for many TECs specify that surveys should take place in spring or early summer and should be undertaken during periods when the patch in question has not been subject to disturbance; for this reason, reassessment is required during the appropriate season to determine whether each PCT is likely to meet the condition and composition thresholds. Consequently, the assessment and mapping provided here should be regarded as indicative only. The results of this preliminary assessment are given in **Table 5-5**. TECs assessed as occurring or likely to occur within the subject site are mapped in **Figure 5-3**. The extent of each TEC within the subject site and focus area are given in table **Table 5-6** below.

Note that additional areas of the BC Act- and EPBC Act-listed Grey Box EECs and the BC Act-listed Fuzzy Box EEC occur in the northern road corridor of Cragie Lea Lane. It was noted that the Fuzzy Box community in particular was extensive on the northern side of the road.

Table 5-5. Assessment of potential TECs within subject site

PCT ID	Associated TECs	Conditions met
45	BC Act, CE: Artesian Springs Ecological Community in the Great Artesian Basin.	No. Outside TEC distribution and not associated with artesian springs.
53	BC Act, CE: Artesian Springs Ecological Community in the Great Artesian Basin.	No. Outside TEC distribution and not associated with artesian springs.
82	BC Act, E: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions.	Yes. Areas mapped as PCT 82 were dominated by Grey Box (<i>E. microcarpa</i>) and understorey possessed associated native species. No condition thresholds are specified for the BC Act TEC.
82	EPBC Act, E: Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Likely. Areas mapped as PCT 82 were dominated by Grey Box (<i>E. microcarpa</i>) and understorey possessed associated native species. Many sites appeared to meet the thresholds for consideration as this TEC; however, guidelines specify that surveys should take place in spring and, given the scope of the present survey, closer attention to each individual patch may be required to determine whether it meets the threshold conditions. Some patches fell below the 0.5 ha minimum size threshold and were excluded from consideration.
201	BC Act, E: Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions.	Yes. All areas of PCT 201 belong to this community. The listing applies to all remnant woodland in which Fuzzy Box (<i>Eucalyptus conica</i>) is the dominant species and does not specify a minimum patch threshold.
250	EPBC Act, CE: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England	No. Sites lacked associated species.

PCT ID	Associated TECs	Conditions met
	Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions.	
250	BC Act, CE: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions.	No. Sites lacked associated species.
250	BC Act, E: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Penepplain, Nandewar and Brigalow Belt South Bioregions.	Yes (Part). Areas adjacent to or largely enclosed by PCT 82, and where the understorey was consistent with the TEC description, were considered to belong to the derived grassland form of this TEC. Areas of PCT 250 that could not confidently be assumed to have formerly been dominated by Grey Box (<i>Eucalyptus microcarpa</i>) as they may have been derived from other woodland types, such as Fuzzy Box (<i>Eucalyptus conica</i>), were not included in this TEC. While it is likely that much larger areas of PCT 250 were historically derived from a former Grey Box woodland, this cannot be stated with certainty.
250	EPBC Act, E: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Penepplain, Nandewar and Brigalow Belt South Bioregions.	Likely (Part). Areas adjacent to or largely enclosed by PCT 82, and where the understorey was consistent with the TEC description, were provisionally considered to belong to the derived grassland form of this TEC, pending reassessment during the appropriate seasons. Areas of PCT 250 that could not confidently be assumed to have formerly been dominated by Grey Box (<i>Eucalyptus microcarpa</i>), or which were in a degraded condition that did not meet the specified conditions, were not included in this TEC.

Table 5-6. Extent of each TEC within the subject site and future expansion area.

TEC	Extent (Subject Site)	Extent (Future Expansion Area)
BC Act, E: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Penepplain, Nandewar and Brigalow Belt South Bioregions.	8.79 ha	16.62 ha
EPBC Act, E: Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia.	7.86 ha	16.62 ha
BC Act, E: Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions.	0.70 ha	-

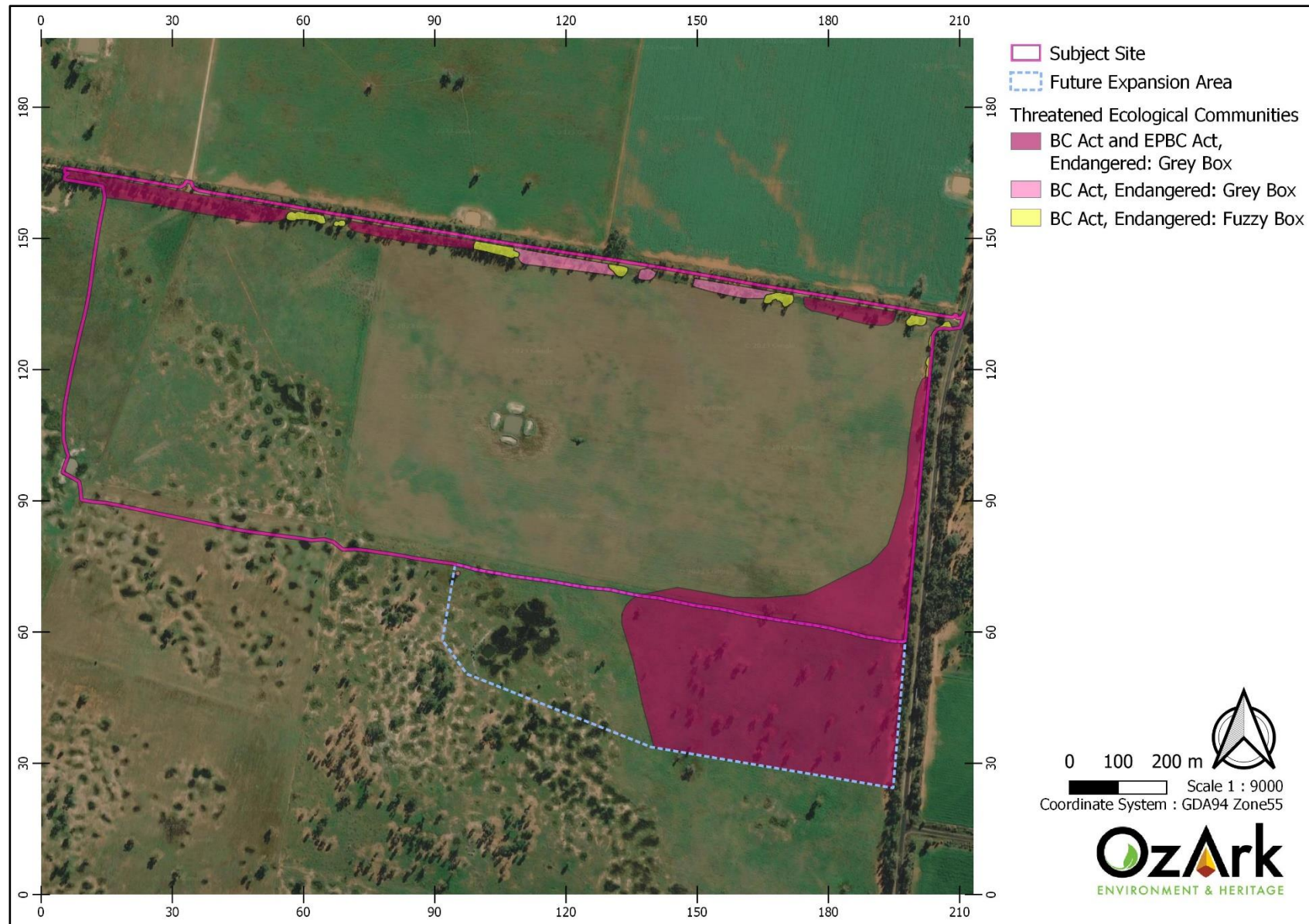


Figure 5-3. Indicative locations of Threatened Ecological Communities (TECs) within the subject site and future expansion area.

5.4 THREATENED SPECIES

5.4.1 Flora

One threatened plant species – Bluegrass (*Dichanthium setosum*) – was recorded during the field survey (**Figure 5-4** and **Figure 5-5**). This species is listed as vulnerable under the BC and EPBC Acts. Two previous records of this species exist within 10 km of the subject site, both dating to November 1892. One small population (c. 30 plants) was recorded within the proposed development footprint of the freight hub and one much larger population in the future expansion area. As only part of the latter population was in flower at the time of the survey, the size of the population is not known; however, it may exceed 200 plants. The recommended survey period for this species extends from November to May but may be contingent on recent rainfall. Surveying 3-4 weeks after significant rainfall is advised. Five further populations were recorded in the initial assessment area in prior surveys (April 2021).

The species is known to occur in gilgai topography and the largest populations recorded within the initial assessment area were in the marginal clays of gilgais. As a large area of gilgai topography is included within the subject site, it is possible that additional undetected populations occur within the potential impact footprint of the proposal. As this population occurs at the southern limit of the known distribution of this species, it likely constitutes an important population as defined under the EPBC Act. Impacts to this species that may lead to permanent reductions in its area of occupancy or that threaten the local population with extinction are therefore likely to be regarded as significant.

Despite the apparent close association between the species and gilgai landforms, the small population recorded within the footprint of the proposed freight hub was not associated with gilgai topography but was instead recorded in the margins of an existing track. It is possible that the species has benefited from alterations to drainage in this area caused by the formation of the track. The possibility that other populations of the species occur away from gilgais, potentially in areas of altered drainage or disturbance, therefore cannot be discounted.

It should be noted that a common relative of *Dichanthium setosum*, Queensland Bluegrass (*D. sericeum*), was also frequently encountered within the site. The general form of the inflorescence of *D. setosum* is shown in **Figure 5-6**. It typically possesses longer, darker and more slender inflorescences than *D. sericeum*; however, microscopic analysis may be needed to confirm identification. The species are typically separated on the basis on the number, length, and colour of racemes in the inflorescence and the size and fertility of the individual spikelets, as well as a range of more informal qualities. The characteristic larger purple spikelets of *D. setosum* are a common trait used to identify the species *in situ* (**Figure 5-7**). However, a range of intermediate forms are commonly reported in sites where both species are known (**Figure 5-8**). These intermediates are considered putative hybrids and are not explicitly protected under state or

federal legislation. In the present case, specimens with ambiguous characteristics were noted within populations of otherwise unambiguous *D. setosum* and *D. sericeum*, and were often found to outnumber “pure” individuals. This included extensive populations of *D. sericeum* and ambiguous individuals in the roadside drains of Cragie Lea Lane. It is expected that these plants would be excluded from the protections offered by the BC Act and EPBC Act listings; however, populations containing large numbers of ambiguous individuals may also harbour undetected examples of the threatened *D. setosum*. Close investigation of these populations is advised prior to undertaking any clearing activities. The locations of these populations are shown in **Figure 5-5**.

Additional threatened flora species may occur within the subject site that were not detected during the field survey. Potential impacts to these species are discussed in **Section 6**.

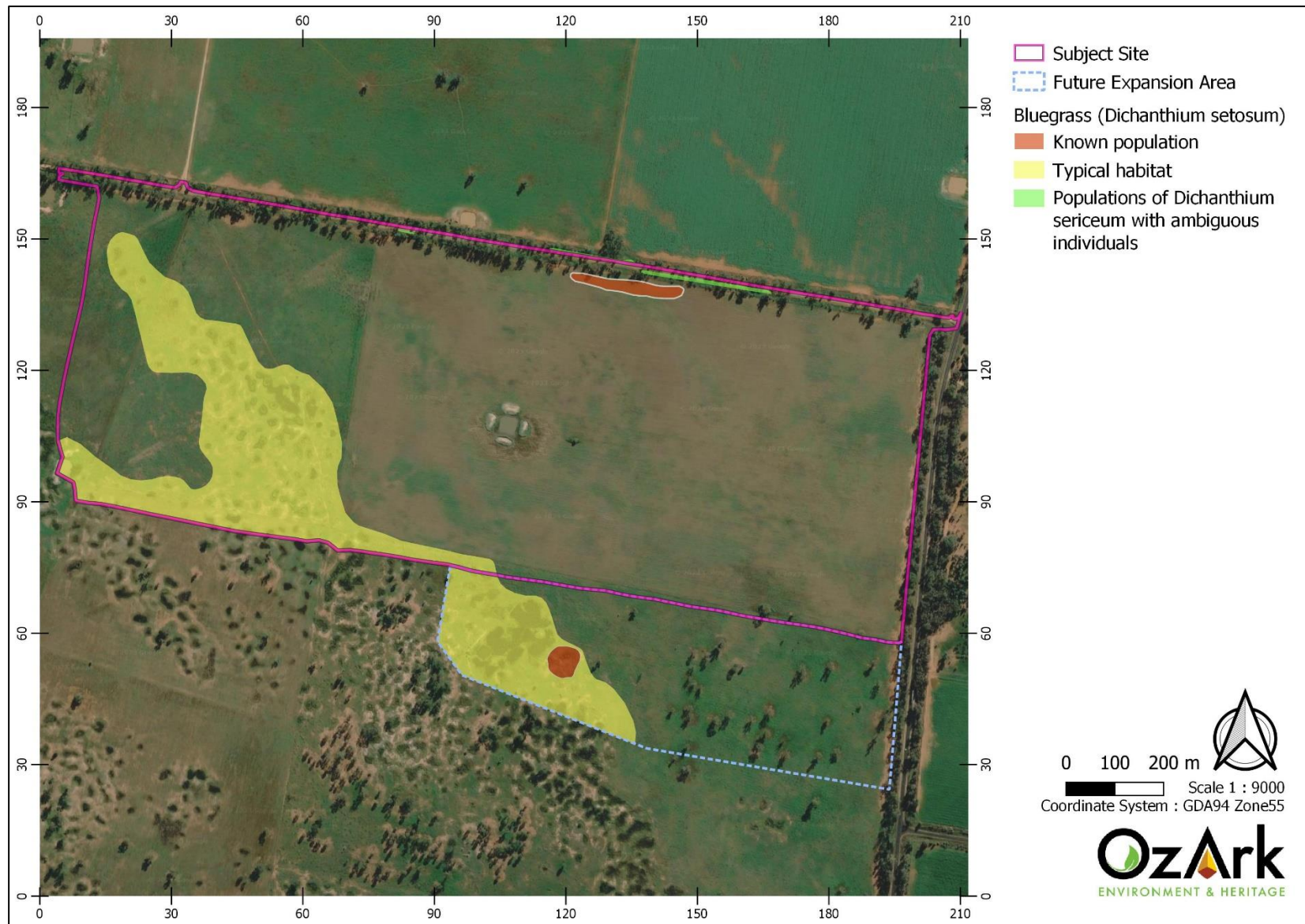


Figure 5-4. Populations of the threatened Bluegrass (*Dichanthium setosum*) recorded within the subject site, future expansion area, and road corridor.



Figure 5-5. Populations of the threatened Bluegrass (*Dichanthium setosum*) recorded within the subject site and road corridor.

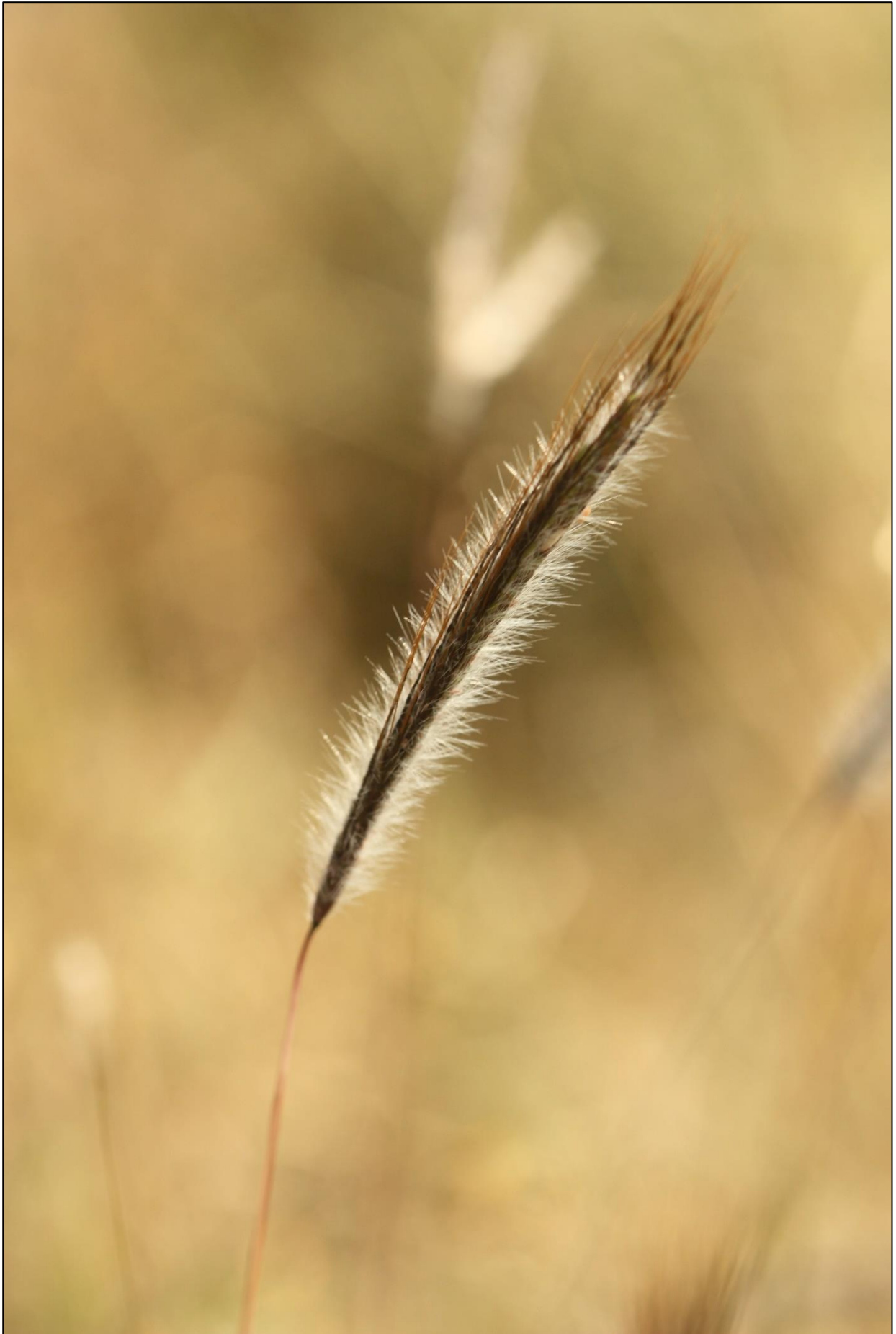


Figure 5-6. Inflorescence of the BC Act- and EPBC Act-listed Bluegrass (*Dichanthium setosum*).



Figure 5-7. A spikelet of the threatened Bluegrass (*Dichanthium setosum*; left), showing the characteristic purple colouration found in this species. The spikelets of Queensland Bluegrass (*D. sericeum*; right) tend to be pale in colour. Both spikelets were collected from the subject site.



Figure 5-8. Magnified view of a raceme collected from a putative *Dichanthium setosum* × *D. sericeum* hybrid or intermediate form, collected from the subject site.

The mixture of blue or purple and pale green spikelets in the above may point to the hybrid origin of the sample.

5.4.2 Fauna

Four threatened bird species were detected within the initial assessment area during the field survey in April 2021:

- Superb Parrot (*Polytelis swainsonii*) – BC and EPBC Act: Vulnerable
- Spotted Harrier (*Circus assimilis*) – BC Act: Vulnerable
- Turquoise Parrot (*Neophema pulchella*) – BC Act: Vulnerable
- Grey-crowned Babbler (eastern subspecies; *Pomatostomus temporalis temporalis*) – BC Act: Vulnerable

The Grey-crowned Babbler was also recorded during the subsequent surveys in April 2023, chiefly within the road corridor of Cragie Lea Lane. Two additional threatened fauna species were recorded through bat detector analysis:

- Little Pied Bat (*Chalinolobus picatus*) – BC Act: Vulnerable
- Large Bent-winged Bat (*Miniopterus orianae oceanensis*) – BC Act: Vulnerable

A third bat species, identified only as *Nyctophilus* sp., may represent an additional threatened bat species, Corben's Long-eared Bat (*Nyctophilus corbeni*), which is listed as Vulnerable under the BC and EPBC Acts. This taxon cannot be confidently identified to species level through analysis of bat detector data.

Additional threatened fauna species may occur within the subject site that were not detected during the field survey. Potential impacts to these species are discussed in **Section 6**.

5.5 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

Under the environmental assessment provisions of the EPBC Act, Matters of National Environmental Significance (MNES) and impacts on Commonwealth land are required to be considered to assist in determining whether the proposal should be referred to the Australian Government. The EPBC Act protected matters search has identified four wetlands of international importance, six TECs, 41 threatened species, 9 migratory species and 16 marine species that could possibly occur in the study area (**Appendix A**). A summary of these matters and whether the proposal is likely to impact them is provided in **Table 5-7**.

Table 5-7. EPBC Act, Matters of National Environmental Significance

Factor	Potential Impact
Any impact on a listed threatened species or communities?	Yes
Any impacts on listed migratory species?	Yes
Any impacts on a Ramsar wetland of international importance?	No
Any impacts on a Commonwealth marine environment?	No
Any impacts on a World Heritage property?	No
Any impacts on a National Heritage place?	No
Any impacts on the Great Barrier Reef Marine Park?	No
Does the proposal involve a nuclear action (including uranium mining)?	No
Any impact on a water resource, in relation to coal seam gas development and large coal mining development?	No
Additionally, any impact (direct or indirect) on Commonwealth land?	No

For further discussion of MNES, see **Appendix D**.

6 CONSTRAINTS ASSESSMENT AND IMPACT SUMMARY

This assessment assumes that the proposal would entail the removal of all vegetation within the subject site. Therefore, there would be a range of potential impacts associated with the removal of native vegetation, including:

- Removal of threatened fauna species habitat.
- Removal of threatened plants.
- Injury and mortality of fauna.
- Habitat fragmentation and disruptions to wildlife connectivity.
- Edge effects on adjacent native vegetation and habitat.
- Invasion and spread of weeds.
- Invasion and spread of pests.
- Invasion and spread of pathogens and disease.
- Noise, light and vibration.

This section of the report considers these impacts and the major constraints associated with the proposal in detail.

6.1 CONSTRAINTS ASSESSMENT

The most significant constraints identified during the assessment include the presence of the BC Act-listed EEC *Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions* and *Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions*, and the EPBC Act-listed EEC *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia*, and the presence of populations of the BC Act- and EPBC Act-listed vulnerable plant, *Bluegrass (Dichanthium setosum)*. The presence of hollow-bearing trees, chiefly in the road corridor, is also a significant constraint.

Less significant but still notable constraints include the presence of *Dichanthium* populations that contain ambiguous or hybrid individuals and may contain a small number of threatened individuals, and areas of suitable habitat for the threatened *Bluegrass* associated with gilgai formations.

Constraints are mapped in **Figure 6-1**. Areas that are not coloured in this figure possess the fewest identified constraints.

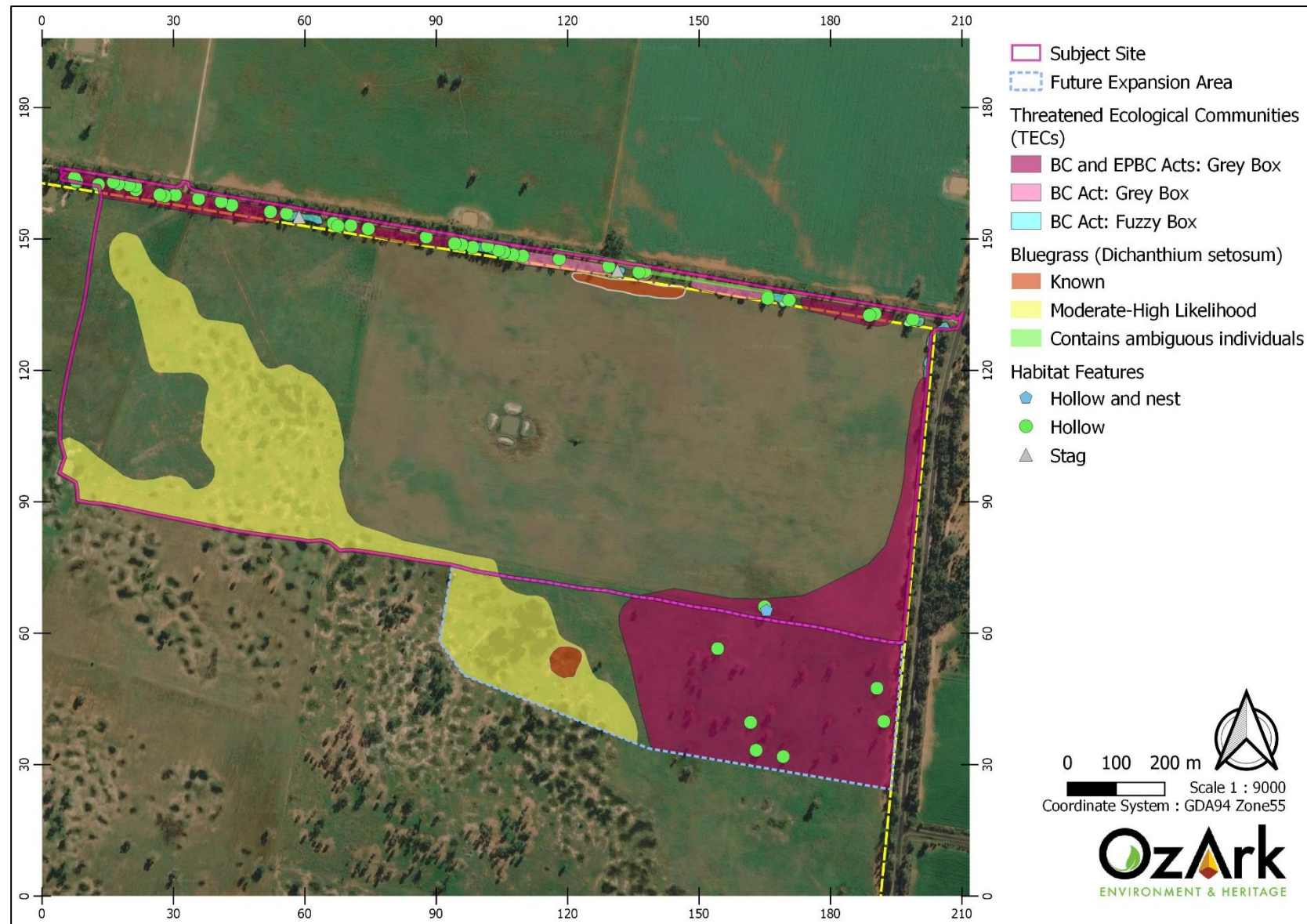


Figure 6-1. Key constraints identified within the subject site and future expansion area.

6.2 CONSTRUCTION IMPACTS

6.2.1 Removal of Native Vegetation

The subject site contains five PCTs and up to 118.04 ha of vegetation would be cleared by this proposal (see **Table 5-2**). The future expansion area contains four PCTs and up to 26.37 ha of native vegetation would be cleared by the proposal (

Table 5-3).

Three Threatened Ecological Communities were assessed as occurring or being likely to occur within the subject site (

Table 6-1). The approximate extent of each TEC within the subject site and future expansion area are indicative based on a rapid survey outside of the recommended survey season.

Table 6-1. Extent of each TEC within the subject site and focus area

TEC	Extent (Subject Site)	Extent (Future Expansion Area)
BC Act, E: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions.	8.79 ha	16.62 ha
EPBC Act, E: Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	7.86 ha	16.62 ha
BC Act, E: Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions.	0.70 ha	-

Removal of native vegetation and ground disturbance will further exacerbate a number of Key Threatening Processes, including *Clearing of native vegetation*, *Invasion and establishment of exotic vines and scramblers* and *Invasion of native plant communities by exotic perennial grasses*. Key Threatening Processes are considered in more detail in **Appendix E**.

6.2.2 Impacts to BC Act- and EPBC Act-listed threatened flora

Sixty-three BC Act-listed threatened plant species or populations are known or predicted to occur within the three IBRA Subregions that overlap the 10 km search area. Forty-one of these entities are also listed under the EPBC Act. A list of these species, and whether the proposal is likely to impact them, is given in **Table 6-2**, along with the extent of suitable vegetation within subject site and future expansion area. The likelihood and severity of an impact is contingent on the nature of the final impact. Impacts are expected to 16 threatened flora species within the subject site and 13 within the future expansion area.

Table 6-2. BC Act-listed threatened flora species and populations potentially impacted by the proposal.

Scientific Name	Common Name	*NSW Status	+Comm. Status	Records < 10 km	Potential Impact (Subject Site)	Potential Impact (Future Expansion Area)
<i>Caesia parviflora</i> var. <i>minor</i>	Small Pale Grass-lily	E1		N	None expected	None expected

Scientific Name	Common Name	*NSW Status	+Comm. Status	Records < 10 km	Potential Impact (Subject Site)	Potential Impact (Future Expansion Area)
<i>Cynanchum elegans</i>	White-flowered Wax Plant	E1	E	N	None expected	None expected
<i>Tylophora linearis</i>		V	E	N	None expected	None expected
<i>Ammobium craspedioides</i>	Yass Daisy	V	V	N	None expected	None expected
<i>Brachyscome muelleroides</i>	Claypan Daisy	V	V	N	None expected	None expected
<i>Leucochrysum albicans</i> subsp. <i>tricolor</i>	Hoary Sunray	E1	E	N	None expected	None expected
<i>Senecio garlandii</i>	Woolly Ragwort	V		N	None expected	None expected
<i>Lepidium aschersonii</i>	Spiny Peppercross	V	V	N	4.77 ha	2.43 ha
<i>Lepidium monoplocoides</i>	Winged Peppercross	E1	E	N	12.56 ha	5.05 ha
<i>Atriplex infrequens</i>	A saltbush	V	V	N	None expected	None expected
<i>Carex raleighii</i>	Raleigh Sedge	E1		N	None expected	None expected
<i>Eriocaulon australasicum</i>	Austral Pipewort	E1	E	N	4.07 ha	2.43 ha
<i>Bertya opposens</i>	Coolabah Bertya	V	V	N	None expected	None expected
<i>Monotaxis macrophylla</i>	Large-leafed Monotaxis	E1		N	None expected	None expected
<i>Bossiaea fragrans</i>		E4A	CE	N	None expected	None expected
<i>Cullen parvum</i>	Small Scurf-pea	E1		N	None expected	None expected
<i>Indigofera efoliata</i>	Leafless Indigo	E1,3	E	N	None expected	None expected
<i>Pultenaea humilis</i>	Dwarf Bush-pea	V		N	None expected	None expected
<i>Swainsona murrayana</i>	Slender Darling Pea	V	V	N	15.23 ha	9.09 ha
<i>Swainsona plagiotropis</i>	Red Darling Pea	V	V	N	12.56 ha	5.05 ha
<i>Swainsona recta</i>	Small Purple-pea	E1	E	N	0.70 ha	None expected
<i>Swainsona sericea</i>	Silky Swainson-pea	V		N	112.25 ha	23.92 ha
<i>Acacia ausfeldii</i>	Ausfeld's Wattle	V		N	0.70 ha	None expected

Scientific Name	Common Name	*NSW Status	+Comm. Status	Records < 10 km	Potential Impact (Subject Site)	Potential Impact (Future Expansion Area)
<i>Acacia meiantha</i>		E1	E	N	None expected	None expected
<i>Acacia pendula</i>	Acacia pendula population in the Hunter catchment	E2		N	None expected	None expected
<i>Acacia phasmoides</i>	Phantom Wattle	V	V	N	None expected	None expected
<i>Myriophyllum implicatum</i>		E4A,2		N	4.07 ha	2.43 ha
<i>Commersonia procumbens</i>		V	V	N	None expected	None expected
<i>Pilularia novae-hollandiae</i>	Austral Pillwort	E1,3		N	16.63 ha	7.48 ha
<i>Eucalyptus aggregata</i>	Black Gum	V	V	N	None expected	None expected
<i>Eucalyptus alligatrix</i> subsp. <i>alligatrix</i>		V	V	N	None expected	None expected
<i>Eucalyptus camaldulensis</i>	Eucalyptus camaldulensis population in the Hunter catchment	E2		N	None expected	None expected
<i>Eucalyptus cannonii</i>	Capertee Stringybark	V		N	None expected	None expected
<i>Eucalyptus robertsonii</i> subsp. <i>hemisphaerica</i>	Robertson's Peppermint	V	V	N	None expected	None expected
<i>Homoranthus darwinoides</i>	Fairy Bells	V	V	N	None expected	None expected
<i>Homoranthus prolixus</i>	Granite Homoranthus	V	V	N	None expected	None expected
<i>Caladenia arenaria</i>	Sand-hill Spider Orchid	E1,P,2	E	N	None expected	None expected
<i>Caladenia concolor</i>	Crimson Spider Orchid	E1,P,2	V	N	None expected	None expected
<i>Caladenia rosella</i>	Rosella Spider Orchid	E4,P,2	E	N	None expected	None expected
<i>Caladenia tessellata</i>	Thick Lip Spider Orchid	E1,P,2	V	N	None expected	None expected
<i>Cymbidium canaliculatum</i>	Cymbidium canaliculatum population in the Hunter Catchment	E2,P,2		N	None expected	None expected
<i>Diuris tricolor</i>	Pine Donkey Orchid	V,P,2		N	3.37 ha	4.04 ha

Scientific Name	Common Name	*NSW Status	+Comm. Status	Records < 10 km	Potential Impact (Subject Site)	Potential Impact (Future Expansion Area)
<i>Prasophyllum petilum</i>	Tarengo Leek Orchid	E1,P,2	E	N	None expected	None expected
<i>Pterostylis cobarensis</i>	Greenhood Orchid	V,P,2		N	None expected	None expected
<i>Prasophyllum</i> sp. Wybong		P	CE	N	97.02 ha	14.83 ha
<i>Euphrasia arguta</i>		E4A	CE	N	0.70 ha	None expected
<i>Euphrasia collina</i> subsp. <i>muelleri</i>	Mueller's Eyebright	E1	E	N	None expected	None expected
<i>Amphibromus fluitans</i>	Floating Swamp Wallaby-grass	V	V	N	None expected	None expected
<i>Austrostipa wakoolica</i>	A spear-grass	E1	E	N	99.69 ha	18.87 ha
<i>Dichanthium setosum</i>	Bluegrass	V	V	Y	109.58 ha	19.88 ha
<i>Digitaria porrecta</i>	Finger Panic Grass	E1		N	12.56 ha	5.05 ha
<i>Polygala linariifolia</i>	Native Milkwort	E1		N	None expected	None expected
<i>Muehlenbeckia</i> sp. Mt Norman	Scrambling Lignum	V		N	None expected	None expected
<i>Grevillea wilkinsonii</i>	Tumut Grevillea	E4A	E	N	None expected	None expected
<i>Persoonia marginata</i>	Clandulla Geebung	V,P	V	N	None expected	None expected
<i>Cheilanthes sieberi</i> subsp. <i>pseudovellea</i>		E1,3		N	None expected	None expected
<i>Pomaderris cotoneaster</i>	Cotoneaster Pomaderris	E1	E	N	None expected	None expected
<i>Pomaderris queenslandica</i>	Scant Pomaderris	E1		N	None expected	None expected
<i>Boronia granitica</i>	Granite Boronia	V,P	E	N	None expected	None expected
<i>Zieria ingramii</i>	Keith's Zieria	E1	E	N	None expected	None expected
<i>Zieria obcordata</i>	Granite Zieria	E1	E	N	None expected	None expected
<i>Thesium australe</i>	Austral Toadflax	V	V	N	None expected	None expected
<i>Pimelea bracteata</i>		E4A		N	None expected	None expected

***NSW Status:** P=Protected, V=Vulnerable, E1=Endangered, E4A=Critically Endangered, 2=Category 2 sensitive species, 3=Category 3 sensitive species.

+Comm. Status: CE=Critically endangered, E=Endangered, V=Vulnerable

6.2.3 Impacts to BC Act- and EPBC Act-listed threatened and migratory fauna species

In total, 112 BC Act-listed threatened fauna species or populations are predicted to occur within the three IBRA Subregions that overlap the 10 km search area. Forty-eight of these species are also listed under the EPBC Act or federally protected by a migratory birds agreement. A list of these species, and whether the proposal is likely to impact them, is given in **Table 6-3**. The likelihood and severity of an impact is contingent on the nature of the final impact. Impacts are expected to 65 threatened fauna species within the subject site and 54 within the future expansion area.

Table 6-3. BC and EPBC Act-listed threatened or migratory fauna potentially impacted by proposal.

Scientific Name	Common Name	NSW Status	Comm. Status	Records < 10 km	Potential Impact (Subject Site)	Potential Impact (Future Expansion Area)
<i>Litoria booroolongensis</i>	Booroolong Frog	E1,P	E	N	None expected	None expected
<i>Litoria raniformis</i>	Southern Bell Frog	E1,P	V	N	4.07 ha	None expected
<i>Crinia sloanei</i>	Sloane's Froglet	V,P	E	N	2.67 ha	4.04 ha
<i>Chthonicola sagittata</i>	Speckled Warbler	V,P		N	3.37 ha	4.04 ha
<i>Circus assimilis</i>	Spotted Harrier	V,P		Y	115.62 ha	26.35 ha
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V,P		N	116.32 ha	26.35 ha
<i>Hamirostra melanosternon</i>	Black-breasted Buzzard	V,P,3		N	None expected	None expected
<i>Hieraaetus morphnoides</i>	Little Eagle	V,P		N	116.32 ha	26.35 ha
<i>Lophoictinia isura</i>	Square-tailed Kite	V,P,3		N	13.26 ha	5.05 ha
<i>Pandion cristatus</i>	Eastern Osprey	V,P,3		N	None expected	None expected
<i>Nettapus coromandelianus</i>	Cotton Pygmy-Goose	E1,P		N	4.07 ha	2.43 ha
<i>Oxyura australis</i>	Blue-billed Duck	V,P		N	None expected	None expected
<i>Stictonetta naevosa</i>	Freckled Duck	V,P		N	None expected	None expected

Scientific Name	Common Name	NSW Status	Comm. Status	Records < 10 km	Potential Impact (Subject Site)	Potential Impact (Future Expansion Area)
<i>Anseranas semipalmata</i>	Magpie Goose	V,P		Y	112.95 ha	22.31 ha
<i>Apus pacificus</i>	Fork-tailed Swift	P	C,J,K	N	Some marginal habitat impacted	Some marginal habitat impacted
<i>Hirundapus caudacutus</i>	White-throated Needletail	P	V,C,J,K	N	116.32 ha	26.35 ha
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E1,P	E	N	4.07 ha	2.43 ha
<i>Ixobrychus flavicollis</i>	Black Bittern	V,P		N	None expected	None expected
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V,P		N	116.32 ha	26.35 ha
<i>Burhinus grallarius</i>	Bush Stone-curlew	E1,P		N	3.37 ha	4.04 ha
<i>^^Calyptrorhynchus banksii samueli</i>	Red-tailed Black-Cockatoo (inland subspecies)	V,P,2		N	12.56 ha	5.05 ha
<i>^^Calyptrorhynchus lathamii</i>	Glossy Black-Cockatoo	V,P,2		N	3.37 ha	4.04 ha
<i>^^Lophochroa leadbeateri</i>	Major Mitchell's Cockatoo	V,P,2		N	112.25 ha	23.92 ha
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V,P,3		N	None expected	None expected
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	E1,P		N	None expected	None expected
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V,P		Y	0.70 ha	None expected
<i>Cuculus optatus</i>	Oriental Cuckoo	P	C,J,K	N	None expected	None expected
<i>Stagonopleura guttata</i>	Diamond Firetail	V,P		Y	112.25 ha	23.92 ha
<i>^^Falco hypoleucos</i>	Grey Falcon	E1,P,2		N	115.62 ha	26.35 ha
<i>Falco subniger</i>	Black Falcon	V,P		Y	116.32 ha	26.35 ha
<i>Grus rubicunda</i>	Brolga	V,P		Y	19.30 ha	11.52 ha
<i>Gelochelidon nilotica</i>	Gull-billed Tern	P	C	N	None expected	None expected

Scientific Name	Common Name	NSW Status	Comm. Status	Records < 10 km	Potential Impact (Subject Site)	Potential Impact (Future Expansion Area)
<i>Hydroprogne caspia</i>	Caspian Tern	P	J	N	None expected	None expected
<i>Thalasseus bergii</i>	Crested Tern	P	J	N	None expected	None expected
<i>Leipoa ocellata</i>	Malleefowl	E1,P	V	N	None expected	None expected
<i>Anthochaera phrygia</i>	Regent Honeyeater	E4A,P	CE	N	0.70 ha	None expected
<i>Certhionyx variegatus</i>	Pied Honeyeater	V,P		N	2.67 ha	4.04 ha
<i>Epthianura albifrons</i>	White-fronted Chat	V,P		N	112.95 ha	22.31 ha
<i>Grantiella picta</i>	Painted Honeyeater	V,P	V	Y	3.37 ha	None expected
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	V,P		N	0.70 ha	None expected
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V,P		N	3.37 ha	4.04 ha
<i>Ardeotis australis</i>	Australian Bustard	E1,P		Y	115.62 ha	26.35 ha
<i>Pachycephala inornata</i>	Gilbert's Whistler	V,P		N	None expected	None expected
<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south-eastern form)	V,P		N	3.37 ha	4.04 ha
<i>Petroica boodang</i>	Scarlet Robin	V,P		N	99.69 ha	18.87 ha
<i>Petroica phoenicea</i>	Flame Robin	V,P		N	98.99 ha	18.87 ha
<i>Petroica rodinogaster</i>	Pink Robin	V,P		N	None expected	None expected
<i>Phaethon rubricauda</i>	Red-tailed Tropicbird	V,P	C,J	N	None expected	None expected
<i>Pomatostomus halli</i>	Hall's Babbler	V,P		N	None expected	None expected
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V,P		Y	99.69 ha	18.87 ha
<i>Pycnoptilus floccosus</i>	Pilotbird	P	V	N	None expected	None expected
<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet	V,P,3		N	None expected	None expected

Scientific Name	Common Name	NSW Status	Comm. Status	Records < 10 km	Potential Impact (Subject Site)	Potential Impact (Future Expansion Area)
<i>Glossopsitta pusilla</i>	Little Lorikeet	V,P		N	0.70 ha	None expected
<i>Lathamus discolor</i>	Swift Parrot	E1,P,3	CE	N	99.69 ha	18.87 ha
<i>Neophema pulchella</i>	Turquoise Parrot	V,P,3		Y	3.37 ha	4.04 ha
<i>Polytelis swainsonii</i>	Superb Parrot	V,P,3	V	Y	112.25 ha	23.92 ha
<i>Rostratula australis</i>	Australian Painted Snipe	E1,P	E	N	Some marginal habitat impacted	Some marginal habitat impacted
<i>Actitis hypoleucos</i>	Common Sandpiper	P	C,J,K	N	Some marginal habitat impacted	Some marginal habitat impacted
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	P	C,J,K	N	Some marginal habitat impacted	Some marginal habitat impacted
<i>Calidris ferruginea</i>	Curlew Sandpiper	E1,P	CE,C,J,K	N	Some marginal habitat impacted	Some marginal habitat impacted
<i>Calidris ruficollis</i>	Red-necked Stint	P	C,J,K	N	Some marginal habitat impacted	Some marginal habitat impacted
<i>Gallinago hardwickii</i>	Latham's Snipe	P	J,K	Y	Some marginal habitat impacted	Some marginal habitat impacted
<i>Limosa lapponica</i>	Bar-tailed Godwit	P	C,J,K	N	Some marginal habitat impacted	Some marginal habitat impacted
<i>Limosa limosa</i>	Black-tailed Godwit	V,P	C,J,K	N	Some marginal habitat impacted	Some marginal habitat impacted
<i>Tringa glareola</i>	Wood Sandpiper	P	C,J,K	N	Some marginal habitat impacted	Some marginal habitat impacted
<i>Tringa nebularia</i>	Common Greenshank	P	C,J,K	N	Some marginal	Some marginal habitat impacted

Scientific Name	Common Name	NSW Status	Comm. Status	Records < 10 km	Potential Impact (Subject Site)	Potential Impact (Future Expansion Area)
					habitat impacted	
<i>Tringa stagnatilis</i>	Marsh Sandpiper	P	C,J,K	N	Some marginal habitat impacted	Some marginal habitat impacted
<i>Ninox connivens</i>	Barking Owl	V,P,3		N	7.44 ha	6.47 ha
<i>Ninox strenua</i>	Powerful Owl	V,P,3		N	None expected	None expected
<i>Turnix maculosus</i>	Red-backed Button-quail	V,P		N	100.39 ha	19.88 ha
<i>Tyto longimembris</i>	Eastern Grass Owl	V,P,3		N	None expected	None expected
<i>Tyto novaehollandiae</i>	Masked Owl	V,P,3		N	7.44 ha	6.47 ha
<i>Synemon plana</i>	Golden Sun Moth	E1	CE	N	None expected	None expected
<i>Keyacris scurra</i>	Key's Matchstick Grasshopper	E1		N	None expected	None expected
<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V,P		N	None expected	None expected
<i>Antechinomys laniger</i>	Kultarr	E1,P		N	112.25 ha	23.92 ha
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V,P	E	N	0.70 ha	None expected
<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale	V,P		N	0.70 ha	None expected
<i>Sminthopsis macroura</i>	Stripe-faced Dunnart	V,P		N	12.56 ha	5.05 ha
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V,P		Y	20.00 ha	11.52 ha
<i>Macropus dorsalis</i>	Black-striped Wallaby	E1,P		N	None expected	None expected
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	E1,P	V	N	0.70 ha	None expected
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V,P		N	0.70 ha	None expected
<i>Conilurus albipes</i>	White-footed Tree-rat	E4,P	X	N	None expected	None expected
<i>Leporillus apicalis</i>	Lesser Stick-nest Rat	E4,P	X	N	None expected	None expected

Scientific Name	Common Name	NSW Status	Comm. Status	Records < 10 km	Potential Impact (Subject Site)	Potential Impact (Future Expansion Area)
<i>Leporillus conditor</i>	Greater Stick-nest Rat	E4,P	V	N	None expected	None expected
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	P	V	N	None expected	None expected
<i>Pseudomys oralis</i>	Hastings River Mouse	E1,P	E	N	None expected	None expected
<i>Pseudomys pilligaensis</i>	Pilliga Mouse	V,P	V	N	None expected	None expected
<i>Petaurus australis</i>	Yellow-bellied Glider	V,P		N	None expected	None expected
<i>Petaurus norfolcensis</i>	Squirrel Glider	V,P		N	3.37 ha	4.04 ha
<i>Petaurus norfolcensis</i>	Squirrel Glider in the Wagga Wagga Local Government Area	E2,V,P		N	None expected	None expected
<i>Phascolarctos cinereus</i>	Koala	V,P	V	Y	103.76 ha	21.30 ha
<i>Aepyprymnus rufescens</i>	Rufous Bettong	V,P		N	None expected	None expected
<i>Bettongia lesueur graii</i>	Boodie, Burrowing Bettong (mainland)	E4,P	X	N	None expected	None expected
<i>Petauroides volans</i>	Greater Glider	P	V	N	None expected	None expected
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V,P	V	Y	None expected	None expected
<i>Macrotis lagotis</i>	Bilby	E4,P	V	N	None expected	None expected
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V,P	V	N	0.70 ha	None expected
<i>Chalinolobus picatus</i>	Little Pied Bat	V,P		Y	7.44 ha	6.47 ha
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V,P		N	None expected	None expected
<i>Myotis macropus</i>	Southern Myotis	V,P		N	None expected	None expected
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	V,P	V	N	3.37 ha	4.04 ha
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V,P		N	None expected	None expected

Scientific Name	Common Name	NSW Status	Comm. Status	Records < 10 km	Potential Impact (Subject Site)	Potential Impact (Future Expansion Area)
<i>Vespadelus troughtoni</i>	Eastern Cave Bat	V,P		N	None expected	None expected
<i>Hoplocephalus bitorquatus</i>	Pale-headed Snake	V,P		N	4.07 ha	2.43 ha
<i>Aprasia parapulchella</i>	Pink-tailed Legless Lizard	V,P	V	N	96.32 ha	14.83 ha
<i>Delma impar</i>	Striped Legless Lizard	V,P	V	N	None expected	None expected
<i>Aspidites ramsayi</i>	Woma	V,P		N	None expected	None expected
<i>Hemiaspis demelii</i>	Grey Snake	E1,P	E	N	None expected	None expected
<i>Varanus rosenbergi</i>	Rosenberg's Goanna	V,P		N	None expected	None expected
<i>Tympanocryptis lineata</i>	Canberra Grassland Earless Dragon	E4A,P	E	N	None expected	None expected

***NSW Status:** P=Protected, V=Vulnerable, E1=Endangered, E2=Endangered Population, E4=Extinct, E4A=Critically Endangered, 2=Category 2 sensitive species, 3=Category 3 sensitive species.

+**Comm. Status:** CE=Critically endangered, E=Endangered, V=Vulnerable

6.2.4 Matters of National Environmental Significance

Impacts to 42 threatened, migratory or marine species and one TEC identified as Matters of National Environmental Significance may result from this proposal. These matters are discussed in **Appendix D**. Note that this does not include impacts to Bluegrass (*Dichanthium setosum*), which was not identified in the Protected Matters Report. The significance of these impacts should be considered in any future biodiversity assessments associated with this proposal.

6.2.5 Impact to habitat features

Hollow-bearing trees and stags constitute important habitat for threatened bird and bat species, including those detected by recording devices and during the field survey. This proposal would reduce available habitat for these species in the area. The subject site was found to contain 44 hollow-bearing live or dead trees, possessing a total of 28 large (≥ 20 cm) and 99 small (< 20 cm) hollows. The future expansion area contained an additional six hollow-bearing trees, possessing a total of one large and 14 small hollows. Additional hollows were noted in the northern road corridor but were not mapped in detail. One stick nest occurs within the subject site and several more occur adjacent to the subject site, including in the northern road corridor.

6.2.6 Injury and mortality

During the construction phase of the proposal, the removal of hollow logs, felling of trees and removal of stags is likely to disturb fauna.

In addition, fauna may become trapped in or may choose to shelter in machinery that is stored in the study area overnight. If these animals were to remain inside the machinery, or under the wheels or tracks, they may be injured or die once the machinery is in use.

6.3 INDIRECT/OPERATIONAL IMPACTS

6.3.1 Wildlife connectivity and habitat fragmentation

The proposal has the potential to cause habitat fragmentation for wildlife. The removal of the central row of trees and areas of remnant woodland within the subject site would likely disrupt landscape connectivity for many species that rely on enclosed vegetation when moving.

6.3.2 Edge effects on adjacent native vegetation and habitat

Clearing of vegetation has the potential to cause significant edge effects on any surviving or surrounding vegetation. These effects include:

- Changes to the micro-climate.
- Weed proliferation.
- Increases in pest animals.
- Impacts from surrounding areas, e.g. spray-drift from agriculture or litter associated with roadways.
- Increased noise, light, and movement.

While many edge effects are already active in the landscape, owing to the agricultural history of the site and the presence of nearby roads and infrastructure, this proposal has the potential to exacerbate these effects. This should be considered in managing impacts.

6.3.3 Invasion and spread of weeds

Proliferation of weed species is an indirect impact (i.e. not a direct result) of proposal activities. The most likely causes of weed dispersal and importation associated with the proposal include earthworks, movement of soil, and attachment of seed (and other propagules) to vehicles and machinery. Removal of existing vegetation creates niches that allow invasive species to flourish. Weed encroachment spans several listed Key Threatening Processes, including *Invasion and establishment of exotic vines and scramblers*, *Invasion and establishment of Scotch Broom (Cytisus scoparius)*, *Invasion of native plant communities by African Olive Olea europaea subsp. cuspidata*, *Invasion of native plant communities by Chrysanthemoides monilifera*, *Invasion of*

native plant communities by exotic perennial grasses and Invasion, establishment and spread of Lantana (see **Appendix E**).

6.3.4 Invasion and spread of pathogens and disease

Several pathogens known from NSW have the potential to impact on biodiversity due to their movement and infection during construction. Of these, three are listed as a key threatening process under either the EPBC Act and/or BC Act including:

- Dieback caused by *Phytophthora* (Root Rot; EPBC Act and BC Act)
- Infection of frogs by amphibian chytrid fungus causing the disease chytridiomycosis (EPBC Act and BC Act)
- Introduction and establishment of exotic Rust Fungi of the order *Pucciniales* on plants of the family *Myrtaceae* (BC Act).

These pathogens were not observed or tested for in the study area. The most likely causes of pathogen dispersal and importation associated with the proposal include earthworks, movement of soil, and attachment of plant matter to vehicles and machinery.

6.4 CUMULATIVE IMPACTS

The potential biodiversity impacts of the proposal must be considered in light of the long history of clearing and biodiversity loss to which the surrounding lands have been subjected. This proposal will not act alone in contributing to the loss of biodiversity in the region; instead, it will form one contribution to the ongoing and, in some cases, intensifying loss of native biodiversity. The incremental effects of multiple sources of impact (past, present, and future) are referred to as cumulative impacts and provide an opportunity to consider the proposal within a strategic context. These cumulative impacts are having and continue to have a significant impact on biodiversity in the local region. Historical impacts associated with agriculture have profoundly altered the landscape, resulting in widespread and dramatic loss of biodiversity. Development associated with the Inland Rail, development for energy infrastructure, and continuing agricultural impacts represents perhaps the most significant ongoing cause of decline in local biodiversity.

7 CONCLUSION

The following summary of findings is provided to assist with ongoing project planning.

The proposal would clear up to 118.04 ha of vegetation within the subject site belonging to five Plant Community Types (PCTs):

- PCT 45 – Plains Grass grassland on alluvial mainly clay soils in the Riverina Bioregion and NSW South Western Slopes Bioregion.
- PCT 53 – Shallow freshwater wetland sedgeland in depressions on floodplains on inland alluvial plains and floodplains.
- PCT 82 – Western Grey Box - Poplar Box - White Cypress Pine tall woodland on red loams mainly of the eastern Cobar Peneplain Bioregion.
- PCT 201 – Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion.
- PCT 250 – Derived tussock grassland of the central western plains and lower slopes of NSW.

The most common of these was PCT 250 (96.32 ha), followed by PCT 45 (12.56 ha), PCT 53 (4.07 ha), PCT 82 (2.67 ha), and PCT 201 (0.70 ha). The proposal would additionally clear up to 26.37 ha of vegetation within the future expansion area, belonging to PCTs 45 (5.05 ha), 53 (2.43 ha), 82 (4.04 ha) and 250 (14.83 ha).

Two Threatened Ecological Communities (TECs) were positively identified within the subject site and one within the future expansion area:

- BC Act, Endangered: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions. (Subject site: 8.79 ha. Future expansion area: 16.62 ha).
- EPBC Act, Endangered: Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia. (Subject site: 7.86 ha. Future expansion area: 16.62 ha).

An additional TEC was provisionally identified within the subject site and future expansion area, pending reassessment during the appropriate season (spring):

- EPBC Act, Endangered: Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia. (Subject site: 7.86 ha. Future expansion area: 16.62 ha).

Additional areas of these TECs occur on the northern side of the Cragie Lea Lane road corridor. A greater extent of the BC Act-listed Fuzzy Box Endangered Ecological Community (EEC) occurs on this northern side than within the subject site.

One threatened plant species, Bluegrass (*Dichanthium setosum*), was recorded during the field survey. One small population was recorded within the subject site and one larger population within the future expansion area. Four additional populations were recorded within the initial assessment area during surveys in April 2021. This species is listed as vulnerable under the BC

and EPBC Acts. As the subject site is located at the southern limit of the known range of this species, this occurrence is likely to constitute an important population. Consequently, impacts to this species may be deemed significant and therefore trigger entry into the Biodiversity Offsets Scheme and/or referral to the Minister under the EPBC Act.

Six threatened fauna species (four birds and two bats) were detected either during the field surveys or by means of recording devices. All six species are listed as vulnerable under the BC Act, while one, the Superb Parrot (*Polytelis swainsonii*), is also listed as vulnerable under the EPBC Act. As these species are highly mobile, they are likely to make use of both the subject site and future expansion area, as well as much of the road corridor.

A total of 175 threatened species or populations are known or predicted to occur within the three IBRA subregions that fall within 10 km of the subject site. Impacts to 81 of these may occur as a result of clearing of the subject site. Clearing of the future expansion area may result in impacts to 67 of these species. Impacts to up to 42 species identified by a Matters of National Environmental Significance search may result from future development within these areas. Tests of significance have not been conducted for these species; consequently, it cannot be stated with certainty whether these impacts would be significant. In the case of many species, particularly marine and migratory species, the impacts are likely to be negligible.

The field survey identified 44 hollow-bearing trees (42 live and two dead) within the subject site and an additional six (all live) within the future expansion area (**Figure 5-1**). Hollows were classed as either small (< 20 cm diameter) or large (≥ 20 cm diameter) to provide an indication of the species most likely to make use of them. The trees within the subject site contained a total of 28 large and 99 small hollows, as well as one stick nest. Six habitat trees (all live) were recorded within the future expansion area, containing a total of one large and 14 small hollows. Additional habitat trees containing nests and hollows were recorded in the northern side of the road corridor and outside of the western limit of the subject site within the southern road corridor.

The most significant identified constraints associated with any proposal situated in the subject site or future expansion area are the relatively large areas of TEC that would be impacted and the presence of the threatened Bluegrass. Efforts to reduce impacts to these entities are strongly encouraged in order for future development to comply with the requirement to avoid and/or minimise impacts to biodiversity values.

This report covers the current form of the proposal and is intended only to assess constraints and limitations within the proposal site. It does not constitute a finalised biodiversity assessment.

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Appendix A - Database search results



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: 26-Apr-2023

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[Details](#)

[Matters of NES](#)

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

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[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)	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	41
Listed Migratory Species:	9

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:	3
Commonwealth Heritage Places:	None
Listed Marine Species:	16
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:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	3
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	700 - 800km upstream from Ramsar site	In feature area
Riverland	600 - 700km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	800 - 900km upstream from Ramsar site	In feature area
The macquarie marshes	100 - 150km upstream from Ramsar site	In buffer area only

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	Buffer Status
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community may occur within area	In feature area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area	In feature area
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community may occur within area	In buffer area only
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area	In feature area
Weeping Myall Woodlands	Endangered	Community likely to occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area	In feature area

Community Name	Threatened Category	Presence Text	Buffer Status
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	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<u>Leipoa ocellata</u> Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<u>Lophochroa leadbeateri leadbeateri</u> Major Mitchell's Cockatoo (eastern), Eastern Major Mitchell's Cockatoo [82926]	Endangered	Species or species habitat likely to occur within area	In feature area
<u>Melanodryas cucullata cucullata</u> South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area	In feature area
<u>Neophema chrysostoma</u> Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area	In feature area
<u>Polytelis swainsonii</u> Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area	In feature area
<u>Rostratula australis</u> Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
<u>Stagonopleura guttata</u> Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In feature area
FISH			
<u>Bidyanus bidyanus</u> Silver Perch, Bidyan [76155]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
<u>Maccullochella macquariensis</u> Trout Cod [26171]	Endangered	Species or species habitat likely to occur within area	In buffer area only
<u>Maccullochella peelii</u> Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
<u>Macquaria australasica</u> Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area	In buffer area only
FROG			

Scientific Name	Threatened Category	Presence Text	Buffer Status
<u>Crinia sloanei</u> Sloane's Froglet [59151]	Endangered	Species or species habitat may occur within area	In buffer area only
MAMMAL			
<u>Chalinolobus dwyeri</u> Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area	In feature area
<u>Dasyurus maculatus maculatus (SE mainland population)</u> Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area	In feature area
<u>Nyctophilus corbeni</u> Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<u>Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)</u> Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area	In feature area
<u>Pteropus poliocephalus</u> Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In feature area
PLANT			
<u>Androcalva procumbens</u> [87153]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
<u>Austrostipa wakoolica</u> [66623]	Endangered	Species or species habitat may occur within area	In feature area
<u>Homoranthus darwinioides</u> [12974]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<u>Lepidium aschersonii</u> Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lepidium monoplacoides Winged Pepper-cress [9190]	Endangered	Species or species habitat may occur within area	In feature area
Prasophyllum petilum Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area	In buffer area only
Prasophyllum sp. Wybong (C.Phelps ORG 5269) a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Swainsona recta Small Purple-pea, Mountain Swainson-pea, Small Purple Pea [7580]	Endangered	Species or species habitat may occur within area	In buffer area only
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Vincetoxicum forsteri listed as Tylophora linearis [92384]	Endangered	Species or species habitat may occur within area	In buffer area only
REPTILE			
Anomalopus mackayi Five-clawed Worm-skink, Long-legged Worm-skink [25934]	Vulnerable	Species or species habitat may occur within area	In feature area
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat may occur within area	In feature area
Listed Migratory Species		[Resource Information]	
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands

[\[Resource Information \]](#)

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Communications, Information Technology and the Arts - Australian Postal Corporation		
Commonwealth Land - Australian Postal Commission [14064]	NSW	In buffer area only

Communications, Information Technology and the Arts - Telstra Corporation Limited

Commonwealth Land - Australian Telecommunications Commission [14066]	NSW	In buffer area only
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Unknown

Commonwealth Land - [14065]	NSW	In buffer area only
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Listed Marine Species

[\[Resource Information \]](#)

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<u>Chalcites osculans as Chrysococcyx osculans</u> Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
<u>Gallinago hardwickii</u> Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area overfly marine area	In feature area
<u>Haliaeetus leucogaster</u> White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
<u>Hirundapus caudacutus</u> White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
<u>Lathamus discolor</u> Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
<u>Merops ornatus</u> Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
<u>Motacilla flava</u> Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
<u>Myiagra cyanoleuca</u> Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
<u>Neophema chrysostoma</u> Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rostratula australis as Rostratula benghalensis (sensu lato)			
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

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

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Narwonah Materials Distribution Centre	2022/09226		Completed	In feature area

Controlled action

Parkes to Narromine Section Inland Rail, NSW	2016/7731	Controlled Action	Post-Approval	In buffer area only
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Not controlled action

Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
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Bioregional Assessments

SubRegion	BioRegion	Website	Buffer Status
Central West	Northern Inland Catchments	BA website	In buffer area only

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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BioNET Atlas search – threatened species predicted to occur within the Bogan-Macquarie, Inland Slopes, and Pilliga IBRA subregions.

Key

*NSW Status: P=Protected, V=Vulnerable, E1=Endangered, E2=Endangered population, E4=Extinct, E4A=Critically endangered, 2=Category 2 sensitive species, 3=Category 3 sensitive species.

*Comm. Status: C=CAMBA, J=JAMBA, K=ROKAMBA, CE=Critically endangered, E=Endangered, V=Vulnerable.

*Number of Records: P = predicted to occur.

Kingdom	Scientific Name	Common Name	NSW Status	Comm. Status	Total Records
Amphibia	<i>Crinia sloanei</i>	Sloane's Froglet	V,P	E	157
Amphibia	<i>Litoria booroolongensis</i>	Booroolong Frog	E1,P	E	34
Amphibia	<i>Litoria raniformis</i>	Southern Bell Frog	E1,P	V	12
Aves	<i>^Calyptrorhynchus banksii samueli</i>	Red-tailed Black-Cockatoo (inland subspecies)	V,P,2		5
Aves	<i>^Calyptrorhynchus lathamii</i>	Glossy Black-Cockatoo	V,P,2	V	1110
Aves	<i>^Falco hypoleucos</i>	Grey Falcon	V,P,2	V	8
Aves	<i>^Lophochroa leadbeateri</i>	Major Mitchell's Cockatoo	V,P,2		57
Aves	<i>Actitis hypoleucos</i>	Common Sandpiper	P	C,J,K	8
Aves	<i>Anseranas semipalmata</i>	Magpie Goose	V,P		168
Aves	<i>Anthochaera phrygia</i>	Regent Honeyeater	E4A,P	CE	229
Aves	<i>Apus pacificus</i>	Fork-tailed Swift	P	C,J,K	57
Aves	<i>Ardeotis australis</i>	Australian Bustard	E1,P		24
Aves	<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V,P		2817
Aves	<i>Botaurus poiciloptilus</i>	Australasian Bittern	E1,P	E	68
Aves	<i>Burhinus grallarius</i>	Bush Stone-curlew	E1,P		27
Aves	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	P	C,J,K	102
Aves	<i>Calidris ferruginea</i>	Curlew Sandpiper	E1,P	CE,C,J,K	6
Aves	<i>Calidris ruficollis</i>	Red-necked Stint	P	C,J,K	7
Aves	<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V,P,3	E	377
Aves	<i>Certhionyx variegatus</i>	Pied Honeyeater	V,P		10
Aves	<i>Chthonicola sagittata</i>	Speckled Warbler	V,P		2563
Aves	<i>Circus assimilis</i>	Spotted Harrier	V,P		209
Aves	<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V,P		6087
Aves	<i>Cuculus optatus</i>	Oriental Cuckoo	P	C,J,K	1
Aves	<i>Daphoenositta chrysoptera</i>	Varied Sittella	V,P		848
Aves	<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	E1,P		12
Aves	<i>Epthianura albifrons</i>	White-fronted Chat	V,P		148

Kingdom	Scientific Name	Common Name	NSW Status	Comm. Status	Total Records
Aves	<i>Falco subniger</i>	Black Falcon	V,P		155
Aves	<i>Gallinago hardwickii</i>	Latham's Snipe	P	J,K	176
Aves	<i>Gelochelidon nilotica</i>	Gull-billed Tern	P	C	11
Aves	<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet	V,P,3		9
Aves	<i>Glossopsitta pusilla</i>	Little Lorikeet	V,P		748
Aves	<i>Grantiella picta</i>	Painted Honeyeater	V,P	V	137
Aves	<i>Grus rubicunda</i>	Brolga	V,P		218
Aves	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V,P		257
Aves	<i>Hamirostra melanosternon</i>	Black-breasted Buzzard	V,P,3		6
Aves	<i>Hieraaetus morphnoides</i>	Little Eagle	V,P		521
Aves	<i>Hirundapus caudacutus</i>	White-throated Needletail	P	V,C,J,K	195
Aves	<i>Hydroprogne caspia</i>	Caspian Tern	P	J	23
Aves	<i>Ixobrychus flavicollis</i>	Black Bittern	V,P		2
Aves	<i>Lathamus discolor</i>	Swift Parrot	E1,P	CE	239
Aves	<i>Leipoa ocellata</i>	Malleefowl	E1,P	V	73
Aves	<i>Limosa lapponica</i>	Bar-tailed Godwit	P	C,J,K	1
Aves	<i>Limosa limosa</i>	Black-tailed Godwit	V,P	C,J,K	2
Aves	<i>Lophoictinia isura</i>	Square-tailed Kite	V,P,3		87
Aves	<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south-eastern form)	V,P		917
Aves	<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	V,P		683
Aves	<i>Neophema pulchella</i>	Turquoise Parrot	V,P,3		935
Aves	<i>Nettapus coromandelianus</i>	Cotton Pygmy-Goose	E1,P		2
Aves	<i>Ninox connivens</i>	Barking Owl	V,P,3		232
Aves	<i>Ninox strenua</i>	Powerful Owl	V,P,3		26
Aves	<i>Oxyura australis</i>	Blue-billed Duck	V,P		60
Aves	<i>Pachycephala inornata</i>	Gilbert's Whistler	V,P		147
Aves	<i>Pandion cristatus</i>	Eastern Osprey	V,P,3		2
Aves	<i>Petroica boodang</i>	Scarlet Robin	V,P		778
Aves	<i>Petroica phoenicea</i>	Flame Robin	V,P		710
Aves	<i>Petroica rodinogaster</i>	Pink Robin	V,P		2
Aves	<i>Phaethon rubricauda</i>	Red-tailed Tropicbird	V,P	C,J	1
Aves	<i>Polytelis swainsonii</i>	Superb Parrot	V,P,3	V	4669
Aves	<i>Pomatostomus halli</i>	Hall's Babbler	V,P		1

Kingdom	Scientific Name	Common Name	NSW Status	Comm. Status	Total Records
Aves	<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V,P		3123
Aves	<i>Pycnoptilus floccosus</i>	Pilotbird	P	V	1
Aves	<i>Rostratula australis</i>	Australian Painted Snipe	E1,P	E	21
Aves	<i>Stagonopleura guttata</i>	Diamond Firetail	V,P		1856
Aves	<i>Stictonetta naevosa</i>	Freckled Duck	V,P		80
Aves	<i>Thalasseus bergii</i>	Crested Tern	P	J	1
Aves	<i>Tringa glareola</i>	Wood Sandpiper	P	C,J,K	5
Aves	<i>Tringa nebularia</i>	Common Greenshank	P	C,J,K	68
Aves	<i>Tringa stagnatilis</i>	Marsh Sandpiper	P	C,J,K	20
Aves	<i>Turnix maculosus</i>	Red-backed Button-quail	V,P		P
Aves	<i>Tyto longimembris</i>	Eastern Grass Owl	V,P,3		1
Aves	<i>Tyto novaehollandiae</i>	Masked Owl	V,P,3		22
Insecta	<i>Keyacris scurra</i>	Key's Matchstick Grasshopper	E1		5
Insecta	<i>Synemon plana</i>	Golden Sun Moth	V	V	130
Mammalia	<i>Aepyprymnus rufescens</i>	Rufous Bettong	V,P		2
Mammalia	<i>Antechinomys laniger</i>	Kultarr	E1,P		2
Mammalia	<i>Bettongia lesueur graii</i>	Boodie, Burrowing Bettong (mainland)	E4,P	X	2
Mammalia	<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V,P		45
Mammalia	<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V,P	V	46
Mammalia	<i>Chalinolobus picatus</i>	Little Pied Bat	V,P		76
Mammalia	<i>Conilurus albipes</i>	White-footed Tree-rat	E4,P	X	2
Mammalia	<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V,P	E	58
Mammalia	<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V,P		20
Mammalia	<i>Leporillus apicalis</i>	Lesser Stick-nest Rat	E4,P	X	1
Mammalia	<i>Leporillus conditor</i>	Greater Stick-nest Rat	E4,P	V	2
Mammalia	<i>Macropus dorsalis</i>	Black-striped Wallaby	E1,P		681
Mammalia	<i>Macrotis lagotis</i>	Bilby	E4,P	V	3
Mammalia	<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V,P		118
Mammalia	<i>Myotis macropus</i>	Southern Myotis	V,P		20

Kingdom	Scientific Name	Common Name	NSW Status	Comm. Status	Total Records
Mammalia	<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	V,P	V	107
Mammalia	<i>Petauroides volans</i>	Southern Greater Glider	E1,P	E	124
Mammalia	<i>Petaurus australis</i>	Yellow-bellied Glider	V,P	V	2
Mammalia	<i>Petaurus norfolcensis</i>	Squirrel Glider	V,P		1292
Mammalia	<i>Petaurus norfolcensis</i>	Squirrel Glider in the Wagga Wagga Local Government Area	V,P		528
Mammalia	<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	E1,P	V	56
Mammalia	<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale	V,P		P
Mammalia	<i>Phascolarctos cinereus</i>	Koala	E1,P	E	511
Mammalia	<i>Pseudomys novaehollandiae</i>	New Holland Mouse	P	V	8
Mammalia	<i>Pseudomys oralis</i>	Hastings River Mouse	E1,P	E	1
Mammalia	<i>Pseudomys pilligaensis</i>	Pilliga Mouse	V,P	V	176
Mammalia	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V,P	V	270
Mammalia	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V,P		170
Mammalia	<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V,P		4
Mammalia	<i>Sminthopsis macroura</i>	Stripe-faced Dunnart	V,P		1
Mammalia	<i>Vespadelus troughtoni</i>	Eastern Cave Bat	V,P		15
Reptilia	<i>Aprasia parapulchella</i>	Pink-tailed Legless Lizard	V,P	V	192
Reptilia	<i>Aspidites ramsayi</i>	Woma	V,P		P
Reptilia	<i>Delma impar</i>	Striped Legless Lizard	V,P	V	4
Reptilia	<i>Hemiaspis damelii</i>	Grey Snake	E1,P	E	8
Reptilia	<i>Hoplocephalus bitorquatus</i>	Pale-headed Snake	V,P		3
Reptilia	<i>Tympanocryptis lineata</i>	Canberra Grassland Earless Dragon	E4A,P	E	4
Reptilia	<i>Varanus rosenbergi</i>	Rosenberg's Goanna	V,P		6
Flora	<i>Caladenia arenaria</i>	Sand-hill Spider Orchid	E1,P,2	E	6
Flora	<i>Caladenia concolor</i>	Crimson Spider Orchid	E1,P,2	V	504
Flora	<i>Caladenia rosella</i>	Rosella Spider Orchid	E4,P,2	E	1

Kingdom	Scientific Name	Common Name	NSW Status	Comm. Status	Total Records
Flora	<i>Caladenia tessellata</i>	Thick Lip Spider Orchid	E1,P,2	V	1
Flora	<i>Cymbidium canaliculatum</i>	Cymbidium canaliculatum population in the Hunter Catchment	E2,P,2		1
Flora	<i>Diuris tricolor</i>	Pine Donkey Orchid	V,P,2		80
Flora	<i>Myriophyllum implicatum</i>		E4A,2		P
Flora	<i>Prasophyllum petilum</i>	Tarengo Leek Orchid	E1,P,2	E	25
Flora	<i>Pterostylis cobarensis</i>	Greenhood Orchid	V,P,2		175
Flora	<i>Acacia ausfeldii</i>	Ausfeld's Wattle	V		3932
Flora	<i>Acacia meiantha</i>		E1	E	P
Flora	<i>Acacia pendula</i>	Acacia pendula population in the Hunter catchment	E2		P
Flora	<i>Acacia phasmoides</i>	Phantom Wattle	V	V	95
Flora	<i>Ammobium craspedioides</i>	Yass Daisy	V	V	825
Flora	<i>Amphibromus fluitans</i>	Floating Swamp Wallaby-grass	V	V	30
Flora	<i>Atriplex infrequens</i>	A saltbush	V	V	1
Flora	<i>Austrostipa wakoolica</i>	A spear-grass	E1	E	P
Flora	<i>Bertya opposens</i>	Coolabah Bertya	V	V	224
Flora	<i>Boronia granitica</i>	Granite Boronia	V,P	E	1
Flora	<i>Bossiaea fragrans</i>		E4A	CE	55
Flora	<i>Brachyscome muelleroides</i>	Claypan Daisy	V	V	1
Flora	<i>Caesia parviflora</i> var. <i>minor</i>	Small Pale Grass-lily	E1		3
Flora	<i>Carex raleighii</i>	Raleigh Sedge	E1		1
Flora	<i>Cheilanthes sieberi</i> subsp. <i>pseudovellea</i>		E1,3		22
Flora	<i>Commersonia procumbens</i>		V	V	298
Flora	<i>Cullen parvum</i>	Small Scurf-pea	E1		7
Flora	<i>Cynanchum elegans</i>	White-flowered Wax Plant	E1	E	P
Flora	<i>Dichanthium setosum</i>	Bluegrass	V	V	13
Flora	<i>Digitaria porrecta</i>	Finger Panic Grass	E1		18
Flora	<i>Eriocaulon australasicum</i>	Austral Pipewort	E1	E	P
Flora	<i>Eucalyptus aggregata</i>	Black Gum	V	V	1
Flora	<i>Eucalyptus alligatrix</i> subsp. <i>alligatrix</i>		V	V	2
Flora	<i>Eucalyptus camaldulensis</i>	Eucalyptus camaldulensis	E2		P

Kingdom	Scientific Name	Common Name	NSW Status	Comm. Status	Total Records
		population in the Hunter catchment			
Flora	<i>Eucalyptus cannonii</i>	Capertee Stringybark	V		8
Flora	<i>Eucalyptus robertsonii</i> subsp. <i>hemisphaerica</i>	Robertson's Peppermint	V	V	P
Flora	<i>Euphrasia arguta</i>		E4A	CE	1
Flora	<i>Euphrasia collina</i> subsp. <i>muelleri</i>	Mueller's Eyebright	E1	E	P
Flora	<i>Grevillea wilkinsonii</i>	Tumut Grevillea	E4A	E	17
Flora	<i>Homoranthus darwinoides</i>	Fairy Bells	V	V	186
Flora	<i>Homoranthus prolixus</i>	Granite Homoranthus	V	V	1
Flora	<i>Indigofera efoliata</i>	Leafless Indigo	E1,3	E	6
Flora	<i>Lepidium aschersonii</i>	Spiny Peppercress	V	V	3
Flora	<i>Lepidium monophloeoides</i>	Winged Peppercress	E1	E	P
Flora	<i>Leucochrysum albicans</i> subsp. <i>tricolor</i>	Hoary Sunray	E1	E	33
Flora	<i>Monotaxis macrophylla</i>	Large-leaved Monotaxis	E1		2
Flora	<i>Muehlenbeckia</i> sp. Mt Norman	Scrambling Lignum	V		1
Flora	<i>Persoonia marginata</i>	Clandulla Geebung	V,P	V	P
Flora	<i>Pilularia novae-hollandiae</i>	Austral Pillwort	E1,3		5
Flora	<i>Pimelea bracteata</i>		E4A		1
Flora	<i>Polygala linariifolia</i>	Native Milkwort	E1		14
Flora	<i>Pomaderris cotoneaster</i>	Cotoneaster Pomaderris	E1	E	P
Flora	<i>Pomaderris queenslandica</i>	Scant Pomaderris	E1		45
Flora	<i>Prasophyllum</i> sp. Wybong		P	CE	P
Flora	<i>Pultenaea humilis</i>	Dwarf Bush-pea	V		8
Flora	<i>Senecio garlandii</i>	Woolly Ragwort	V		72
Flora	<i>Swainsona murrayana</i>	Slender Darling Pea	V	V	6
Flora	<i>Swainsona plagiotropis</i>	Red Darling Pea	V	V	4
Flora	<i>Swainsona recta</i>	Small Purple-pea	E1	E	737
Flora	<i>Swainsona sericea</i>	Silky Swainson-pea	V		234
Flora	<i>Thesium australe</i>	Austral Toadflax	V	V	2
Flora	<i>Tylophora linearis</i>		V	E	200
Flora	<i>Zieria ingramii</i>	Keith's Zieria	E1	E	422
Flora	<i>Zieria obcordata</i>	Granite Zieria	E1	E	26

BioNET Atlas search – threatened ecological communities predicted to occur within the Bogan-Macquarie, Inland Slopes, and Pilliga IBRA subregions

*NSW Status: E3=Endangered Ecological Community, E4B=Critically Endangered Ecological Community,

+Comm. Status: CE=Critically endangered, E=Endangered.

Records: K = known to occur, P = predicted to occur.

Community	NSW status	Comm. status	Records
Alpine Sphagnum Bogs and Associated Fens		E	K
Artesian Springs Ecological Community in the Great Artesian Basin	E4B		K
Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions	E3		K
Brigalow-Gidgee woodland/shrubland in the Mulga Lands and Darling Riverine Plains Bioregions	E3		P
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions		E	K
Carex Sedgeland of the New England Tableland, Nandewar, Brigalow Belt South and NSW North Coast Bioregions	E3		K
Central Hunter Valley eucalypt forest and woodland		CE	K
Coolac-Tumut Serpentine Shrubby Woodland in the NSW South Western Slopes and South Eastern Highlands Bioregions	E3		K
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions		E	K
Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions	E3		K
Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	E3		K
Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia		E	K
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	E3		K
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	E3		K
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland		CE	K
Pilliga Outwash Ephemeral Wetlands in the Brigalow Belt South Bioregion	E3		K
Poplar Box Grassy Woodland on Alluvial Plains		E	K
The community of native species dependent on natural discharge of groundwater from the Great Artesian Basin		E	K
Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion		E	K
Weeping Myall Woodlands		E	K
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and	E4B		K
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland		CE	K

Biodiversity Values Map



Biodiversity Values Map



1: 13,628



692.3 0 346.16 692.3 Metres
WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days

Notes

© NSW Department of Planning and Environment



Biodiversity Values Map and Threshold Report

Results Summary

Date of Calculation	26/04/2023 11:01 AM	BDAR Required*
Total Digitised Area	1,185,050.9 sqm	
Minimum Lot Size Method	LEP	
Minimum Lot Size 10,000sqm = 1ha	4,000,000 sqm	
Area Clearing Threshold 10,000sqm = 1ha	10,000 sqm	
Area clearing trigger Area of native vegetation cleared	Unknown #	Unknown #
Biodiversity values map trigger Impact on biodiversity values map(not including values added within the last 90 days)?	no	no
Date of the 90 day Expiry	N/A	

*If BDAR required has:

- at least one 'Yes': you have exceeded the BOS threshold. You are now required to submit a Biodiversity Development Assessment Report with your development application. Go to <https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor> to access a list of assessors who are accredited to apply the Biodiversity Assessment Method and write a Biodiversity Development Assessment Report
- 'No': you have not exceeded the BOS threshold. You may still require a permit from local council. Review the development control plan and consult with council. You may still be required to assess whether the development is "likely to significantly affect threatened species" as determined under the test in s. 7.3 of the Biodiversity Conservation Act 2016. You may still be required to review the area where no vegetation mapping is available.

Where the area of impact occurs on land with no vegetation mapping available, the tool cannot determine the area of native vegetation cleared and if this exceeds the Area Threshold. You will need to work out the area of native vegetation cleared - refer to the BMAT user guide for how to do this.

On and after the 90 day expiry date a BDAR will be required.

Disclaimer

This results summary and map can be used as guidance material only. This results summary and map is not guaranteed to be free from error or omission. The State of NSW and Department of Planning and Environment and its employees disclaim liability for any act done on the information in the results summary or map and any consequences of such acts or omissions. It remains the responsibility of the proponent to ensure that their development application complies with all aspects of the *Biodiversity Conservation Act 2016*.

The mapping provided in this tool has been done with the best available mapping and knowledge of species habitat requirements. This map is valid for a period of 30 days from the date of calculation (above).

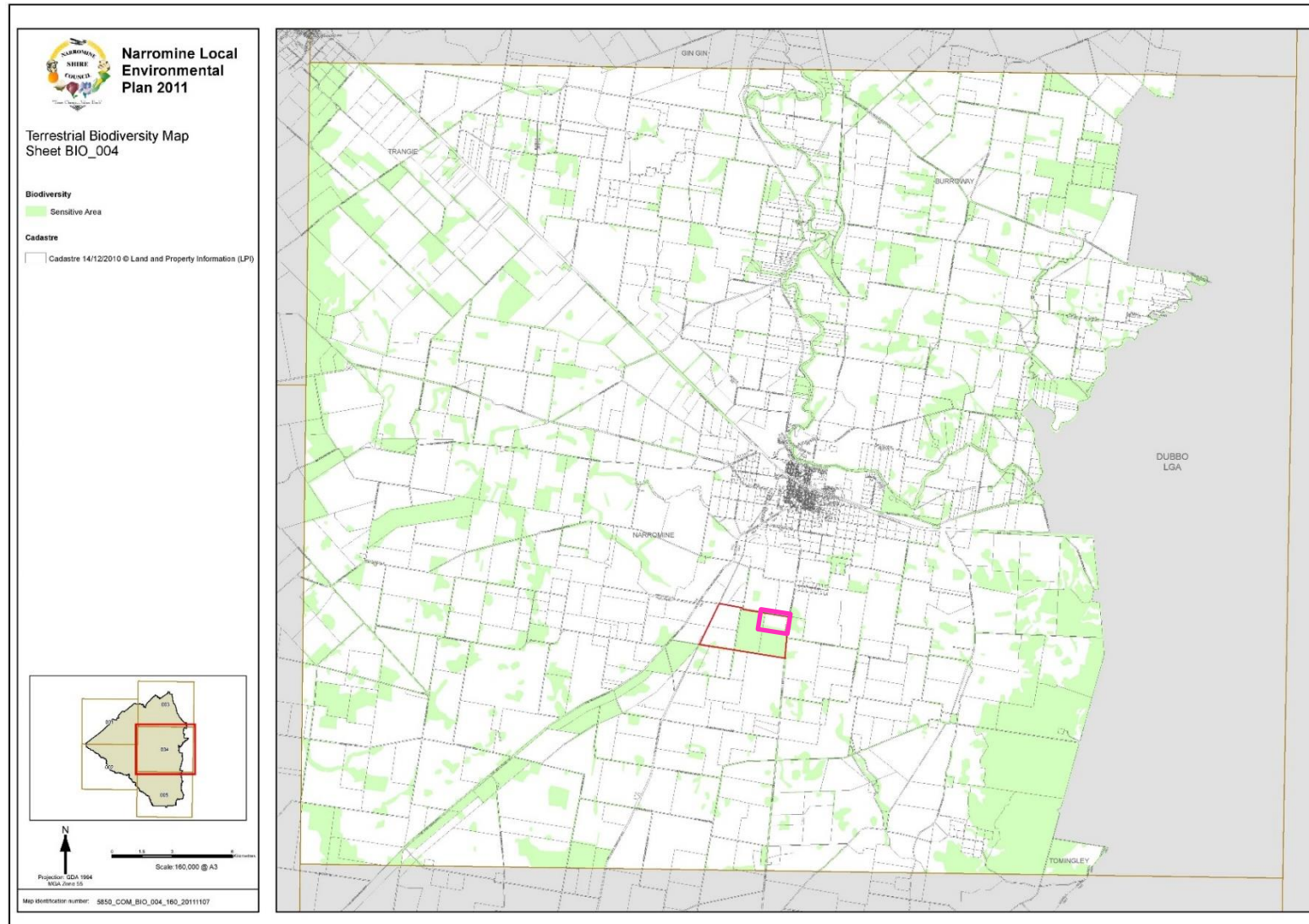
Acknowledgement

I as the applicant for this development, submit that I have correctly depicted the area that will be impacted or likely to be impacted as a result of the proposed development.

Signature _____ Date: 26/04/2023 11:01 AM


Narromine Local Environmental Plan (2011)

Large sections of the initial assessment area (indicated in red) are mapped as sensitive areas for biodiversity. The subject site (pink) contains mapped sensitive areas chiefly in the road corridor.



APPENDIX B – PLANT COMMUNITY TYPES

PCTs recorded within the subject site or future expansion area are depicted below.

PCT	Photographs
45	<div data-bbox="465 395 1294 858">  <p data-bbox="517 858 1240 890">Small pocket of PCT 45 in foreground. Regrowth of PCT 82 behind.</p> </div> <div data-bbox="1332 395 2016 1308">  <p data-bbox="1417 1308 1930 1337">Note gilgai (PCT 53) behind grassland (PCT 45)</p> </div>

53



82



201



250



APPENDIX C – FLORA AND FAUNA SURVEY RESULTS

Flora species list

The following table lists all 208 flora species recorded within the subject site during the April 2021 and April 2023 field surveys. Of these, 149 species (71.63%) are native and 59 (28.37%) introduced.

Growth Form ¹	Scientific Name	Common Name	Status ²	HTE ³	WoNS ⁴	PW ⁵
TG	<i>Acacia oswaldii</i>	Umbrella Wattle	N	No	No	No
TG	<i>Acacia pendula</i>	Weeping Myall	N	No	No	No
TG	<i>Acacia salicina</i>	Willow Wattle	N	No	No	No
TG	<i>Alectryon oleifolius</i>	Western Rosewood	N	No	No	No
TG	<i>Allocasuarina luehmannii</i>	Buloke	N	No	No	No
TG	<i>Brachychiton populneus</i>	Kurrajong	N	No	No	No
TG	<i>Callitris glaucophylla</i>	White Cypress Pine	N	No	No	No
TG	<i>Casuarina cristata</i>	Belah	N	No	No	No
TG	<i>Eucalyptus blakelyi</i>	Blakely's Red Gum	N	No	No	No
TG	<i>Eucalyptus melliodora</i>	Yellow Box	N	No	No	No
TG	<i>Eucalyptus microcarpa</i>	Grey Box	N	No	No	No
TG	<i>Eucalyptus pilligaensis</i>	Narrow-Leaved Grey Box	N	No	No	No
TG	<i>Eucalyptus populnea</i> subsp. <i>bimbil</i>	Poplar Box	N	No	No	No
SG	<i>Acacia deanei</i>	Deane's Wattle	N	No	No	No
SG	<i>Acacia lineata</i>	Streaked Wattle	N	No	No	No
SG	<i>Atriplex semibaccata</i>	Creeping Saltbush	N	No	No	No
SG	<i>Chenopodium desertorum</i>	Desert Crumbweed	N	No	No	No
SG	<i>Denhamia cunninghamii</i>	Yellowberry Bush	N	No	No	No
SG	<i>Dodonaea viscosa</i> subsp. <i>spatulata</i>	Stick Hop-bush	N	No	No	No
SG	<i>Duma florulenta</i>	Lignum	N	No	No	No
SG	<i>Enchylaena tomentosa</i>	Ruby Saltbush	N	No	No	No
SG	<i>Eremophila debilis</i>	Winter Apple, Amulla	N	No	No	No
SG	<i>Eremophila mitchellii</i>	Budda, False Sandalwood	N	No	No	No
SG	<i>Geijera parviflora</i>	Wilga	N	No	No	No
SG	<i>Hakea tephrosperma</i>	Hooked Needlewood	N	No	No	No
SG	<i>Maireana decalvans</i>	Black Cotton Bush	N	No	No	No
SG	<i>Maireana microphylla</i>	Small-Leaf Bluebush	N	No	No	No
SG	<i>Myoporum montanum</i>	Western Boobialla	N	No	No	No
SG	<i>Pittosporum angustifolium</i>	Berrigan	N	No	No	No
SG	<i>Rhagodia spinescens</i>	Spiny Saltbush	N	No	No	No
SG	<i>Salsola australis</i>	Buckbush	N	No	No	No
SG	<i>Sclerolaena bicornis</i>	Goathead Burr	N	No	No	No

Growth Form ¹	Scientific Name	Common Name	Status ²	HTE ³	WoNS ⁴	PW ⁵
SG	<i>Sclerolaena birchii</i>	Galvanized Burr	N	No	No	No
SG	<i>Sclerolaena diacantha</i>	Grey Copperburr	N	No	No	No
SG	<i>Sclerolaena muricata</i>	Black Rolypoly	N	No	No	No
SG	<i>Senna artemisioides</i> group	Silver Cassia	N	No	No	No
GG	<i>Anthosachne scabra</i>	Common Wheatgrass	N	No	No	No
GG	<i>Aristida ramosa</i>	Purple Wiregrass	N	No	No	No
GG	<i>Austrostipa aristiglumis</i>	Plains Grass	N	No	No	No
GG	<i>Austrostipa scabra</i>	Speargrass	N	No	No	No
GG	<i>Austrostipa verticillata</i>	Slender Bamboo Grass	N	No	No	No
GG	<i>Bolboschoenus medianus</i>	Marsh Club-rush	N	No	No	No
GG	<i>Bothriochloa decipiens</i> var. <i>decipiens</i>	Red Grass	N	No	No	No
GG	<i>Bothriochloa macra</i>	Red Grass	N	No	No	No
GG	<i>Carex inversa</i>	Knob Sedge	N	No	No	No
GG	<i>Chloris truncata</i>	Windmill Grass	N	No	No	No
GG	<i>Chloris ventricosa</i>	Plump Windmill Grass	N	No	No	No
GG	<i>Cynodon dactylon</i>	Couch	N	No	No	No
GG	<i>Cyperus bifax</i>	Downs Nutgrass	N	No	No	No
GG	<i>Cyperus concinnus</i>	Trim Flat-Sedge	N	No	No	No
GG	<i>Dactyloctenium radulans</i>	Button Grass	N	No	No	No
GG	<i>Dichanthium sericeum</i>	Queensland Bluegrass	N	No	No	No
GG	<i>Dichanthium setosum</i>	Bluegrass	N	No	No	No
GG	<i>Digitaria brownii</i>	Cotton Panic Grass	N	No	No	No
GG	<i>Digitaria divaricatissima</i>	Umbrella Grass	N	No	No	No
GG	<i>Diplachne fusca</i>	Brown Beetle Grass	N	No	No	No
GG	<i>Echinochloa colona</i>	Awnless Barnyard Grass	N	No	No	No
GG	<i>Eleocharis pallens</i>	Pale Spike-Sedge	N	No	No	No
GG	<i>Eleocharis plana</i>	Flat Spike-Sedge	N	No	No	No
GG	<i>Enneapogon nigricans</i>	Nine-Awn Grass	N	No	No	No
GG	<i>Enteropogon acicularis</i>	Curly Windmill Grass	N	No	No	No
GG	<i>Eragrostis brownii</i>	Brown's Lovegrass	N	No	No	No
GG	<i>Eragrostis elongata</i>	Clustered Lovegrass	N	No	No	No
GG	<i>Eragrostis lacunaria</i>	Purple Lovegrass	N	No	No	No
GG	<i>Eragrostis leptostachya</i>	Paddock Lovegrass	N	No	No	No
GG	<i>Eragrostis parviflora</i>	Weeping Lovegrass	N	No	No	No
GG	<i>Eriochloa pseudoacrotricha</i>	Early Spring Grass	N	No	No	No
GG	<i>Fimbristylis dichotoma</i>	Common Fringe-Sedge	N	No	No	No
GG	<i>Juncus aridicola</i>	Rush	N	No	No	No
GG	<i>Juncus radula</i>	Rush	N	No	No	No
GG	<i>Juncus subsecundus</i>	Rush	N	No	No	No

Growth Form ¹	Scientific Name	Common Name	Status ²	HTE ³	WoNS ⁴	PW ⁵
GG	<i>Lachnagrostis filiformis</i>	Common Blown-grass	N	No	No	No
GG	<i>Panicum decompositum</i>	Native Millet	N	No	No	No
GG	<i>Panicum effusum</i>	Hairy Panic	N	No	No	No
GG	<i>Paspalidium aversum</i>	Paspalidium	N	No	No	No
GG	<i>Paspalidium constrictum</i>	Knottybutt Grass	N	No	No	No
GG	<i>Rytidosperma caespitosum</i>	Ringed Wallaby Grass	N	No	No	No
GG	<i>Rytidosperma fulvum</i>	Wallaby Grass	N	No	No	No
GG	<i>Sporobolus caroli</i>	Fairy Grass	N	No	No	No
GG	<i>Sporobolus creber</i>	Slender Rat's Tail Grass	N	No	No	No
GG	<i>Tragus australianus</i>	Small Burrgrass	N	No	No	No
GG	<i>Walwhalleya proluta</i>	Rigid Panic	N	No	No	No
FG	<i>Alternanthera denticulata</i>	Lesser Joyweed	N	No	No	No
FG	<i>Alternanthera</i> sp. A Flora of New South Wales (M.Gray 5187)	Joyweed	N	No	No	No
FG	<i>Atriplex spinibractea</i>	Spiny-Fruit Saltbush	N	No	No	No
FG	<i>Calotis cuneifolia</i>	Purple Burr-Daisy	N	No	No	No
FG	<i>Calotis lappulacea</i>	Yellow Burr-Daisy	N	No	No	No
FG	<i>Calotis scapigera</i>	Tufted Burr-Daisy	N	No	No	No
FG	<i>Dianella porracea</i>	Riverine Flax-Lily	N	No	No	No
FG	<i>Dichondra repens</i>	Kidney Weed	N	No	No	No
FG	<i>Dysphania cristata</i>	Crested Goosefoot	N	No	No	No
FG	<i>Eclipta platyglossa</i>	Yellow Eclipta	N	No	No	No
FG	<i>Einadia hastata</i>	Berry Saltbush	N	No	No	No
FG	<i>Einadia nutans</i>	Climbing Saltbush	N	No	No	No
FG	<i>Einadia polygonoides</i>	Climbing Saltbush	N	No	No	No
FG	<i>Epilobium billardierianum</i>	Willowherb	N	No	No	No
FG	<i>Erodium crinitum</i>	Blue Crowfoot	N	No	No	No
FG	<i>Euchiton sphaericus</i>	Star Cudweed	N	No	No	No
FG	<i>Euphorbia dallachyana</i>	Mat Spurge	N	No	No	No
FG	<i>Glinus lotoides</i>	Carpet Weed	N	No	No	No
FG	<i>Goodenia cycloptera</i>	Goodenia	N	No	No	No
FG	<i>Goodenia fascicularis</i>	Goodenia	N	No	No	No
FG	<i>Lepidium pseudohyssopifolium</i>	Peppercress	N	No	No	No
FG	<i>Lobelia concolor</i>	Poison Pratia	N	No	No	No
FG	<i>Maireana enchylaenoides</i>	Wingless Bluebush	N	No	No	No
FG	<i>Microtis</i> sp.	Onion Orchid	N	No	No	No
FG	<i>Minuria leptophylla</i>	Minnie Daisy	N	No	No	No
FG	<i>Oxalis perennans</i>	Grassland Wood-sorrel	N	No	No	No
FG	<i>Oxalis thompsoniae</i>	Wood-sorrel	N	No	No	No

Growth Form ¹	Scientific Name	Common Name	Status ²	HTE ³	WoNS ⁴	PW ⁵
FG	<i>Portulaca oleracea</i>	Pigweed	N	No	No	No
FG	<i>Pseudognaphalium luteoalbum</i>	Jersey Cudweed	N	No	No	No
FG	<i>Ptilotus semilanatus</i>	Pussytail	N	No	No	No
FG	<i>Ranunculus pentandrus</i>	Buttercup	N	No	No	No
FG	<i>Rumex brownii</i>	Swamp Dock	N	No	No	No
FG	<i>Rumex dumosus</i>	Wiry Dock	N	No	No	No
FG	<i>Rumex stenoglottis</i>	Dock	N	No	No	No
FG	<i>Rumex tenax</i>	Shiny Dock	N	No	No	No
FG	<i>Scleroblitum atriplicinum</i>	Purple Goosefoot	N	No	No	No
FG	<i>Senecio quadridentatus</i>	Cotton Fireweed	N	No	No	No
FG	<i>Senna barclayana</i>	Pepper-Leaf Senna	N	No	No	No
FG	<i>Sida corrugata</i>	Corrugated Sida	N	No	No	No
FG	<i>Sida cunninghamii</i>	Ridged Sida	N	No	No	No
FG	<i>Sida trichopoda</i>	Hairy Sida	N	No	No	No
FG	<i>Solanum americanum</i>	Glossy Nightshade	N	No	No	No
FG	<i>Solanum eremophilum</i>	Nightshade	N	No	No	No
FG	<i>Solanum esuriale</i>	Quena	N	No	No	No
FG	<i>Solenogyne bellioides</i>	Solenogyne	N	No	No	No
FG	<i>Tribulus micrococcus</i>	Yellow Vine	N	No	No	No
FG	<i>Verbena gaudichaudii</i>	Native Vervain	N	No	No	No
FG	<i>Vittadinia cervicularis</i>	New Holland Daisy	N	No	No	No
FG	<i>Vittadinia cuneata</i>	Fuzzweed	N	No	No	No
FG	<i>Vittadinia pterochaeta</i>	Winged New Holland Daisy	N	No	No	No
FG	<i>Wahlenbergia communis</i>	Tufted Bluebell	N	No	No	No
FG	<i>Wahlenbergia gracilentia</i>	Hairy Annual Bluebell	N	No	No	No
FG	<i>Wahlenbergia gracilis</i>	Sprawling Bluebell	N	No	No	No
FG	<i>Wahlenbergia luteola</i>	Yellow Bluebell	N	No	No	No
FG	<i>Wahlenbergia stricta</i>	Tall Bluebell	N	No	No	No
FG	<i>Xerochrysum viscosum</i>	Sticky Everlasting	N	No	No	No
FG	<i>Zaleya galericulata</i>	Hogweed	N	No	No	No
EG	<i>Cheilanthes sieberi</i>	Rock Fern	N	No	No	No
EG	<i>Marsilea drummondii</i>	Common Nardoo	N	No	No	No
EG	<i>Marsilea hirsuta</i>	Nardoo	N	No	No	No
OG	<i>Amyema miquelii</i>	Box Mistletoe	N	No	No	No
OG	<i>Amyema miraculosa</i> subsp. <i>boormanii</i>	Mistletoe	N	No	No	No
OG	<i>Amyema quandang</i>	Grey Mistletoe	N	No	No	No
OG	<i>Convolvulus angustissimus</i>	Bindweed	N	No	No	No
OG	<i>Convolvulus clementii</i>	Desert Bindweed	N	No	No	No
OG	<i>Glycine clandestina</i>	Twining Glycine	N	No	No	No

Growth Form ¹	Scientific Name	Common Name	Status ²	HTE ³	WoNS ⁴	PW ⁵
OG	<i>Glycine tabacina</i>	Variable Glycine	N	No	No	No
TG	<i>Melia azedarach</i>	White Cedar	I	No	No	No
SG	<i>Lycium ferocissimum</i>	African Boxthorn	I	Yes	Yes	Yes
GG	<i>Cenchrus ciliaris</i>	Buffel Grass	I	Yes	No	No
GG	<i>Cyperus eragrostis</i>	Umbrella Sedge	I	Yes	No	No
GG	<i>Eragrostis curvula</i>	African Lovegrass	I	Yes	No	No
GG	<i>Paspalum dilatatum</i>	Paspalum	I	Yes	No	No
GG	<i>Avena fatua</i>	Wild Oats	I	No	No	No
GG	<i>Bromus catharticus</i>	Prairie Grass	I	No	No	No
GG	<i>Cenchrus clandestinus</i>	Kikuyu Grass	I	No	No	No
GG	<i>Chloris virgata</i>	Feathertop Rhodes Grass	I	No	No	No
GG	<i>Echinochloa crus-galli</i>	Barnyard Grass	I	No	No	No
GG	<i>Eragrostis cilianensis</i>	Stinkgrass	I	No	No	No
GG	<i>Sorghum bicolor</i>	Cultivated Sorghum	I	No	No	No
GG	<i>Urochloa panicoides</i>	Liverseed Grass	I	No	No	No
FG	<i>Alternanthera pungens</i>	Khaki Weed	I	Yes	No	No
FG	<i>Bidens pilosa</i>	Cobblers Pegs	I	Yes	No	No
FG	<i>Bidens subalternans</i>	Greater Beggar's Ticks	I	Yes	No	No
FG	<i>Carthamus lanatus</i>	Saffron Thistle	I	Yes	No	No
FG	<i>Heliotropium amplexicaule</i>	Blue Heliotrope	I	Yes	No	No
FG	<i>Phyla canescens</i>	Lippia	I	Yes	No	No
FG	<i>Xanthium spinosum</i>	Bathurst Burr	I	Yes	No	No
FG	<i>Arctotheca calendula</i>	Capeweed	I	No	No	No
FG	<i>Aster subulatus</i>	Wild Aster	I	No	No	No
FG	<i>Chenopodium album</i>	Fat Hen	I	No	No	No
FG	<i>Chondrilla juncea</i>	Skeleton Weed	I	No	No	No
FG	<i>Cirsium vulgare</i>	Spear Thistle	I	No	No	No
FG	<i>Conyza bonariensis</i>	Flaxleaf Fleabane	I	No	No	No
FG	<i>Conyza sumatrensis</i>	Tall Fleabane	I	No	No	No
FG	<i>Echium plantagineum</i>	Paterson's Curse	I	No	No	No
FG	<i>Gomphrena celosioides</i>	Gomphrena Weed	I	No	No	No
FG	<i>Heliotropium europaeum</i>	Potato Weed	I	No	No	No
FG	<i>Hirschfeldia incana</i>	Buchan Weed	I	No	No	No
FG	<i>Hypochaeris glabra</i>	Smooth Catsear	I	No	No	No
FG	<i>Lactuca serriola</i>	Prickly Lettuce	I	No	No	No
FG	<i>Lepidium africanum</i>	African Peppergrass	I	No	No	No
FG	<i>Malva parviflora</i>	Small-Flowered Mallow	I	No	No	No
FG	<i>Marrubium vulgare</i>	White Horehound	I	No	No	No
FG	<i>Medicago arabica</i>	Spotted Burr Medic	I	No	No	No

Growth Form ¹	Scientific Name	Common Name	Status ²	HTE ³	WoNS ⁴	PW ⁵
FG	<i>Medicago minima</i>	Woolly Burr Medic	I	No	No	No
FG	<i>Medicago truncatula</i>	Barrel Medic	I	No	No	No
FG	<i>Polygonum arenastrum</i>	Wireweed	I	No	No	No
FG	<i>Raphanus raphanistrum</i>	Wild Radish	I	No	No	No
FG	<i>Rapistrum rugosum</i>	Turnip Weed	I	No	No	No
FG	<i>Salvia verbenaca</i>	Vervain	I	No	No	No
FG	<i>Schkuhria pinnata</i>	Curious Weed	I	No	No	No
FG	<i>Sisymbrium erysimoides</i>	Smooth Mustard	I	No	No	No
FG	<i>Solanum nigrum</i>	Black-Berry Nightshade	I	No	No	No
FG	<i>Sonchus oleraceus</i>	Common Sowthistle	I	No	No	No
FG	<i>Taraxacum officinale</i>	Dandelion	I	No	No	No
FG	<i>Tribulus terrestris</i>	Caltrop	I	No	No	No
FG	<i>Trifolium glomeratum</i>	Clustered Clover	I	No	No	No
FG	<i>Urtica urens</i>	Small Nettle	I	No	No	No
FG	<i>Verbascum virgatum</i>	Twiggy Mullein	I	No	No	No
FG	<i>Verbena bonariensis</i>	Purpletop	I	No	No	No
FG	<i>Verbena incompta</i>	Purpletop	I	No	No	No
FG	<i>Verbena officinalis</i>	Common Verbena	I	No	No	No
FG	<i>Vicia villosa</i>	Russian Vetch	I	No	No	No
OG	<i>Citrullus amarus</i>	Camel Melon	I	No	No	No
OG	<i>Cucumis myriocarpus</i> subsp. <i>myriocarpus</i>	Paddy Melon	I	No	No	No

¹Growth form: FG = forb, GG = grass and grass-like, SG = shrub, TG = tree, EG = fern, OG = other. ²Status: N = native, I = introduced. ³High-threat exotic species (Yes/No). ⁴Weed of National Significance (Yes/No). ⁵Priority weed for the Central West LLS region (Yes/No).

Fauna species list

The following table lists all 62 fauna species recorded within the subject site during the April 2021 field survey or by means of recording devices. This comprises 46 birds (all native), 15 mammals (12 native and three introduced), and one native reptile.

Class	Common Name	Scientific Name	Detection ¹	Status ²
Aves	Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>	FS	N
Aves	Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	FS	N
Aves	Pacific Black Duck	<i>Anas superciliosa</i>	FS	N
Aves	Ringneck	<i>Barnardius zonarius</i>	FS	N
Aves	Little Corella	<i>Cacatua sanguinea</i>	FS	N
Aves	Black-eared Cuckoo	<i>Chrysococcyx osculans</i>	FS	N
Aves	Rufous Songlark	<i>Cincloramphus mathewsi</i>	FS	N
Aves	Spotted Harrier	<i>Circus assimilis</i>	FS	N
Aves	Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	FS	N
Aves	White-winged Chough	<i>Corcorax melanorhamphos</i>	FS	N
Aves	Australian Raven	<i>Corvus coronoides</i>	FS SM	N
Aves	Pied Butcherbird	<i>Cracticus nigrogularis</i>	FS	N
Aves	Grey Butcherbird	<i>Cracticus torquatus</i>	FS	N
Aves	Laughing Kookaburra	<i>Dacelo novaeguineae</i>	FS SM	N
Aves	White-faced Heron	<i>Egretta novaehollandiae</i>	FS	N
Aves	Black-shouldered Kite	<i>Elanus axillaris</i>	FS	N
Aves	Blue-faced Honeyeater	<i>Entomyzon cyanotis</i>	FS	N
Aves	Galah	<i>Eolophus roseicapilla</i>	FS	N
Aves	Nankeen Kestrel	<i>Falco cenchroides</i>	FS	N
Aves	Australian Hobby	<i>Falco longipennis</i>	FS	N
Aves	Magpie-lark	<i>Grallina cyanoleuca</i>	FS	N
Aves	Australian Magpie	<i>Gymnorhina tibicen</i>	FS	N
Aves	Whistling Kite	<i>Haliastur sphenurus</i>	FS	N
Aves	Welcome Swallow	<i>Hirundo neoxena</i>	FS	N
Aves	Superb Fairy-wren	<i>Malurus cyaneus</i>	FS	N
Aves	Yellow-throated Miner	<i>Manorina flavigula</i>	FS	N
Aves	Noisy Miner	<i>Manorina melanocephala</i>	FS SM	N
Aves	Black Kite	<i>Milvus migrans</i>	FS	N
Aves	Red-browed Finch	<i>Neochmia temporalis</i>	FS	N
Aves	Bluebonnet	<i>Neophema haematogaster</i>	FS	N
Aves	Turquoise Parrot	<i>Neophema pulchella</i>	FS	N
Aves	Crested Pigeon	<i>Ocyphaps lophotes</i>	FS	N
Aves	Striated Pardalote	<i>Pardalotus striatus</i>	FS	N
Aves	Common Bronzewing	<i>Phaps chalcoptera</i>	FS	N
Aves	Eastern Rosella	<i>Platycercus eximius</i>	FS	N

Class	Common Name	Scientific Name	Detection ¹	Status ²
Aves	Superb Parrot	<i>Polytelis swainsonii</i>	FS	N
Aves	Grey-crowned Babbler	<i>Pomatostomus temporalis temporalis</i>	FS	N
Aves	Red-rumped Parrot	<i>Psephotus haematonotus</i>	FS	N
Aves	Grey Fantail	<i>Rhipidura albiscapa</i>	FS	N
Aves	Wille Wagtail	<i>Rhipidura leucophrys</i>	FS	N
Aves	Apostlebird	<i>Struthidea cinerea</i>	FS	N
Aves	Tawny Frogmouth	<i>Podargus strigoides</i>	SM	N
Aves	Sulphur-crested Cockatoo	<i>Cacatua galerita</i>	SM	N
Aves	Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>	SM	N
Aves	Southern Boobook	<i>Ninox novaeseelandiae</i>	SM	N
Aves	Eastern Whipbird	<i>Psophodes olivaceus</i>	SM	N
Mammalia	Red Fox	<i>Vulpes vulpes</i>	SM	I
Mammalia	Sugar Glider	<i>Petaurus breviceps</i>	SM	N
Mammalia	European Hare	<i>Lepus europaeus occidentalis</i>	FS	I
Mammalia	Eastern Grey Kangaroo	<i>Macropus giganteus</i>	FS	N
Mammalia	House Mouse	<i>Mus musculus</i>	FS	I
Mammalia	Gould's Wattled Bat	<i>Chalinolobus gouldii</i>	BD	N
Mammalia	Chocolate Wattled Bat	<i>Chalinolobus morio</i>	BD	N
Mammalia	Little Pied Bat	<i>Chalinolobus picatus</i>	BD	N
Mammalia	Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	BD	N
Mammalia	Southern Freetail Bat	<i>Mormopterus</i> sp. 4	BD	N
Mammalia	Inland Broad-nosed Bat	<i>Scotorepens balstoni</i>	BD	N
Mammalia	Little Broad-nosed Bat	<i>Scotorepens greyii</i>	BD	N
Mammalia	Little Forest Bat	<i>Vespadelus vulturnus</i>	BD	N
Mammalia	White-striped Freetail Bat	<i>Austronomus australis</i>	BD	N
Mammalia	Long-eared Bat	<i>Nyctophilus</i> sp.	BD	N
Reptilia	Skink	<i>Cryptoblepharus</i> sp.	FS	N

¹Method of detection: FS = field survey, SM = song meter, BD = bat detector. ²Status: N = native, I = introduced.

APPENDIX D – MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

The EPBC Act protects nationally and internationally important flora, fauna, ecological communities and heritage places, which are defined in the EPBC Act as matters of national environmental significance. The EPBC Act policy Matters of National Environmental Significance: Significant Impact Guidelines 1.1 (DoE, 2013) forms the basis of determining if impact to protected matters is significant.

An EPBC Act protected matters search has identified four wetlands of international importance, six TECs, 41 threatened species, 9 migratory species and 16 marine species that could possibly occur in the 10 km search area. The tables below offer a summary of these matters and any potential impacts that might result from this proposal.

Wetlands of International Importance

Name	Proximity	Assessment	Likely Impact
Banrock Station Wetland Complex	700 – 800 km	The proposal is not within close proximity of Banrock Station Wetland Complex.	No
Riverland	600 – 700 km	The proposal is not within close proximity of the Riverland.	No
The Coorong, and Lakes Alexandrina and Albert Wetland	800 – 900 km	The proposal is not within close proximity of the Coorong, and Lakes Alexandrina and Albert Wetland.	No
The Macquarie Marshes	100 – 150 km	The proposal is not within close proximity of The Macquarie Marshes	No

EPBC Act-listed Threatened Ecological Communities

Name	Status	Assessment	Likely Impact (Subject Site)	Likely Impact (Future Expansion Area)
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	E	Not recorded on site.	None	None
Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	E	Present within subject site and future expansion area.	Up to 7.86 ha	Up to 16.62 ha
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	CE	Not recorded on site.	None	None
Poplar Box Grassy Woodland on Alluvial Plains	E	Not recorded within subject site or future expansion area, but considered likely to occur within the initial assessment area.	None	None
Weeping Myall Woodlands	E	Not recorded within subject site or future expansion area, but known to occur within the initial assessment area.	None	None
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CE	Not recorded on site.	None	None

EPBC Act-listed Critically Endangered and Endangered Species

Scientific Name	Common Name	*Comm. Status	Likely Impact (Subject Site)	Likely Impact (Future Expansion Area)
<i>Austrostipa wakoolica</i>	A spear-grass	E	99.69 ha	18.87 ha
<i>Lepidium monoplacoides</i>	Winged Peppergrass	E	12.56 ha	5.05 ha
<i>Prasophyllum petilum</i>	Tarengo Leek Orchid	E	None expected	None expected
<i>Prasophyllum</i> sp. Wybong		CE	97.02 ha	14.83 ha
<i>Swainsona recta</i>	Small Purple-pea	E	0.70 ha	None expected
<i>Vincetoxicum forsteri</i> (syn. <i>Tylophora linearis</i>)		E	None expected	None expected
<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	0.70 ha	None expected
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E	4.07 ha	2.43 ha
<i>Calidris ferruginea</i>	Curlew Sandpiper	CE,C,J,K	Some marginal habitat impacted	Some marginal habitat impacted
<i>Lathamus discolor</i>	Swift Parrot	CE	99.69 ha	18.87 ha
<i>Lophochroa leadbeateri</i>	Major Mitchell's Cockatoo	E	112.25 ha	23.92 ha
<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south-eastern form)	E	3.37 ha	4.04 ha
<i>Rostratula australis</i>	Australian Painted Snipe	E	Some marginal habitat impacted	Some marginal habitat impacted
<i>Bidyanus bidyanus</i>	Silver Perch	CE	None expected	None expected
<i>Maccullochella macquariensis</i>	Trout Cod	E	None expected	None expected
<i>Macquaria australasica</i>	Macquarie Perch	E	None expected	None expected
<i>Dasyurus maculatus maculatus</i>	Spotted-tailed Quoll (SE mainland population)	E	0.70 ha	None expected
<i>Phascolarctos cinereus</i>	Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)	E	103.76 ha	21.30 ha
<i>Crinia sloanei</i>	Sloane's Froglet	E	2.67 ha	4.04 ha
<i>Hemiaspis damelii</i>	Grey Snake	E	None expected	None expected

*Comm. Status: C=CAMBA, J=JAMBA, K=ROKAMBA, CE=Critically endangered, E=Endangered

EPBC Act-listed Vulnerable Species

Scientific Name	Common Name	Comm. Status	Likely Impact (Subject Site)	Likely Impact (Future Expansion Area)
<i>Commersonia procumbens</i> (syn. <i>Androcalva procumbens</i>)		V	None expected	None expected
<i>Homoranthus darwinioides</i>	Fairy Bells	V	None expected	None expected
<i>Lepidium aschersonii</i>	Spiny Peppergrass	V	4.77 ha	2.43 ha
<i>Swainsona murrayana</i>	Slender Darling Pea	V	15.23 ha	9.09 ha
<i>Thesium australe</i>	Austral Toadflax, Toadflax	V	None expected	None expected
<i>Aphelocephala leucopsis</i>	Southern Whiteface	V	Some potential habitat impacted	Some potential habitat impacted
<i>Calyptrorhynchus lathami</i>	Glossy Black-Cockatoo (South-eastern form)	V	3.37 ha	4.04 ha
<i>Climacteris victoricae</i>	Brown Treecreeper (south-eastern)	V	0.70 ha	None expected
<i>Falco hypoleucos</i>	Grey Falcon	V	115.62 ha	26.35 ha
<i>Grantiella picta</i>	Painted Honeyeater	V	3.37 ha	None expected
<i>Hirundapus caudacutus</i>	White-throated Needletail	V,C,J,K	116.32 ha	26.35 ha
<i>Leipoa ocellata</i>	Malleefowl	V	None expected	None expected
<i>Neophema chrysostoma</i>	Blue-winged Parrot	V	Some potential habitat impacted	Some potential habitat impacted
<i>Polytelis swainsonii</i>	Superb Parrot	V	112.25 ha	23.92 ha
<i>Stagonopleura guttata</i>	Diamond Firetail	V	112.25 ha	23.92 ha
<i>Maccullochella peelii</i>	Murray Cod	V	None expected	None expected
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	0.70 ha	None expected
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	V	3.37 ha	4.04 ha
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	None expected	None expected
<i>Anomalopus mackayi</i>	Five-clawed Worm-skink, Long-legged Worm-skink	V	Some potential habitat impacted	Some potential habitat impacted
<i>Aprasia parapulchella</i>	Pink-tailed Worm-lizard	V	96.32 ha	14.83 ha

+Comm. Status: C=CAMBA, J=JAMBA, K=ROKAMBA, V=Vulnerable

EPBC Act-listed Migratory and Marine Species

Scientific Name	Common Name	*Comm. Status	Likely Impact (Subject Site)	Likely Impact (Future Expansion Area)
<i>Apus pacificus</i>	Fork-tailed Swift	C,J,K	Some marginal habitat impacted	Some marginal habitat impacted
<i>Bubulcus ibis</i>	Cattle Egret	Marine	None expected	None expected
<i>Hirundapus caudacutus</i>	White-throated Needletail	V,C,J,K	118.04 ha	26.37 ha
<i>Motacilla flava</i>	Yellow Wagtail	C,J,K	None expected	None expected
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	Marine Bonn	PCTs associations not recorded. Impacts to wooded vegetation may affect this species.	PCTs associations not recorded. Impacts to wooded vegetation may affect this species.
<i>Actitis hypoleucos</i>	Common Sandpiper	C,J,K	Some marginal habitat impacted	Some marginal habitat impacted
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	C,J,K	Some marginal habitat impacted	Some marginal habitat impacted
<i>Calidris ferruginea</i>	Curlew Sandpiper	CE,C,J,K	Some marginal habitat impacted	Some marginal habitat impacted
<i>Calidris melanotos</i>	Pectoral Sandpiper	J,K	Some marginal habitat impacted	Some marginal habitat impacted
<i>Chrysococcyx osculans</i>	Black-eared Cuckoo	Marine	PCTs associations not recorded. Some marginal habitat impacted.	PCTs associations not recorded. Some marginal habitat impacted.
<i>Gallinago hardwickii</i>	Latham's Snipe	J,K	Some marginal habitat impacted	Some marginal habitat impacted
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Marine	118.04 ha	26.37 ha
<i>Lathamus discolor</i>	Swift Parrot	CE	99.69 ha	18.87 ha
<i>Merops ornatus</i>	Rainbow Bee-eater	Marine	PCTs associations not recorded. Impacts to wooded vegetation may affect this species.	PCTs associations not recorded. Impacts to wooded vegetation may affect this species.
<i>Rostratula benghalensis sensu lato</i>	Painted Snipe	E	Some marginal habitat impacted	Some marginal habitat impacted

*Comm. Status: C=CAMBA, J=JAMBA, K=ROKAMBA, Bonn=Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), CE=Critically endangered, E=Endangered, V=Vulnerable.

Appendix E – Key threatening processes

Key Threatening Processes (KTP) predicted as acting on the study area that may be exacerbated by the proposal.

Class	Name	NSW status	Comm. status	Likelihood of Occurrence	Exacerbated by Proposal
Threat	Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners, <i>Manorina melanocephala</i> (Latham, 1802)	KTP	KTP	LIKELY	POTENTIALLY Alteration of woodland structure by removal of understorey may exacerbate this threat.
Threat	Alteration of habitat following subsidence due to longwall mining	KTP		VERY UNLIKELY	NO The proposal does not include any activities that would exacerbate this threat.
Threat	Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	KTP		VERY UNLIKELY	NO There are no mapped watercourses within the subject site.
Threat	Anthropogenic Climate Change	KTP	KTP	VERY LIKELY	YES Some unavoidable emissions would occur from construction machinery.
Threat	Bushrock removal	KTP		VERY UNLIKELY	NO No bushrock was recorded during the survey.
Threat	Clearing of native vegetation	KTP	KTP	VERY LIKELY	YES Up to 144.41 ha of native vegetation within the subject site and future expansion area would be impacted.
Threat	Competition and grazing by the feral European Rabbit, <i>Oryctolagus cuniculus</i>	KTP	KTP	LIKELY	POTENTIALLY Alteration of vegetation structure, including weed encroachment, may favour this species.
Threat	Competition and habitat degradation by Feral Goats, <i>Capra hircus</i> Linnaeus 1758	KTP	KTP	UNLIKELY	NO The proposal does not include any activities that would exacerbate this threat.
Threat	Competition from feral honey bees, <i>Apis mellifera</i>	KTP		LIKELY	YES Removal of nesting hollows is likely to increase competition between native hollow-dependent fauna and honeybees.

Class	Name	NSW status	Comm. status	Likelihood of Occurrence	Exacerbated by Proposal
Threat	Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners	KTP		UNLIKELY	NO The proposal does not include any activities that would exacerbate this threat.
Threat	Herbivory and environmental degradation caused by feral deer	KTP		UNLIKELY	NO The proposal does not include any activities that would exacerbate this threat.
Threat	High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	KTP		UNLIKELY	NO Fire frequency is not expected to increase significantly as a result of this proposal.
Threat	Importation of Red Fire Ants <i>Solenopsis invicta</i>	KTP	KTP	UNLIKELY	POTENTIALLY Machinery used on site can potentially act as a transport for biosecurity risks. The species is not known to occur nearby but may be capable of establishing colonies under local climatic conditions.
Threat	Infection by <i>Psittacine Circoviral</i> (beak and feather) Disease affecting endangered psittacine species and populations	KTP	KTP	UNLIKELY	POTENTIALLY Loss of tree hollows encourages reuse of hollows and competition for hollows, potentially increasing the rate of transmission.
Threat	Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	KTP	KTP	UNLIKELY	POTENTIALLY Machinery used on site can potentially act as a transport for biosecurity risks.
Threat	Infection of native plants by <i>Phytophthora cinnamomi</i>	KTP	KTP	UNLIKELY	POTENTIALLY Machinery used on site can potentially act as a transport for biosecurity risks.
Threat	Introduction of the Large Earth Bumblebee <i>Bombus terrestris</i>	KTP		VERY UNLIKELY	NO Machinery used on site can potentially act as a transport for biosecurity risks; however, this species is known only from Tasmania and there is a low risk of its introduction in this case.
Threat	Invasion and establishment of exotic vines and scramblers	KTP		UNLIKELY	POTENTIALLY Machinery used on site can potentially act as a transport for biosecurity risks. It is uncertain whether many of the

Class	Name	NSW status	Comm. status	Likelihood of Occurrence	Exacerbated by Proposal
					highest-concern species would successfully establish under local climatic conditions. <i>Citrullus amarus</i> and <i>Cucumis myriocarpus</i> , two vines that are common weeds of agriculture, already occur on site.
Threat	Invasion and establishment of Scotch Broom (<i>Cytisus scoparius</i>)	KTP		UNLIKELY	POTENTIALLY Machinery used on site can potentially act as a transport for biosecurity risks. The nearest recorded population of the species is c. 130 km from the site and it is unclear whether the species could become established under local climatic conditions.
Threat	Invasion and establishment of the Cane Toad (<i>Rhinella marina</i>)	KTP	KTP	UNLIKELY	POTENTIALLY Machinery used on site can potentially act as a transport for biosecurity risks. The Cane Toad is not known from any location in close proximity to the site.
Threat	Invasion of native plant communities by African Olive <i>Olea europaea</i> subsp. <i>cuspidata</i>	KTP		UNLIKELY	POTENTIALLY Machinery used on site can potentially act as a transport for biosecurity risks. The species has been recorded at Wongarbon, c. 50 km from the site, and may be capable of establishing under local climatic conditions.
Threat	Invasion of native plant communities by <i>Chrysanthemoides monilifera</i>	KTP		UNLIKELY	POTENTIALLY Machinery used on site can potentially act as a transport for biosecurity risks. As this species is principally a weed of coastal environments, it is unlikely to pose a significant local threat.
Threat	Invasion of native plant communities by exotic perennial grasses	KTP		VERY LIKELY	YES Machinery used on site can potentially act as a transport for biosecurity risks and disturbance is likely to favour invasive species. Species of concern, including African Lovegrass (<i>Eragrostis curvula</i>), are already known from the site.

Class	Name	NSW status	Comm. status	Likelihood of Occurrence	Exacerbated by Proposal
Threat	Invasion of the Yellow Crazy Ant, <i>Anoplolepis gracilipes</i> (Fr. Smith) into NSW	KTP		UNLIKELY	POTENTIALLY Machinery used on site can potentially act as a transport for biosecurity risks. It is considered unlikely that the species could become established under local climatic conditions.
Threat	Invasion, establishment and spread of Lantana	KTP		UNLIKELY	POTENTIALLY Machinery used on site can potentially act as a transport for biosecurity risks. The species is not known from within c. 289 km and is unlikely to become invasive in the local environment.
Threat	Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	KTP	KTP	VERY LIKELY	YES Machinery used on site can potentially act as a transport for biosecurity risks and disturbance is likely to favour invasive species. Species of concern, including Kikuyu Grass (<i>Cenchrus clandestinus</i>), are already known from the site. It is likely that many other invasive plant species recorded from the site originated as garden plants.
Threat	Loss of Hollow-bearing Trees	KTP		VERY LIKELY	YES Up to 50 hollow-bearing trees would be impacted by this proposal, comprising 44 in the subject site and an additional six within the future expansion area.
Threat	Loss or degradation (or both) of sites used for hill-topping by butterflies	KTP		VERY UNLIKELY	NO No sites present.
Threat	Predation and hybridisation by Feral Dogs, <i>Canis lupus familiaris</i>	KTP		UNLIKELY	NO The proposal does not include any activities that are likely to exacerbate this threat.
Threat	Predation by <i>Gambusia holbrooki</i> Girard, 1859 (Plague Minnow or Mosquito Fish)	KTP		VERY UNLIKELY	NO No watercourses occur within the subject site or future expansion area and no impacts to watercourses outside of these areas are anticipated.
Threat	Predation by the European Red Fox (<i>Vulpes vulpes</i>)	KTP	KTP	UNLIKELY	NO

Class	Name	NSW status	Comm. status	Likelihood of Occurrence	Exacerbated by Proposal
					The proposal does not include any activities that are likely to exacerbate this threat.
Threat	Predation by the Feral Cat <i>Felis catus</i>	KTP	KTP	UNLIKELY	NO The proposal does not include any activities that are likely to exacerbate this threat.
Threat	Predation, habitat degradation, competition and disease transmission by Feral Pigs	KTP	KTP	UNLIKELY	NO The proposal does not include any activities that are likely to exacerbate this threat.
Threat	Removal of dead wood and dead trees	KTP		VERY LIKELY	YES Stags and fallen timber are known from the subject site, particularly within the road corridor.



APPENDIX E

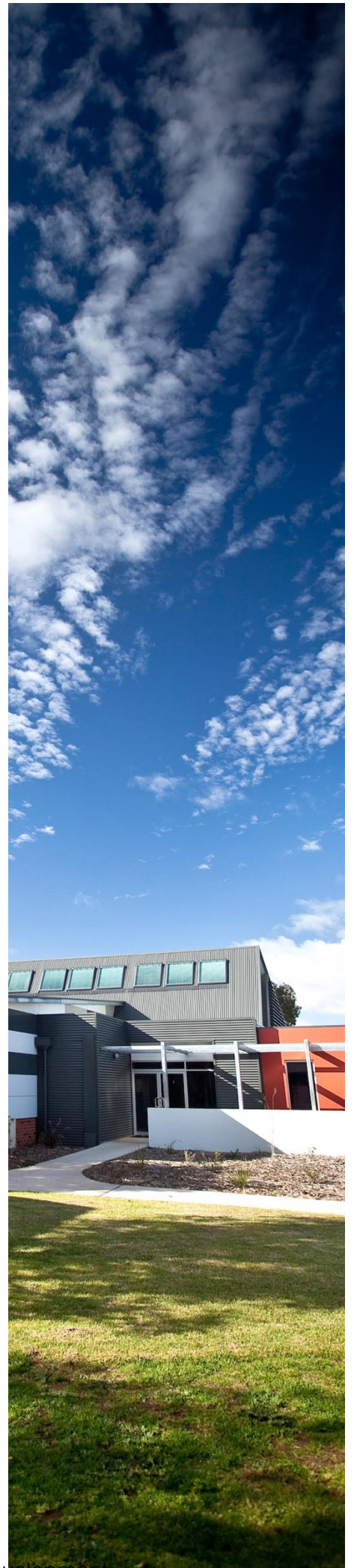
Strategic Bushfire Study



Strategic Bush Fire Study

Planning Proposal
Industrial Subdivision
397 Craigie Lea Lane,
Narromine, NSW 2821

(Our Reference: 40038-BR01_B)
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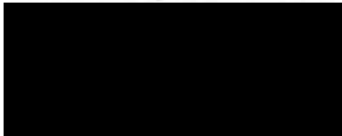





Disclaimer

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Report Title:	Strategic Bush Fire Study
Project Name:	Planning Proposal - Industrial Subdivision at 397 Craigie Lea Lane, Narromine
Client:	Narromine Shire Council
Project No.	40038
Report Reference	40038-BR01_B
Date:	28/02/2024
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Prepared by:	Reviewed by:
	
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1 INTRODUCTION

1.1 Background

This Strategic Bush Fire Study (SBFS) has been prepared to accompany a Planning Proposal for a proposed Craigie Lea Lane Industrial Subdivision of Lot 232 and Lot 233 DP 755131, known as 397 Craigie Lea Lane, Narromine. The subject site is part of a larger holding which also includes Lot 1 DP 1198931, and Lot 16 & 17 DP 755131, Lot 4118 DP 1208595, Lot 1 DP 819468, being bounded by Craigie Lea Lane, Tomingley Road, The McGrane Way, and an unnamed Laneway.

The purpose of this report is to provide a bushfire assessment for the proposed Planning Proposal, and also to ensure the development is consistent with the *Planning for Bushfire Protection 2019* document.

1.1.1 Proposed Planning Proposal

Narromine Shire Council has engaged Barnson Pty Ltd to assist with the preparation of a Planning Proposal affecting 397 Craigie Lea Lane, Narromine, legally described as Lot 2 in Deposited Plan 1294897, that seeks to amend the *Narromine Local Environmental Plan 2011* by way of:

- 1. Land Rezoning** - The Planning Proposal aims to revise the existing land zoning of the property by introducing an E5 – Heavy Industrial Land Zone to a specific area within the site.
- 2. Adoption and modification of Land Use Table** - The proposal involves incorporating the E5 – Heavy Industrial Land Use Table into the Local Environmental Plan (LEP) and adjusting the land use table to establish specific objectives. These objectives are designed to guide the future development of the site in alignment with the strategic vision, which focuses on supporting the agriculture industry and facilitating freight exchange.
- 3. Adjustment Minimum Allotment Size** Adjustment - Changes to the current Minimum Allotment Size requirements are proposed to facilitate the future subdivision of E5 – Heavy Industrial Allotments. Additionally, a site-specific pre-conditioning to services will be introduced.
- 4. Amendment to Split Zone Clause** - A modification to the Split Zone Clause (Cl4.1C of the LEP) is suggested to enable the creation of single-zoned lots for the original lots that are currently split-zoned.

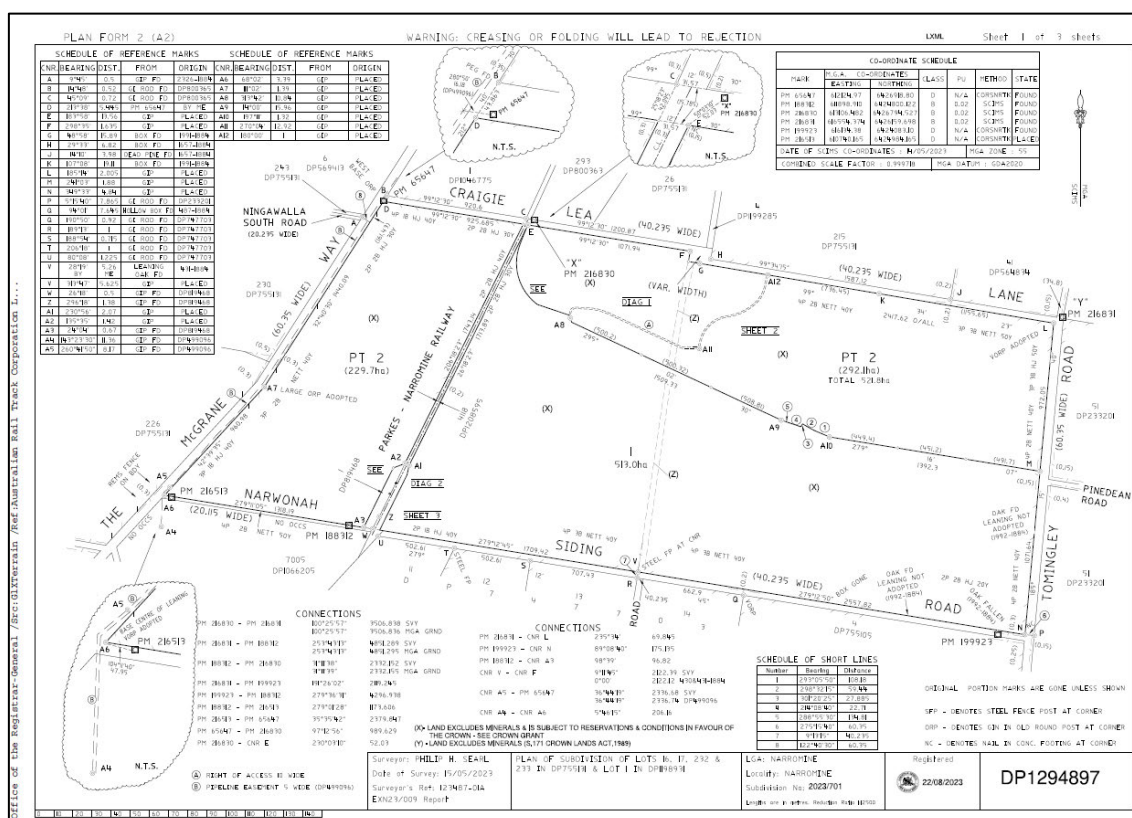
1.1.2 Proposed Development

Narromine Heavy Industrial Precinct

In February 2021, the NSW Government affirmed its support for the Narromine Heavy Industrial Precinct and Freight Exchange by successfully securing \$9 million funding from the Growing Local Economies Fund. Following the confirmation of funding for the industrial precinct, the Australian Rail Track Corporation (ARTC) acquired the land in the designated area and initiated the construction of its Material Distribution Centre to serve the Inland Rail project. The Industrial

Presently, the existing Local Environmental Plan imposes restrictions on the further subdivision or development of the land adjoining the Material Distribution Centre area. Consequently, the Narromine Shire Council is actively exploring the possibility of introducing amendments to the LEP to establish a viable framework for the continued development of the land.

Barnson has been engaged by Narromine Shire Council to assist with the preparation of a 2-lot subdivision Development Application that seeks to separate Lot 2 in Deposited Plan 1294897 (**Figure 1** below) (currently described on SIXMAPS as Lot 2 in Deposited Plan 1294897 and Lot 22 in DP 1295665).



The existing lot is transversed by the Parkes Narromine Railway corridor running north-south. The two parcels of land are to be utilised as proposed Lot 21 and Lot 22. Please refer to the table below for a breakdown of the proposal: The proposed subdivision seeks to create 2 allotments, see **Table 1** and **Figure 1** below for the breakup.

Table 1 - Breakup Details

Existing Lot	Location	Proposed Lot	Area
Pt 2 (DP1294897)	Western side of railway	Proposed Lot 100	229.7ha
Pt 2 (DP1294897)	Eastern side of railway	Proposed Lot 101	292.1ha

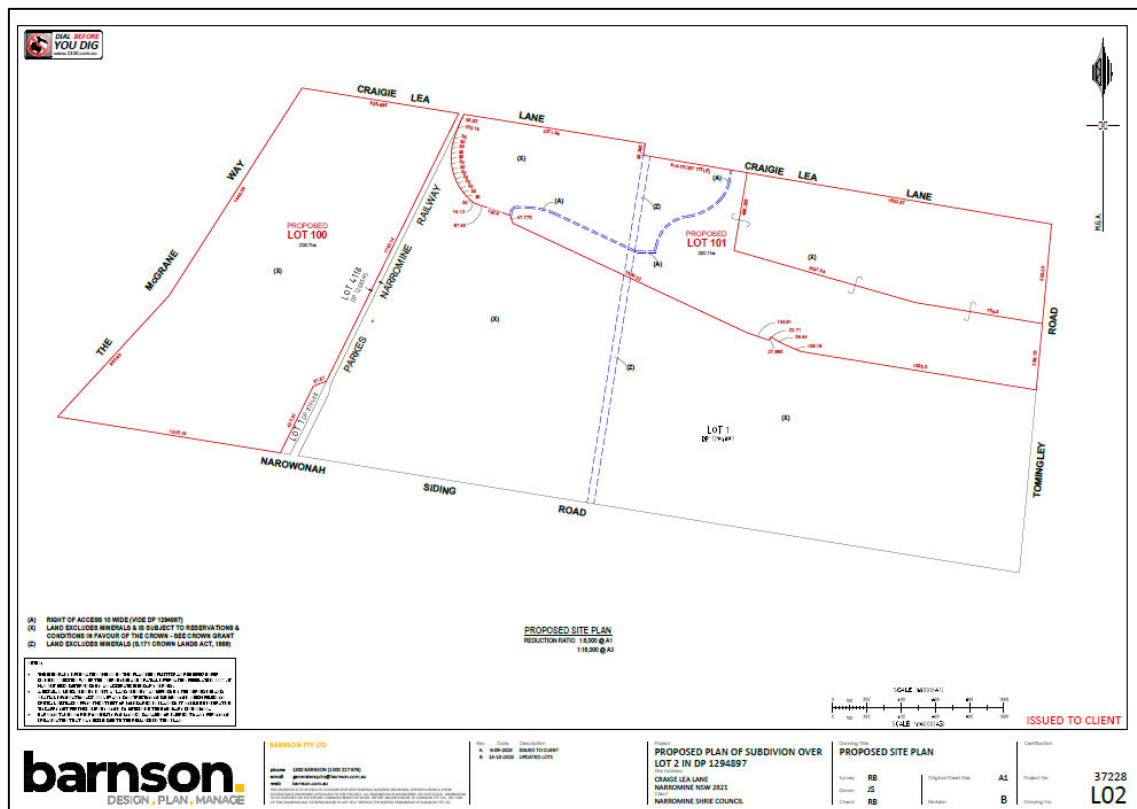


Figure 2 Site Details

The development presents an opportunity to delineate in an orderly manner the two (2) individual lots that are already separated by the Parkes Narromine Railway Corridor. Notably, the land that is indicated as Proposed Lot 101 is the subject to this Planning Proposal.

Refer to the Concept Subdivision Plans in **Appendix A** of this report.

1.2 Legislative Requirements

1.2.1 Environmental Planning and Assessment Act 1979

1.2.1.1 Section 9.1(2) of the Environmental Planning and Assessment Act 1979

A Planning Proposal on bushfire prone land must have regard to Section 9.1(2) Direction 4.3 – ‘Planning for Bush Fire Protection’ of the *Environmental Planning and Assessment Act 1979* as well as the NSW Rural Fire Service Document ‘Planning for Bushfire Protection 2019’.

The objectives of Direction 4.3 are as follows:

The objectives of this direction are to:

- (a) protect life, property and the environment from bush fire hazards, by discouraging the establishment of incompatible land uses in bush fire prone areas, and*
- (b) encourage sound management of bush fire prone areas.*

Direction 4.3 instructs Council’s on the bushfire matters which need to be addressed when drafting and amending Local Environmental Plans. They are as follows:

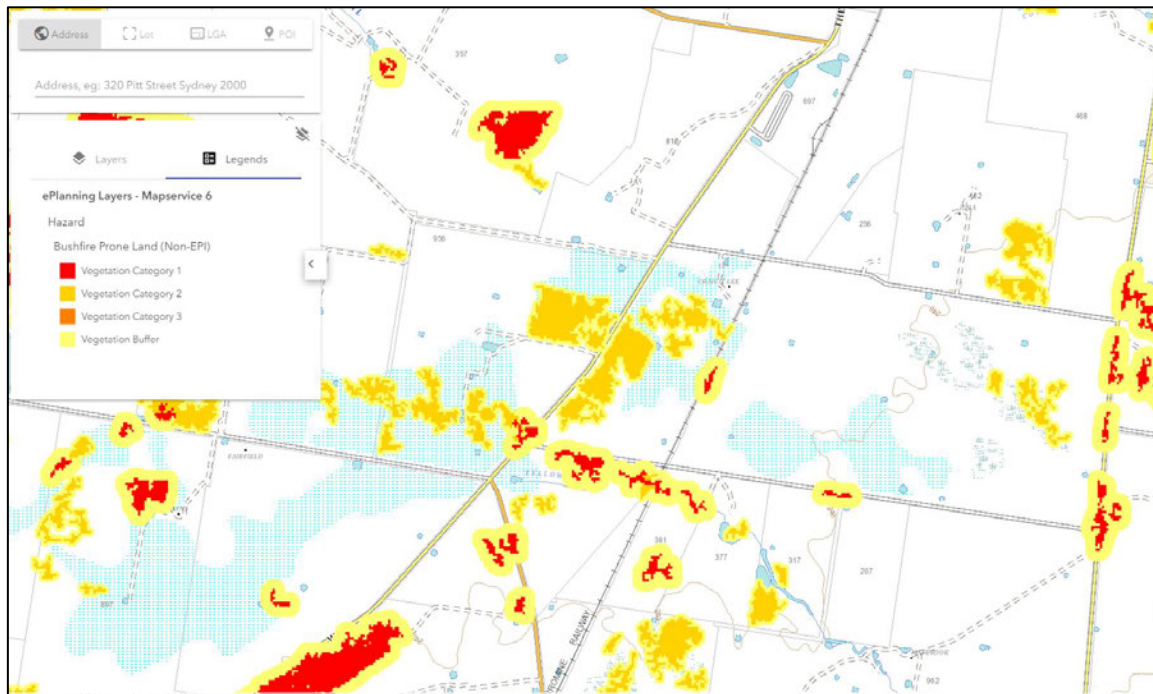
- (1) In the preparation of a planning proposal the relevant planning authority must consult with the Commissioner of the NSW Rural Fire Service following receipt of a gateway determination under section 3.34 of the Act, and prior to undertaking community consultation in satisfaction of clause 4, Schedule 1 to the EP&A Act, and take into account any comments so made.*
- (2) A Planning Proposal Must:*
 - (a) have regard to Planning for Bushfire Protection 2019,*
 - (b) introduce controls that avoid placing inappropriate developments in hazardous areas, and*
 - (c) ensure that bushfire hazard reduction is not prohibited within the Asset Protection Zone (APZ).*
- (3) A planning proposal must, where development is proposed, comply with the following provisions, as appropriate:*
 - (a) provide an Asset Protection Zone (APZ) incorporating at a minimum:*
 - (i) an Inner Protection Area bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and*
 - (ii) an Outer Protection Area managed for hazard reduction and located on the bushland side of the perimeter road,*
 - (b) for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance*

standard, in consultation with the NSW Rural Fire Service. If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the Rural Fires Act 1997), the APZ provisions must be complied with,

- (c) contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks,
- (d) contain provisions for adequate water supply for firefighting purposes,
- (e) minimise the perimeter of the area of land interfacing the hazard which may be developed,
- (f) introduce controls on the placement of combustible materials in the Inner Protection Area.

1.2.1.2 Bush Fire Prone Land

The subject site is designated as bush fire prone land, pursuant to Section 10.3 of the EP&A Act. The site is identified as containing Category 1 Vegetation and Vegetation Buffer on the Bush Fire Prone Land Map as shown in **Figure 3** below.



Source: (NSW Planning & Environment, 2023)

Figure 3 – Bush Fire Prone Land Map

1.2.1.3 Planning for Bush Fire Protection

The majority of Direction 4.3 provisions are specified within *Planning for Bushfire Protection 2019* (PBP). This report addresses both Direction 4.3 and PBP, combining responses to the requirements where there is an overlap or consistency between the two.



PBP specifies the type of bushfire assessment requirements and what needs to be considered for Planning Proposal submissions. Section 4 'Strategic Planning' of PBP outlines the submission requirements.

Section 8.3 of PBP

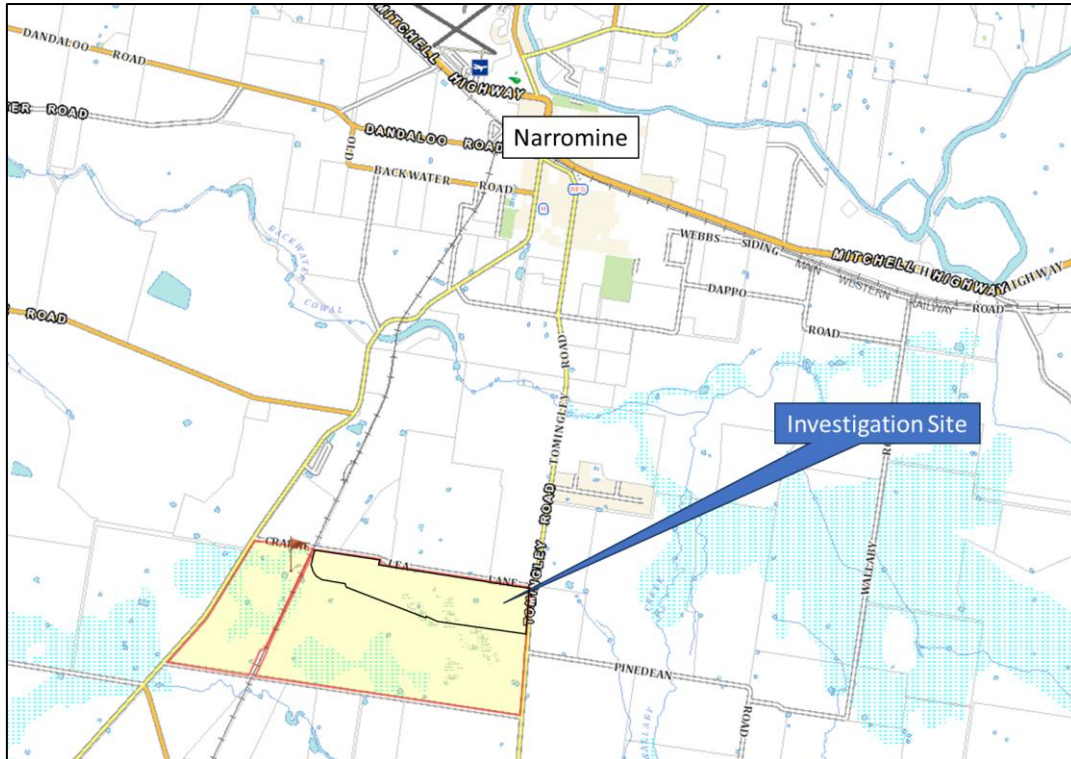
Section 8.3 of PBP provides the assessment methodology and bushfire protection measures for other uses within classes 5-8 of the National Construction Code (NCC). These uses generally include commercial, retail and industrial allied uses. As stated in Section 8.3.1 of PBP, the NCC does not provide for any bushfire specific performance requirements for these types of uses. As such, the Asset Protection Zone requirements and Bushfire Attack Level requirements do not apply in this instance. Whilst bushfire is not captured in the NCC for class 5-8 buildings, the following objectives, as stipulated in section 8.3.1 of PBP, are to be applied in relation to access, water, supply and services, and emergency and evacuation planning:

- *To provide safe access to/from the public road system for firefighters providing property protection during a bush fire and for occupant egress evacuation;*
- *To provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development;*
- *To provide adequate services of water for the protection of buildings during and after the passage of bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building; and*
- *Provide for the storage of hazardous materials away from the hazard wherever possible.*

2 THE SITE & ITS SURROUNDS

2.1 Site Location

The site is located in a rural area, approximately 6km south of Narromine, as shown in **Figure 2** below. The site is located in the Narromine Shire Local Government Area.



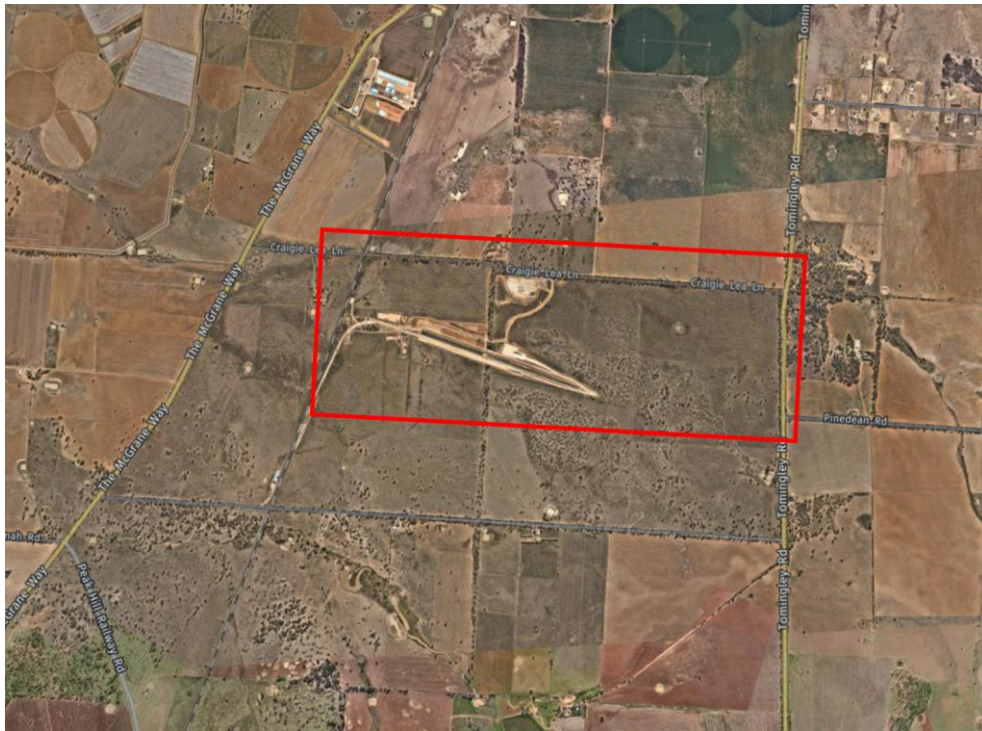
Source: (NSW Government Spatial Services, 2023)

Figure 4 – Site Location

2.2 Site Details

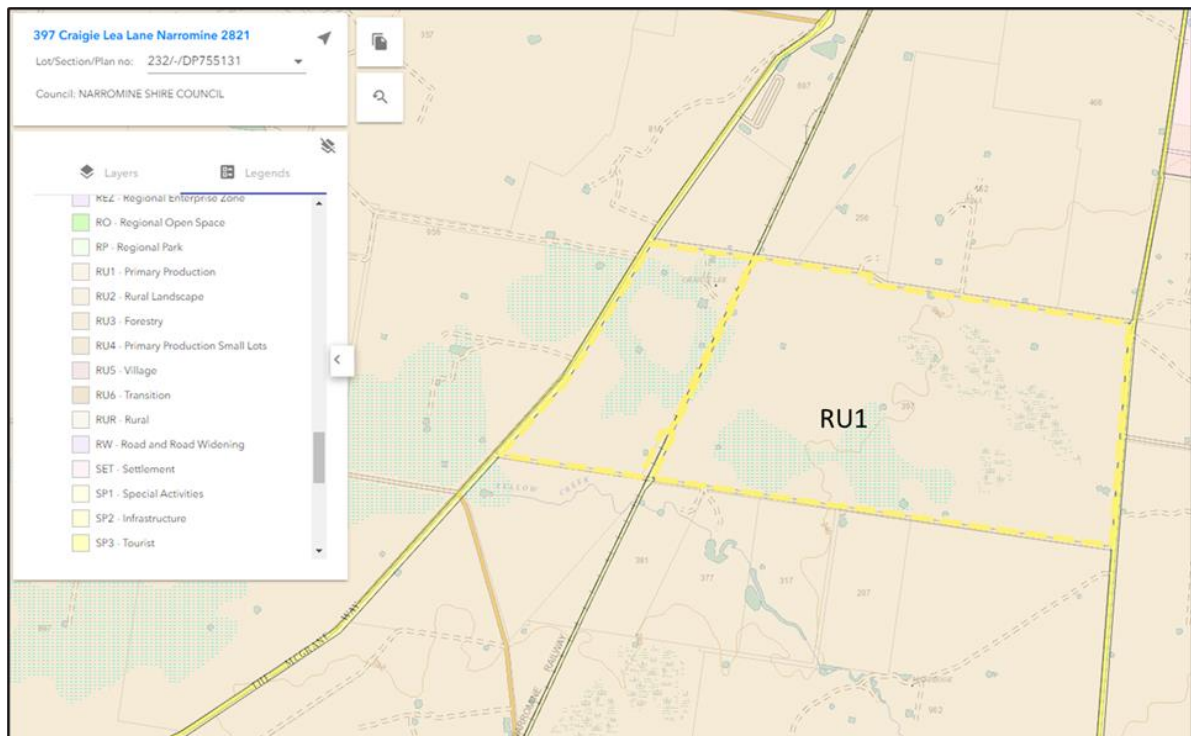
The site in question is known as 397 Craigie Lea Lane, officially identified as Lot 2 in Deposited Plan (DP) 1294897, situated in Narromine. It is important to note the focus of the Strategic Bush Fire Study is specifically on the eastern section of the lot, as delineated as the 'Investigation Site' above, and the remaining portion will remain unaffected. The Deposited Plan is provided in **Appendix B** of this report.

The site has direct frontage to Craigie Lea Lane to the north, and, Tomingley Road to the east, they are a mix of sealed and unsealed local roads. There are trees scattered throughout the site, as shown in **Figure 5** below.



Source: (NearMaps, 2023)

Figure 5 – Site Aerial



Source: (NSW Planning & Environment, 2023)

Figure 6 – Zoning Map



The site is zoned RU1 Primary Production under the *Narromine Shire Local Environmental Plan 2011* as shown in **Figure 6** above. The wider locality is generally zoned RU1 Primary Production.

2.3 Environmental Considerations

2.3.1 Environmentally Significant Features

The area to be utilised for the Industrial subdivision is cleared and has been used for farming practices for a considerable time. The farming activities including animal grazing with evidence of livestock being onsite. Furthermore, the subject site is not located in proximity to any significant water courses or the like. Given the previous use of the site and the locality, the possibility of environmentally significant features is considered to be low.

2.3.2 Threatened Species, Populations and Ecological Communities

Ozark Environment & Heritage (Ozark) has been engaged to undertake a biodiversity site suitability assessment of the proposed site of a freight hub associated with the development.

As per the BioNet Vegetation Classification Database, all Plant Community Types (PCTs) identified within the subject site are linked to Threatened Ecological Communities (TECs). Additionally, various TECs listed under the BC Act and EPBC Act were identified, showing similarities in structure or composition with the site's vegetation, although not catalogued in the BioNet Database. The results of the field survey for each community were evaluated against composition and condition thresholds for each vegetation type. A summary of the findings have been provided below:

1. The field survey verified the presence of these PCTs within the subject site. The vegetation within the site comprises a mix of derived and/or natural grasslands, small ephemeral wetlands, isolated remnant trees, and remnant woodland communities in the road corridor. Consequently, a total of five PCTs were documented within the subject site. The extent of each PCT within the subject site and the future expansion area is detailed in **Table 4**, respectively. **Figure 11** maps the vegetation communities within the site.
2. The boundaries between specific communities, especially PCT 45 and PCT 250, and between PCT 53 and the surrounding grasslands, are likely to fluctuate based on seasonal conditions. The mapping of each community within the site reflects conditions observed during the surveys. Although much of the paddock was initially classified as non-native, field surveys revealed that this area is predominantly occupied by native groundcover species, with only minor areas of disturbance. Consequently, it has been classified as a derived grassland community (PCT 250).
3. Additionally, the area modelled as containing PCT 45 was found to host numerous gilgai-associated wetlands, which were mapped as a separate ephemeral wetland community (PCT 53).



4. The survey also identified patches of a Fuzzy Box (*Eucalyptus conica*)-dominated community within the road corridor (PCT 201), intergrading with PCT 82. Minor occurrences of a narrow-leaved eucalypt consistent with Pilliga Box (*E. pilligaensis*) or a hybrid between Pilliga Box and Grey Box (*E. microcarpa*) were noted in the road corridor. These individuals were mapped to PCT 82. Note that additional areas of the BC Act- and EPBC Act-listed Grey Box EECs and the BC Act-listed Fuzzy Box EEC occur in the northern road corridor of Cragie Lea Lane. It was noted that the Fuzzy Box community in particular was extensive on the northern side of the road.

The most significant identified constraints associated with any proposal situated in the subject site or future expansion area are the relatively large areas of TEC that would be impacted and the presence of the threatened Bluegrass. Ozark confirmed that significant efforts to reduce impacts to these entities are strongly encouraged in order for future development to comply with the requirement to avoid and/or minimise impacts to biodiversity values. It is noted that the proposed concept subdivision detailed in this report illustrates how the land could be potentially subdivided whilst retaining and protecting the Bluegrass and the land identified as “typical habitat” for blue grass.

2.3.3 Indigenous Heritage

An Aboriginal Due Diligence report prepared by OzaArk Environment & Heritage states that no Aboriginal objects or areas of potential archaeological deposits were identified within the development footprint during a site inspection (OzArk Environment & Heritage Pty Ltd, 2023).

A search conducted on March 17, 2023, using the Aboriginal Heritage Information Management System (AHIMS) within a 5 x 5 km search area (GDA Zone 55 Eastings: 610694–620637, Northings: 6420967–6430960) revealed 24 recorded Aboriginal sites within that broader search area. Importantly, none of these sites are located within the specific study area.

Findings from the AHIMS search indicate that modified trees, such as those with carvings or scars, are the most likely recorded site type in the region, followed by isolated finds. Culturally modified trees have been previously documented along creek or drainage lines and road corridors, where mature trees are more likely to be present. The AHIMS search also reveals that artefact sites have predominantly been recorded on landforms with gilgai and/or along the Macquarie River. Other recorded sites include modified trees associated with burials, artefact scatters, and artefact sites with unspecified quantities.

Given that the western part of the study area contains gilgai, there is an increased potential for artefact sites, such as isolated finds or low-density scatters, to be present. Any scarred trees, if found, would likely be restricted to the road corridors. Due to past disturbances, such as ploughing, any artefact sites would exist in a secondary context.

A visual inspection of the northern boundary of the study area conducted by OzArk Archaeologist Imogen Crome on April 26, 2023, confirmed that the study area consists of flat plains with remnant mature vegetation. Grey and Bimble box species remain within the road corridor at the



northern end, some of which have been naturally scarred. However, no vegetation displayed comprehensive signs of cultural modification.

The ground cover primarily consists of long grasses and weeds, significantly limiting ground surface exposure within the study area to approximately 0-10%. Areas with increased visibility (10-15%) result from exposure due to wild animal trampling.

The visual inspection did not identify any Aboriginal sites or landforms with subsurface archaeological potential. The lack of archaeological potential is attributed to the undifferentiated nature of the landform and the absence of resources, such as water, which would have attracted Aboriginal occupation. While the proposed works are anticipated to impact the ground surface, it is concluded that no Aboriginal objects or intact archaeological deposits will be harmed.

3 BUSHFIRE LANDSCAPE RISK ASSESSMENT

A bushfire landscape risk assessment was undertaken for the development contemplated by the Planning Proposal and includes assessment of bushfire hazard, probable fire behaviour and bushfire history within a 5km radius of the site along with consideration of potential fire attack scenarios.

3.1 Bushfire Risk Context

The subject site and other lands within the locality are identified as Bushfire Prone Land (BFPL) as shown in **Figure 2**.

The subject site adjoins existing agricultural lands in all directions. According to **Figure 2**, the land identified as Bushfire Prone Land is sporadic in nature and includes Vegetation Category 1, 2, 3, and Vegetation Buffer. The most prominent BFPL is Vegetation Category 3 and Vegetation Buffer, which can be considered a lesser risk type.

The site is bounded by several road corridors, which are to the north and east of the site (Craigie Lea Lane, and the Tomingley Road). These roads along with other roads in the area, and reduced fuel areas (i.e. cleared paddocks, and developed areas such as surrounding dwellings) introduce a level of discontinuity in the BFPL, which would influence the potential fire spread to the site, especially in milder bushfire weather conditions.

3.2 Vegetation

The vegetation hazard at a landscape level is dominated by grasslands, and managed lands as identified in **Plate 1** to **Plate 7**. Given the majority of the surrounding lands is utilised for agricultural lands (grazing and/or cropping), fuel reduction activities provide fuel reduced grasslands.

3.3 Slope

Slope across the broader study area has been depicted in a detail survey provided by Barnson (**Appendix C**). The site and broader locality seems to be dominated by undulating lands grading to steeper lands to the south-east and south-west. Fire spread towards the site would therefore be downslope fire runs across flat to undulating lands.

3.4 Bushfire Weather

Elevated bushfire weather conditions are generally associated with periods of hot and dry weather, often associated with strong winds.

3.5 Fire History

The Subject Site locality has minimal data accessible regarding bushfire history.



3.6 Potential Fire Attack Scenarios

A range of fire attack scenarios on the subject site exist. The more likely scenarios are outlined below:

1. A grassland fire starts to the south of the subject site. The fire progresses further north towards the site. The likelihood of such a fire occurrence is low, given the site is generally maintained through grazing and other agricultural activities. In addition, the subject site will be continued to be managed once the site has been developed.
2. A fire start occurs in vegetation on the opposite side of Tomingley Road with easterly winds. The likelihood of a significant fire under this scenario is low, given the limited fire catchment in this direction, the expected milder bushfire weather conditions of winds from this sector and managed vegetation (Road Corridor) influencing fire ignition, development and spread. Any fire impact on the site under this scenario is expected to be less intense, and far below the design fire that PBP and AS 3959 are based on (i.e. FDI 80).

Despite the low likelihood of bushfire impact, the risk still warrants mitigation and bushfire protection measures will be recommended.



4 BUSH FIRE RISK SUMMARY

The overall bushfire risk is considered to be low, considering the bushfire hazard at a landscape level; the relatively infrequent wildfire history and smaller fire extent; fragmented continuity of the bushfire hazard lessening fire spread risk, and the low likelihood and reduced severity of potential bushfire attack scenarios.

There is no part of the landscape bushfire risk assessment that suggests the planning proposal should be excluded as inappropriate development under the Strategic Planning Principles or exclusion criteria within PBP. This risk exposure will be further lessened through the implementation of bushfire protection measures as covered in Section 6.

5 BUSH FIRE ASSESSMENT

5.1 Methodology

An analysis of the bushfire environment has considered the compliance requirements within Direction 4.3 and PBP. Section A1.1 of PBP has been identified as the most appropriate methodology to utilise for the bush fire assessment in this case. The following provides the required information in accordance with the methodology.

5.2 Bush Fire Fuels

Pursuant to Appendix 1 of PBP, all vegetation within 140m of the site (assessment area) has been classified in accordance with *Ocean Shores to Desert Dunes* (Keith, 2004) and Figure 2.3 of AS3959. Given the scale of the property and associated development, a generalised approach has been adopted for mapping the vegetation (refer to **Figure 7** below). Photographs of the vegetation from the site inspection carried out on 06 September 2023 are provided in the following plates for each assessment plot.

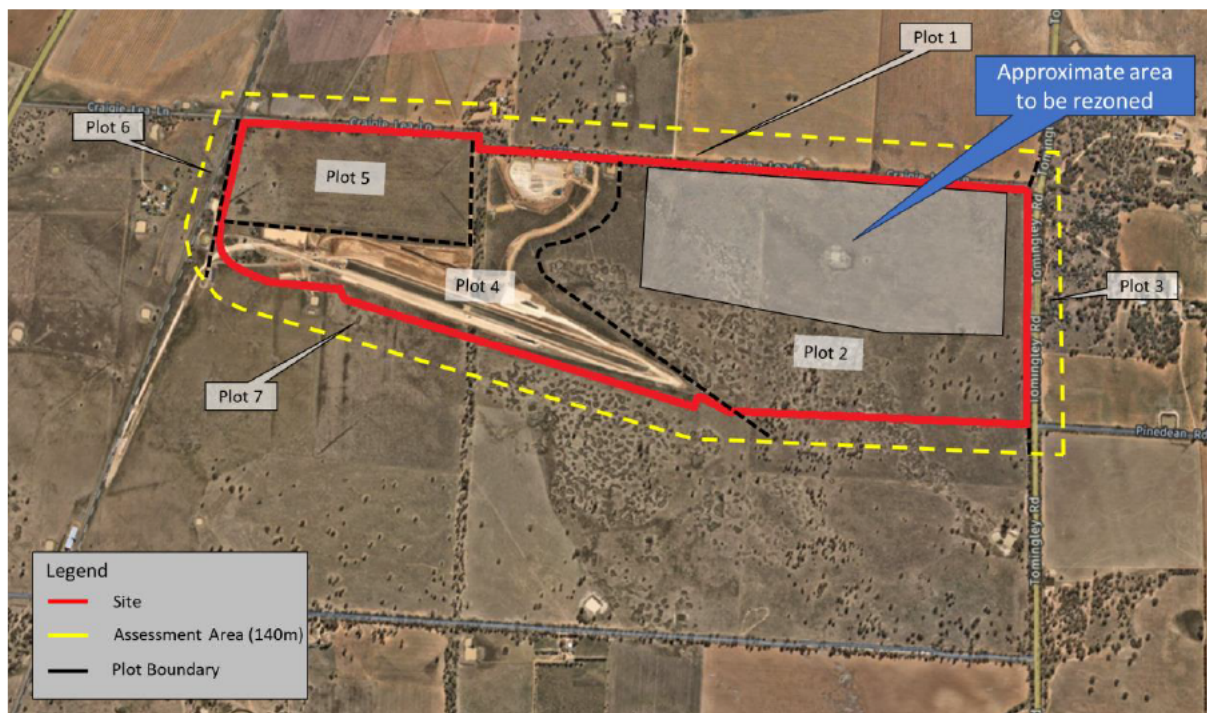




Figure 7 – Vegetation Classification

Plot 1	
Existing Classification:	Managed Vegetation
Post Development Classification:	Managed Vegetation

Description:	Craigie Lea Lane, and a portion of a cropped paddock on neighbouring lot.
	
Plate 1 – Plot 1	Plate 2 – Plot 1

Plot 2	
Existing Classification:	Grassland
Post Development Classification:	Managed Land
Description:	The plot includes grassland in the eastern portion of the site. Scattered trees and earthen dams evident
	
Plate 3 – Plot 2	Plate 4 – Plot 2
Plot 3	
Existing Classification:	Managed Vegetation
Post Development Classification:	Managed Vegetation

Description:	Tomingley Road Corridor.
	
Plate 5 – Plot 3	Plate 6 – Plot 3
Plot 4	
Existing Classification:	Managed Vegetation
Post Development Classification:	Managed Vegetation
Description:	The plot includes an Inland Rail Materials Handling Facility, where workers constantly grab materials.
	
Plate 7 – Plot 4	Plate 8 – Plot 4
Plot 5	
Existing Classification:	Grassland
Post Development Classification:	Grassland
Description:	Dominated by vacant grassland with some tracts of scattered trees.



Plate 9 – Plot 5



Plate 10 – Plot 5

Plot 6

Existing Classification:

Managed Vegetation

Post Development Classification:

Managed Vegetation

Description:

The Parkes Narromine Railway Corridor.



Plate 11 – Plot 6



Plate 12 – Plot 6

Plot 7

Existing Classification:

Grassland

Post Development Classification:

Grassland

Description:

Dominated by vacant grassland with some tracts of scattered trees.

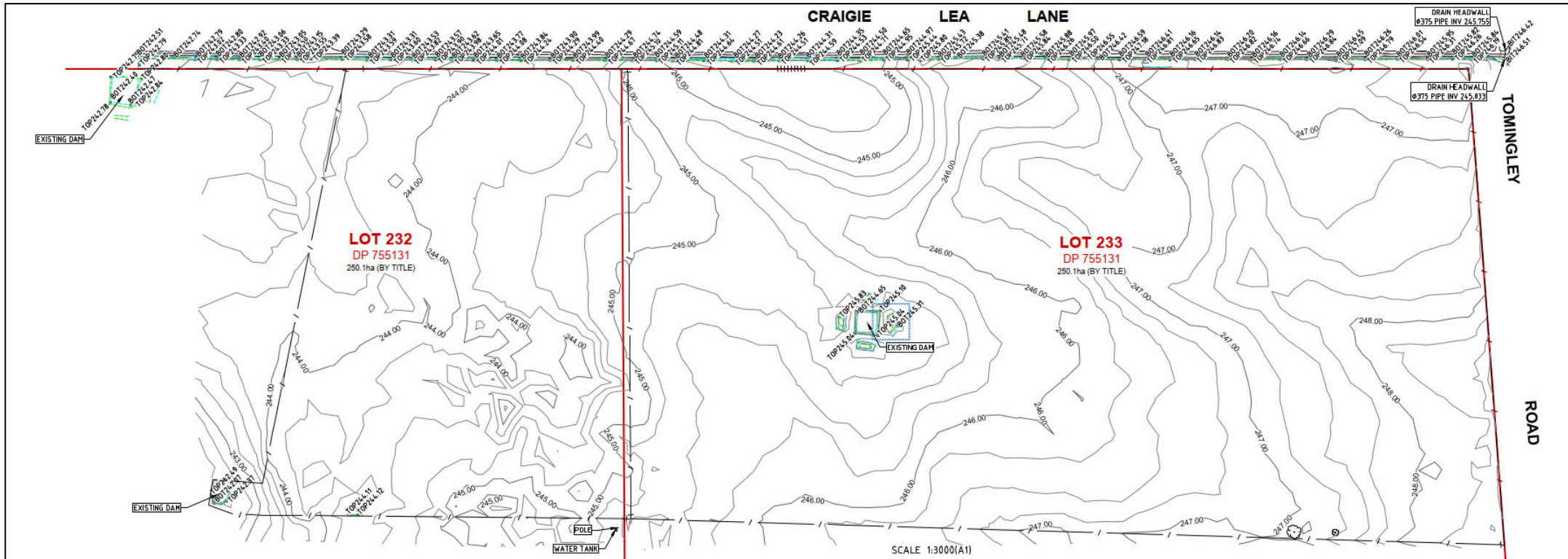


Plate 13 – Plot 7

5.3 Topography

Pursuant to Appendix 1.4 of PBP, contour data has been sourced from the NSW Spatial Information Exchange Mapping system. The contour data was verified by ground truthing during the site inspection. A Detail Survey of the site has also been prepared and is provided in **Appendix C** of this report.

The eastern portion of the site enjoys a slightly higher elevation, however, the overall property is relatively flat throughout. Refer also to **Figure 8**.



Source: (NSW Government Spatial Services, 2020)

Figure 8 – Topography



5.4 Fire Weather Area

The subject site is located within the Narromine Shire Council LGA. Pursuant to Table A1.6 of the PBP, the relevant Forest Fire Danger Index (FFDI) for the site is 80.

5.5 Bushfire Risk

Bushfire risk is defined as the chance of a bushfire igniting, spreading and causing damage to assets of value. This assessment is analysed not only in terms of the existence of an adjacent hazard, but also the potential for ignition, fire spread, and factors contributing to fire control and response.

Relatively speaking, the risk rating of future development facilitated by a Planning Proposal that supports a future industrial subdivision would not be higher than that current situation. This is because the bushfire landscape and vulnerability of the future occupants will remain the same. In addition, the future development will have compliant bushfire protection measures in accordance with the ministerial directions and *Planning for Bushfire Protection 2019*.

6 ADDRESSING COMPLIANCE

This section of the report provides details for compliance with the assessment requirements. The response to the requirements set out in the ministerial directions and PBP have been incorporated. There is crossover between the directions and PBP, and as such, the relevant report subsection is referred to for the appropriate response.

6.1 Direction 4.3

The objectives of Direction 4.3 of the ministerial directions can only be satisfied once the provisions are achieved. Demonstration of achieving the provisions is provided below along with commentary for each section.

6.1.1 Objectives

The objectives of this direction are to:

(a) protect life, property and the environment from bush fire hazards, by discouraging the establishment of incompatible land uses in bush fire prone areas,

Comment: The intension of this objective is to avoid a development outcome that is faced by risks that cannot be managed to an acceptable level. This bushfire assessment covers the requirements of *Planning for Bushfire Protection 2019* in relation to the end use of the site, being for industrial purposes. There is no risk to future development that would be higher than usual, and the implementation of the industrial lands would not increase bushfire risk in the locality, therefore making it compatible with the surrounding bushfire prone area.

(b) encourage sound management of bush fire prone areas.

Comment: The recommended bushfire protection measures demonstrate sound management of the site for the intended industrial use. These provisions are detailed within **Sections 4 and 5** of this report.

6.1.2 Directions

Direction 1

(1) In the preparation of a planning proposal the relevant planning authority must consult with the Commissioner of the NSW Rural Fire Service following receipt of a gateway determination under section 3.34 of the Act, and prior to undertaking community consultation in satisfaction of clause 4, Schedule 1 to the EP&A Act, and take into account any comments so made.

Comment: Noted. Once the Planning Proposal is submitted, Council shall consult with the Commissioner of the NSW Rural Fire Service following receipt of Gateway Determination.

Direction 2

(2) A Planning Proposal Must:

(a) have regard to Planning for Bushfire Protection 2019,

Comment: Noted – a suitable merit based assessment of the required sections of PBP has been provided as part of this report.

(b) introduce controls that avoid placing inappropriate developments in hazardous areas, and

Comment: The proposed industrial land use is not considered inappropriate, and the area is not considered hazardous. All development within hazardous areas will need to consider the potential impact on spreading bushfire or increasing bushfire risk. Controls (i.e. Bush Fire Protection Measures) will be set in place to ensure compliance with PBP, as discussed throughout this report.

(c) ensure that bushfire hazard reduction is not prohibited within the Asset Protection Zone (APZ).

Comment: A specific APZ distance is not required for the proposed industrial land use. APZ's do not apply as deemed-to-satisfy provisions for bushfire protection for class 5-8 buildings, which is confirmed in Section 8 of PBP. The provisions of 'defendable space' and access between the site and the bushfire hazard is discussed throughout this report.

Direction 3

(3) A planning proposal must, where development is proposed, comply with the following provisions, as appropriate:

(a) provide an Asset Protection Zone (APZ) incorporating at a minimum:

- (i) an Inner Protection Area bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and*
- (ii) an Outer Protection Area managed for hazard reduction and located on the bushland side of the perimeter road,*

Comment: Not required in this instance, as discussed above.

(b) for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service. If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the Rural Fires Act 1997), the APZ provisions must be complied with,

Comment: The proposal does not involve infill development. This provision does not apply.

(c) contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks,

Comment: The proposed road network shall allow for two-way travel, with the minimum road corridor being 30m wide. The proposed road corridor will connect with the perimeter road. All roads able to support a carrying capacity of 23 tonnes GVM;

(d) contain provisions for adequate water supply for firefighting purposes,

Comment: all aspects of future development are to have water facilities that complies with the provisions under PBP.

(e) minimise the perimeter of the area of land interfacing the hazard which may be developed,

Comment: Noted.

(f) introduce controls on the placement of combustible materials in the Inner Protection Area.

Comment: Noted.

6.2 Discussions with NSW RFS

Barnson had reached out to NSW RFS on the 7th of December 2023, however, no response has yet to be received from NSW RFS in respect to the Planning Proposal.

6.3 Planning for Bushfire Protection 2019

Compliance with *Planning for Bushfire Protection 2019* (PBP) is achieved by addressing the objectives relating to access, water supply and services. The below sections outline the Bush Fire Protection Measures (BFPM's) that are considered necessary for the future industrial subdivision.

6.3.1 Aims and Objectives of PBP

The aim of PBP is:

to provide for the protection of human life and minimise impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment.

The objectives of PBP are to:

- *Afford buildings and their occupants protection from exposure to a bush fire;*
- *provide for a defensible space to be located around buildings;*
- *provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;*
- *ensure that appropriate operational access and egress for emergency service personnel and occupants is available;*
- *provide for ongoing management and maintenance of BPMs; and*
- *ensure that utility services are adequate to meet the needs of firefighters.*

6.4 Consistency with PBP Objectives

A review of consistency with the objectives of *Planning for Bushfire Protection 2019* is provided in **Table 1** below.

Table 2 - Consistency with PBP Objectives		
Objective	Acceptable Solution/Comment	Consistent
<p>Provide for a defensible space to be located around buildings;</p> <p>Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;</p>	<p>For habitable development types such as dwellings and SFPP developments, the application of bushfire hazard building setbacks (i.e. APZ's) is related to the vulnerability of an asset typically in terms of combustibility of external materials or the nature of the use and its occupants. As future development would not include habitable buildings, PBP does not prescribe an APZ requirement. The general Fire safety measures of the NCC are accepted as adequate bushfire protection for buildings classed 5-8, which includes industrial land uses.</p> <p>However, PBP does require the consideration of a managed hazard-separation area for firefighting purposes referred to as 'defensible space'. The defensible space is defined as the ability to gain access around an asset in order to carry out firefighting operations. Relying on a defensible space in lieu of a formal APZ is deemed acceptable for an industrial allied use.</p> <p>The future industrial subdivision will have a defensible space between buildings and the hazard consisting of public roads and/or appropriate setback distances to boundaries. Defensible space is achieved and available for each future allotment on the subject site.</p> <p>The defensible space will allow continuous thoroughfare around the perimeter of future buildings to ensure firefighting vehicles can carry out firefighting operations successfully. The defensible spaces will be clear of vegetation and therefore satisfy the fuel management performance requirements of an Inner Protection Area in accordance with PBP.</p>	✓
<p>Ensure that appropriate operational access and egress for emergency service personnel and occupants is available</p>	<p>The assessment of access is to consider the adequacy of public road access, property access roads and defensible space.</p> <p><u>Adequacy of access and egress</u></p> <p>The industrial end use will benefit from 1 access point of Craigie Lea Lane. The site has direct access to Craigie Lea</p>	✓

	<p>Lane, and a new proposed road corridor to the east (100m wide). The road provides for suitable heavy articulated vehicles and therefore can cater for fire-fighting vehicles and appliances. Furthermore, it is in close proximity to the Tomingley Road which is a sealed two-way road.</p> <p><u>Internal access</u></p> <p>A public road is proposed that will form a thoroughfare providing access to all areas and future allotments of the site. The road has been designed to cater for large truck movements and will therefore be suitable for fire and emergency authorities as well as evacuation procedures. The road will comply with the non-perimeter roads provisions under PBP.</p> <p><u>Fire Trail Access</u></p> <p>A 30m carriageway is proposed for access providing legal access to Craigie Lea Lane. The condition of the site will be maintained to ensure emergency vehicles can safely access.</p> <p><u>Emergency Response Access/Egress</u></p> <p>The property will have access to Craigie Lea Lane, and a proposed 100m (wide) road corridor to the east. All roads shall be constructed and maintained in accordance with PBP provisions for access, being as follows:</p> <ul style="list-style-type: none"> • From Craigie Lea Lane to industrial lots – 30m width with a carrying capacity of 23 tonnes GVM; and • Future 100m width road corridor width with a carrying capacity of 23 tonnes GVM; and <p>No tree plantings or obstructions shall occur on either side of the access roads that would prohibit access to and from the site in the event of a fire.</p> <p><u>Perimeter Road</u></p> <p>As discussed throughout this report, all hazard interface areas (i.e. future lots adjoining the bushfire hazard) will feature an access road and/or appropriate building setbacks acting as defensible space. At a minimum, the access/setback will have a width of 6m and designed as a suitable thoroughfare for RFS vehicles.</p> <p><u>Surrounding Road Network</u></p> <ul style="list-style-type: none"> • Craigie Lea Lane: Located to the north of the property is Craigie Lea Lane, which is currently an unsealed road, which is approximately 3.50km long and wide enough for two-way traffic use. It should 	
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	<p>be noted that Narromine Shire Council is currently undertaking a Part 5 Approval to provide road upgrades to Cragie Lea Lane to seal.</p> <ul style="list-style-type: none"> • Tomingley Road: The eastern portion of the site is bounded by Tomingley Road which is a sealed two-way road that connects the Narromine and Tomingley townships. 	
Provide for ongoing management and maintenance of BPMs	<p>Before the commencement of the Bushfire Danger Period, a review of vegetation on the site and applied Bushfire Protection Measures is recommended to be undertaken. Fuel reduction is recommended throughout the site. All future lots and areas will be required to be regularly maintained to minimise rapid grass growth.</p>	✓
Ensure that utility services are adequate to meet the needs of firefighters	<p>The water required for firefighting shall be supplied via a series of rainwater tanks. In order to provide adequate storage, the following is recommended:</p> <ul style="list-style-type: none"> • A minimum 20,000L static water supply shall be provided via a concrete tank or steel tank for each lot. This tank shall be provided with a ball valve and Storz outlet; • Portable fire extinguishers shall be installed as per NCC and AS2444-2004; • Overhead powerlines are to be installed with short pole spacing and any vegetation within proximity maintained in accordance with the specifications in <i>ISSC3 Guideline for Managing Vegetation Near Powerlines</i>; • Bottled gas (if any) is to be installed and maintained in accordance with AS1596. Metal piping must be used and the bottles shall not be located near any flammable materials. 	✓

6.5 Section 8.3.1 Buildings of Class 5 to 8 under the NCC

A review of consistency with the objectives of Section 8.3.1 of Planning for *Bushfire Protection 2019* is provided in **Table 2** below.

Table 3 - Consistency with Section 8.3.1 of PBP

Objective	Acceptable Solution/Comment	Consistent
to provide safe access to/from the public road	Safe access to Craigie Lea Lane, and a new 100m wide road corridor will be readily available for firefighters to access the	✓

system for firefighters providing property protection during a bush fire and for occupant egress for evacuation.	site while occupants are able to egress. The site is also in close proximity of the Tomingley Road.	
to provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development;	<u>Noted</u> in table above.	✓
to provide adequate services of water for the protection of buildings during and after the passage of bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building; and	<p>The water required for firefighting shall be supplied via a series of rainwater tanks. In order to provide adequate storage, the following is recommended:</p> <ul style="list-style-type: none"> • A minimum 20,000L static water supply shall be provided via a concrete tank or steel tank for each lot. This tank shall be provided with a ball valve and Storz outlet; • Portable fire extinguishers shall be installed as per NCC and AS2444-2004; • Overhead powerlines are to be installed with short pole spacing and any vegetation within proximity maintained in accordance with the specifications in <i>ISSC3 Guideline for Managing Vegetation Near Powerlines</i>; • Bottled gas (if any) is to be installed and maintained in accordance with AS1596. Metal piping must be used and the bottles shall not be located near any flammable materials. 	✓
provide for the storage of hazardous materials away from the hazard wherever possible.	All hazardous materials are to be located away from any potential hazard.	✓

6.6 Landscaping

The following table outlines the Performance Criteria and associated Acceptable Solutions for Landscaping in accordance with PBP. A merits-based approach of the PBP 2019 has been undertaken given the circumstances of the development.

Table 4 Landscaping		
Performance Criteria	Acceptable Solution/Comment	Compliance
Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	Vegetation and landscaping across the site is to comply with the performance objectives of an Inner Protection Area (IPA) standard as prescribed by Appendix 4 of PBP. The site will be cleared and subject to bulk earthworks resulting in the removal of all vegetation. Future vegetation will only consist of landscaping to internal roads, landscape treatment to detention basins, and eventually within each individual lot. As such, the site will comply with IPA requirements. Any proposed fencing shall be constructed in accordance with Section 7.6 of PBP.	✓

7 RECOMMENDATIONS

The assessment of the proposed development carried out in this report has assumed the development will be carried out in accordance with a number of bush fire protection measures (BFPMs). The following provides a summary of the BFPMs that must be incorporated into the development to ensure it best protects the development from the effects of bushfire in accordance with the requirements of PBP and other best practice guidelines.

- Access
 - Access to water tanks shall be kept clear at all times;
 - Provision of defendable space consisting of roads and/or setbacks to buildings to the bushfire hazard shall be implemented. The width between the building and the hazard shall be at least 6m;
 - The main access from the road shall be designed, constructed and maintained to provide a minimum 30m width with a carrying capacity of 23 tonnes;
 - The capacity of all access driveways an internal road shall be capable of carrying a fully loaded firefighting vehicle up to 23 tonnes;
 - No tree plantings or obstructions shall occur on either side of the access roads that would prohibit access to and from the site in the event of fire;
- Services:
 - Water
 - Hardened access driveway/landings are to be provided for all future tanks;
 - All tanks shall be provided with connections for firefighting purposes including a 65mm Storz outlet with gate/ball valve;
 - Valves and pipes are to be metal and adequate for water flow;
 - All above ground pipes and taps are to be metal; and
 - Pumps are to be shielded.
 - Electricity and Gas:
 - Vegetation around existing/new transmission lines are to be maintained in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Powerlines;
 - Any proposed gas bottles shall be installed and maintained in accordance with AS/NZS 1596:2004 with metal piping used;
 - All fixed cylinders are to be kept clear of flammable materials to a distance of 10m (or appropriately shielded);
 - All connections are to be of metal construction.

- Landscaping:
 - Landscaping shall be maintained in accordance with Appendix 4 of PBP and the applicable Asset Protection Zone Standards;
- Bushfire Danger Period:
 - Before the commencement of the Bushfire Danger Period, a review of the vegetation on the site and applied BPFMs is recommended to be undertaken. Fuel reduction measures are recommended throughout the site;

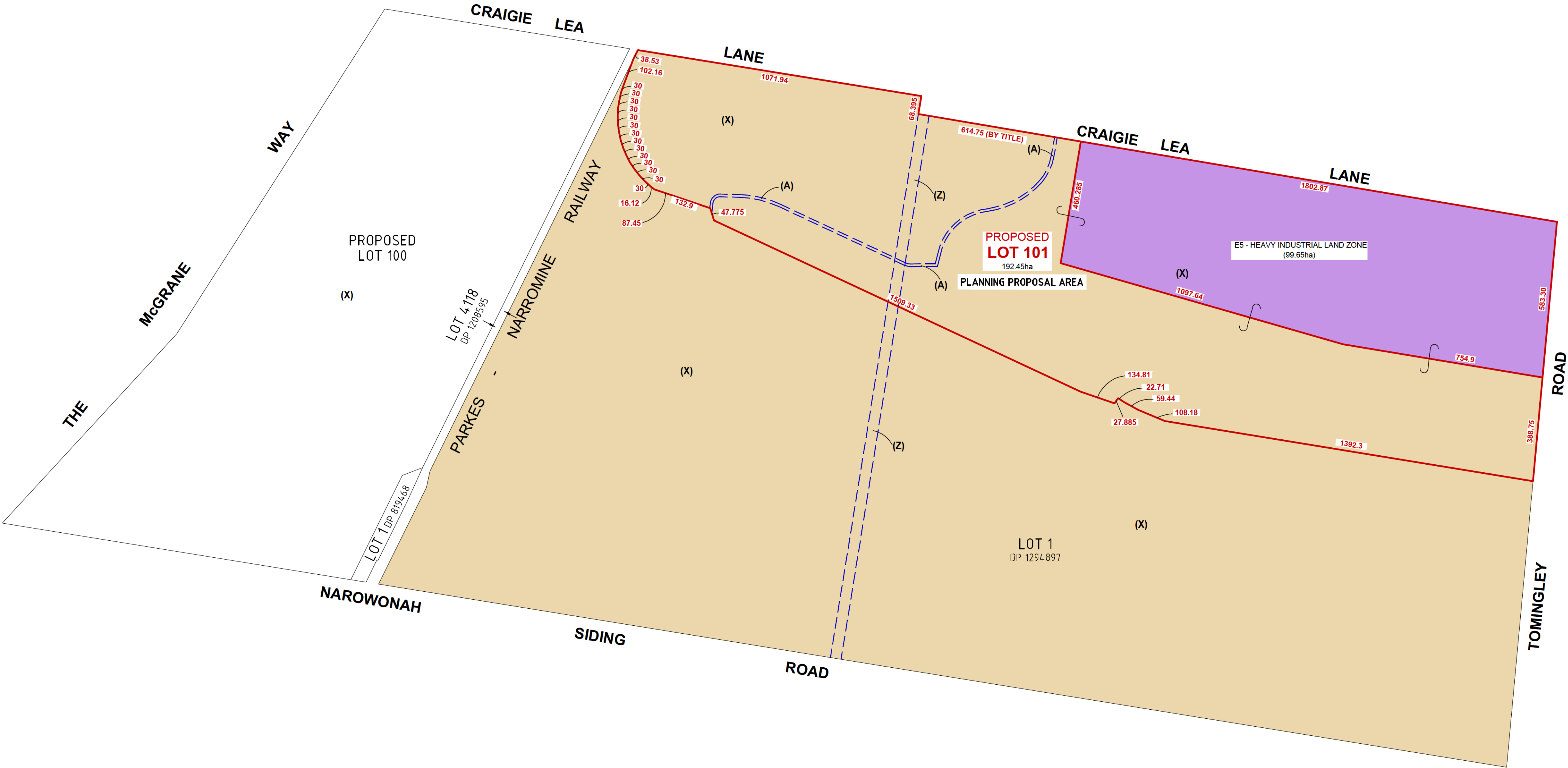
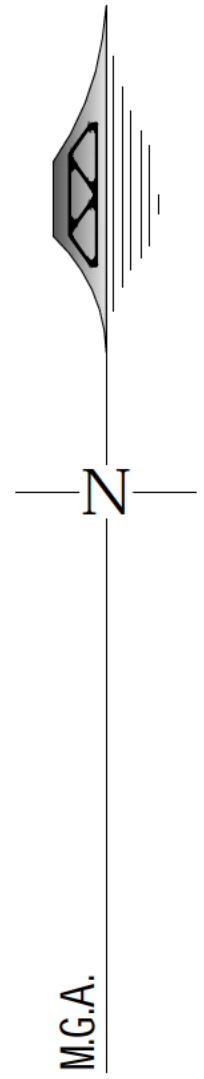
8 CONCLUSION

The proposed development, on completion, will ensure that the subdivision is located in an area that has low to moderate bushfire hazard level. With the implementation of the recommendations, as outlined in **Section 5**, it is considered that the proposed development is appropriately protected from bushfire and complies with the requirements of PBP. The proposed development is not expected to increase the bushfire risk.

9 REFERENCES

- NearMaps. (2020, November 16). *NearMaps*. Retrieved from <http://maps.au.nearmap.com/>
- NSW Government. (2020, September 1). *Biodiversity Value Map*. Retrieved from <https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap>
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- NSW Rural Fire Service. (2019). *Planning for Bush Fire Protection: A Guide for Council's, Planners, Fire Authorities and Developers*. Sydney: NSW RFS.

Appendix A - Subdivision Plan



- (A) RIGHT OF ACCESS 10 WIDE (VIDE DP 1294897)
- (X) LAND EXCLUDES MINERALS & IS SUBJECT TO RESERVATIONS & CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT
- (Z) LAND EXCLUDES MINERALS (S.171 CROWN LANDS ACT, 1989)

NOTES:

- THE BOUNDARY INFORMATION SHOWN ON THIS PLAN BEEN PLOTTED AS REQUIRED UNDER DIVISION 1, SECTION 9.1(1) OF THE "SURVEYING AND SPATIAL INFORMATION REGULATION 2017". IT HAS NOT BEEN DETERMINED BY AN ACCURATE BOUNDARY SURVEY.
- A DETAIL & LEVEL SURVEY IS NOT A "LAND SURVEY" AS DEFINED BY THE SURVEYING AND SPATIAL INFORMATION ACT 2002 IF ANY CONSTRUCTION OR DESIGN WORK WHICH RELIES ON CRITICAL SETBACKS FROM THE STREET OR BOUNDARIES IS PLANNED, IT WOULD BE IMPERATIVE TO CARRY OUT FURTHER SURVEY WORK TO DETERMINE THE BOUNDARY DIMENSIONS.
- BARNSON TAKES NO RESPONSIBILITY FOR LOSSES, DAMAGES OR INJURIES TO ANY PERSON OR ORGANISATION THAT MAY OCCUR DUE TO THE RELIANCE ON THIS PLAN

LEGEND

SUBJECT CADASTRAL BOUNDARIES

E5 - HEAVY INDUSTRIAL LAND ZONE

RU1 - PRIMARY PRODUCTION LAND ZONE

PROPOSED REZONE AREA PLAN
REDUCTION RATIO 1:8,000 @ A1
1:16,000 @ A3



ISSUED TO CLIENT

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Rev	Date	Description
A	4-12-2023	ISSUED TO CLIENT
B	6-02-2024	PROPOSED ZONES UPDATED

Project
PROPOSED PLAN OF SUBDIVISION OVER
LOT 2 IN DP 1294897
Site Address
CRAIGIE LEA LANE
NARROMINE NSW 2821
Client
NARROMINE SHRIE COUNCIL

Drawing Title
PROPOSED REZONE AREA PLAN

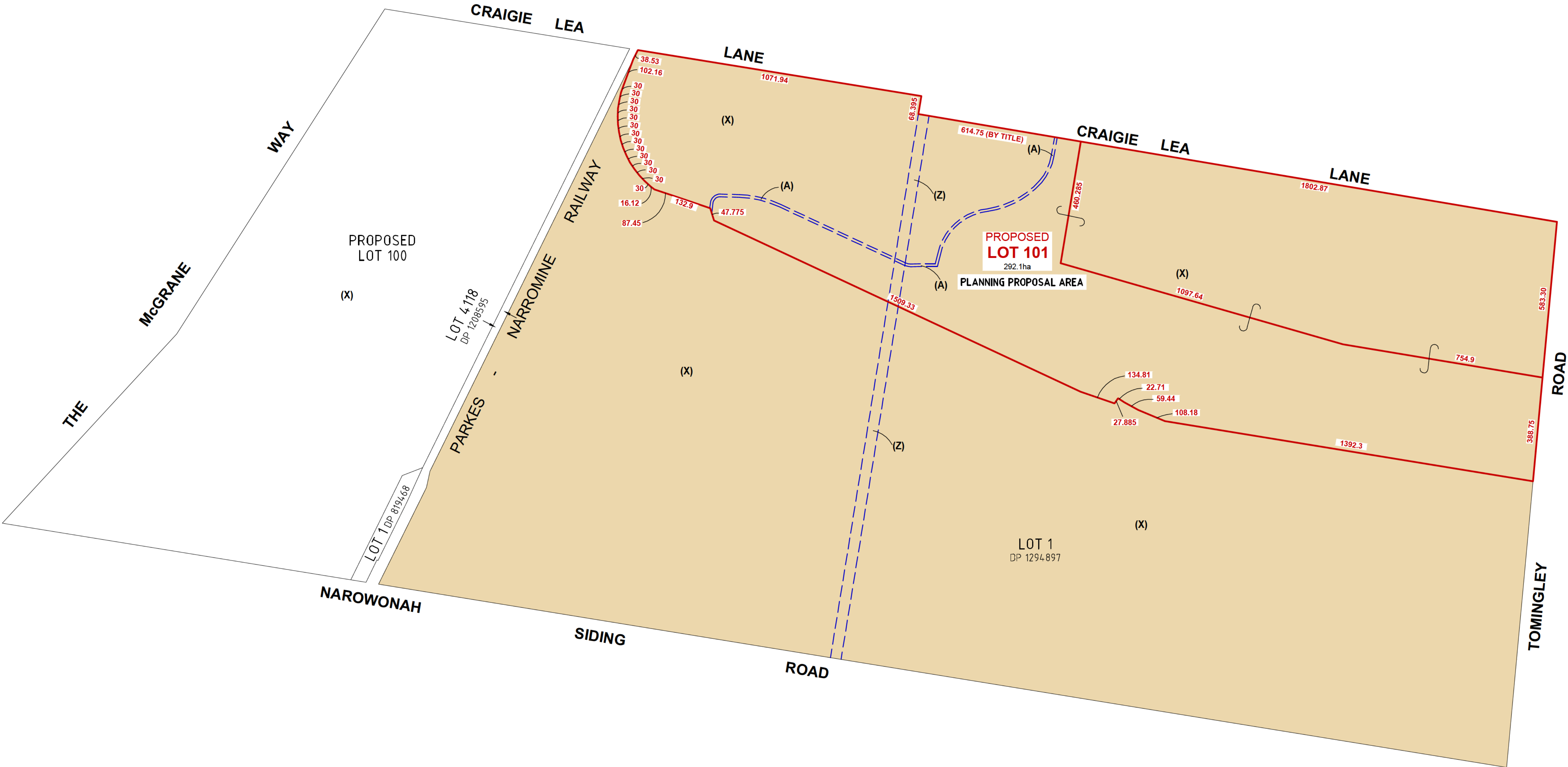
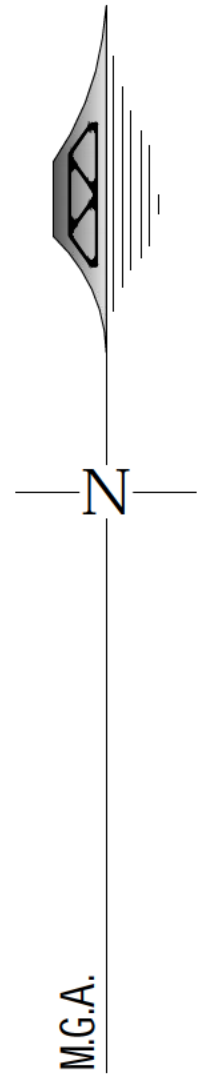
Survey RB
Drawn JS
Check RB

Original Sheet Size
Revision

A1
A

Certification
Project No
Drawing No

40038
P03



- (A) RIGHT OF ACCESS 10 WIDE (VIDE DP 1294897)
- (X) LAND EXCLUDES MINERALS & IS SUBJECT TO RESERVATIONS & CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT
- (Z) LAND EXCLUDES MINERALS (S.171 CROWN LANDS ACT, 1989)

NOTES:

- THE BOUNDARY INFORMATION SHOWN ON THIS PLAN BEEN PLOTTED AS REQUIRED UNDER DIVISION 1, SECTION 9.1(1) OF THE "SURVEYING AND SPATIAL INFORMATION REGULATION 2017". IT HAS NOT BEEN DETERMINED BY AN ACCURATE BOUNDARY SURVEY.
- A DETAIL & LEVEL SURVEY IS NOT A "LAND SURVEY" AS DEFINED BY THE SURVEYING AND SPATIAL INFORMATION ACT 2002 IF ANY CONSTRUCTION OR DESIGN WORK WHICH RELIES ON CRITICAL SETBACKS FROM THE STREET OR BOUNDARIES IS PLANNED, IT WOULD BE IMPERATIVE TO CARRY OUT FURTHER SURVEY WORK TO DETERMINE THE BOUNDARY DIMENSIONS.
- BARNSON TAKES NO RESPONSIBILITY FOR LOSSES, DAMAGES OR INJURIES TO ANY PERSON OR ORGANISATION THAT MAY OCCUR DUE TO THE RELIANCE ON THIS PLAN

LEGEND

SUBJECT CADASTRAL BOUNDARIES

RU1 - PRIMARY PRODUCTION LAND ZONE

EXISTING LAND ZONING PLAN
REDUCTION RATIO 1:8,000 @ A1
1:16,000 @ A3



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Rev	Date	Description
A	6-02-2024	ISSUED TO CLIENT

Project
PROPOSED PLAN OF SUBDIVISION OVER
LOT 2 IN DP 1294897
Site Address
CRAIGIE LEA LANE
NARROMINE NSW 2821
Client
NARROMINE SHRIE COUNCIL

Drawing Title
EXISTING LAND ZONING PLAN

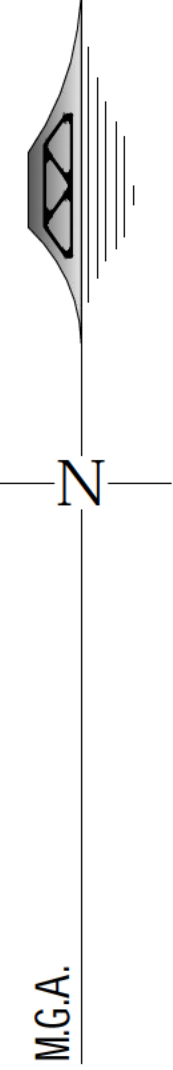
Survey RB
Drawn JS
Check RB

Original Sheet Size
Revision

A1
A

Certification
Project No
Drawing No

40038
P04



- (A) RIGHT OF ACCESS 10 WIDE (VIDE DP 1294897)
- (X) LAND EXCLUDES MINERALS & IS SUBJECT TO RESERVATIONS & CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT
- (Z) LAND EXCLUDES MINERALS (S.171 CROWN LANDS ACT, 1989)

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LEGEND

SUBJECT CADASTRAL BOUNDARIES

80ha - MINIMUM ALLOTMENT SIZE

400ha - MINIMUM ALLOTMENT SIZE

EXISTING MINIMUM ALLOTMENT PLAN
REDUCTION RATIO 1:8,000 @ A1
1:16,000 @ A3



ISSUED TO CLIENT

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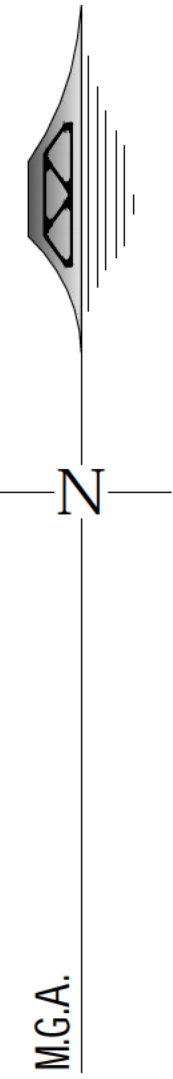
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Rev	Date	Description
A	6-02-2024	ISSUED TO CLIENT

Project
PROPOSED PLAN OF SUBDIVISION OVER
LOT 2 IN DP 1294897
Site Address
CRAIGIE LEA LANE
NARROMINE NSW 2821
Client
NARROMINE SHRIE COUNCIL

Drawing Title		EXISTING MINIMUM ALLOTMENT PLAN	
Survey	RB	Original Sheet Size	A1
Drawn	JS		
Check	RB	Revision	A

Certification	
Project No	40038
Drawing No	P05



- (A) RIGHT OF ACCESS 10 WIDE (VIDE DP 1294897)
- (X) LAND EXCLUDES MINERALS & IS SUBJECT TO RESERVATIONS & CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT
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LEGEND

SUBJECT CADASTRAL BOUNDARIES

2000m² - MINIMUM ALLOTMENT SIZE

80ha - MINIMUM ALLOTMENT SIZE

400ha - MINIMUM ALLOTMENT SIZE

PROPOSED MINIMUM ALLOTMENT PLAN

REDUCTION RATIO 1:8,000 @ A1
1:16,000 @ A3



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Rev	Date	Description
A	6-02-2024	ISSUED TO CLIENT

Project
PROPOSED PLAN OF SUBDIVISION OVER
LOT 2 IN DP 1294897
Site Address
CRAIGIE LEA LANE
NARROMINE NSW 2821
Client
NARROMINE SHRIE COUNCIL

Drawing Title
PROPOSED MINIMUM
ALLOTMENT PLAN

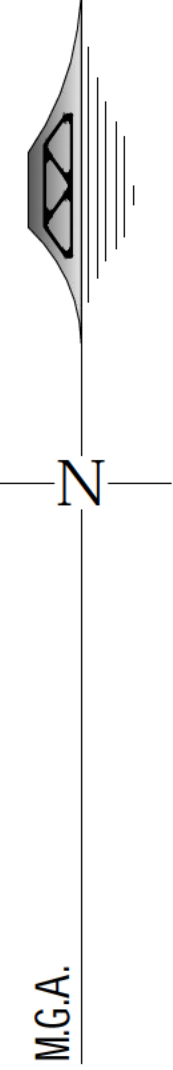
Survey RB
Drawn JS
Check RB

Original Sheet Size
Revision

A1
A

Certification
Project No
Drawing No

40038
P06



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LEGEND

SUBJECT CADASTRAL BOUNDARIES

2000m² - MINIMUM ALLOTMENT SIZE

80ha - MINIMUM ALLOTMENT SIZE

400ha - MINIMUM ALLOTMENT SIZE

SPECIAL SERVICE AREA A

SPECIAL SERVICE PROVISION PLAN

REDUCTION RATIO 1:8,000 @ A1
1:16,000 @ A3



ISSUED TO CLIENT

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Project
PROPOSED PLAN OF SUBDIVISION OVER
LOT 2 IN DP 1294897
Site Address
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NARROMINE NSW 2821
Client
NARROMINE SHRIE COUNCIL

Drawing Title
SPECIAL SERVICE PROVISION PLAN

Survey RB
Drawn JS
Check RB

Original Sheet Size A1
Revision A

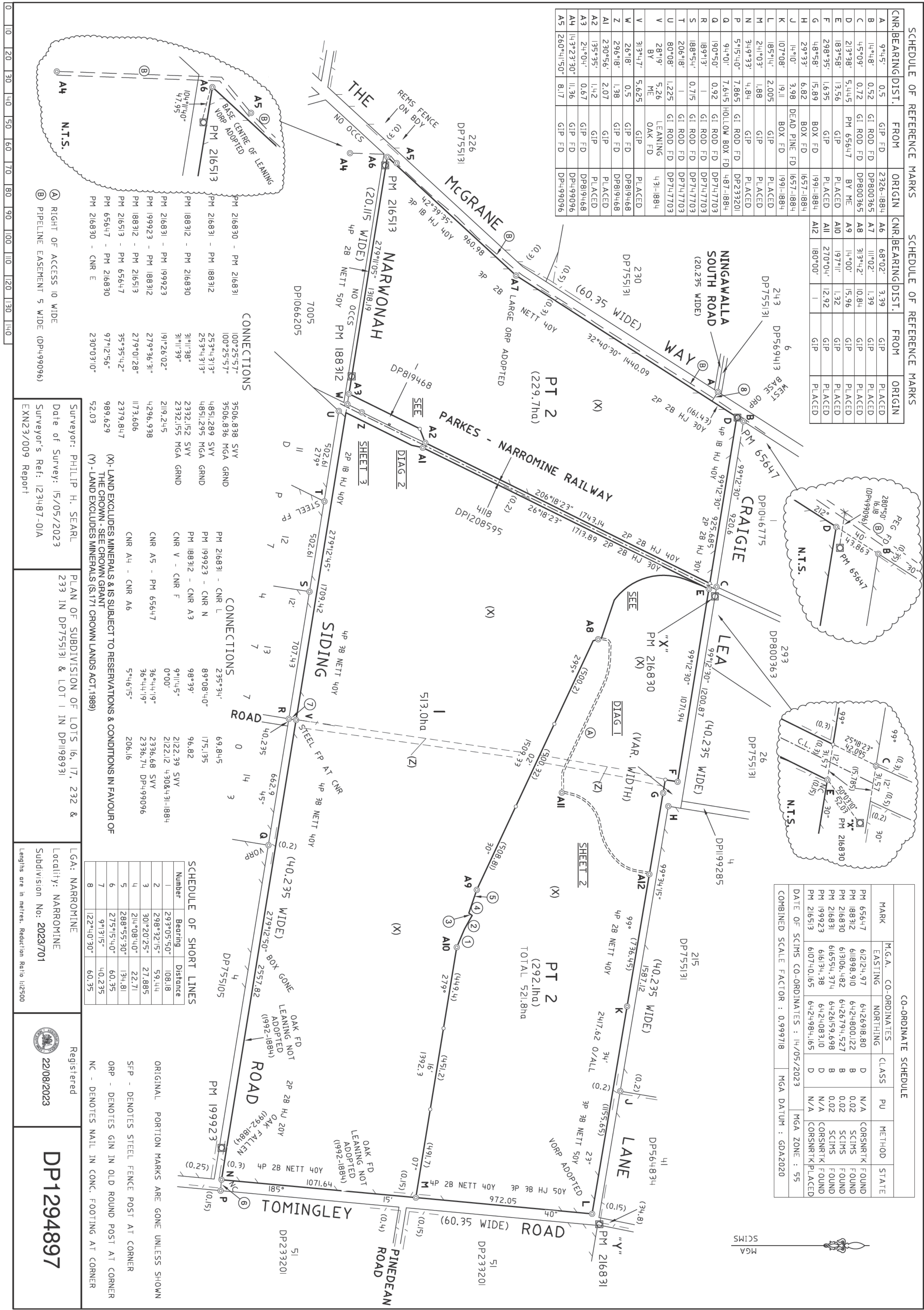
Certification
Project No
Drawing No

40038
P06

Appendix B - Deposited Plan

H	29°33'	6.82	BOX	FD	1657±884
U	14°10'	3.98	DEAD	BOX	FD
K	107°08'	19.11	BOX	FD	1991±884
L	185°14'	2.005	GIP		PLACED
M	244°03'	1.88	GIP		PLACED
N	349°33'	4.84	PLACED		PLACED
P	5°15°40'	7.865	GI	ROD	FD
Q	94°01'	7.645	HOLLOW	BOX	FD
Q	190°50'	0.92	GI	ROD	FD
R	189°13'	1	GI	ROD	FD
S	188°54'	0.715	GI	ROD	FD
T	206°18'	1.25	GI	ROD	FD
U	80°08'	1.225	GI	ROD	FD
V	28°19' BY	5.26	LENNING		
V	313°47'	5.625	GIP		PLACED
W	26°18'	0.5	GIP	FD	DP814968
Z	296°18'	1.38	GIP	FD	DP814968
AI	230°56'	2.07	GIP		PLACED
A2	135°35'	1.42	GIP		PLACED
A3	24°04'	0.67	GIP	FD	DP814968
A4	1143°23'30"	11.36	GIP	FD	DP499096
A5	260°41'50"	8.17	GIP	FD	DP499096

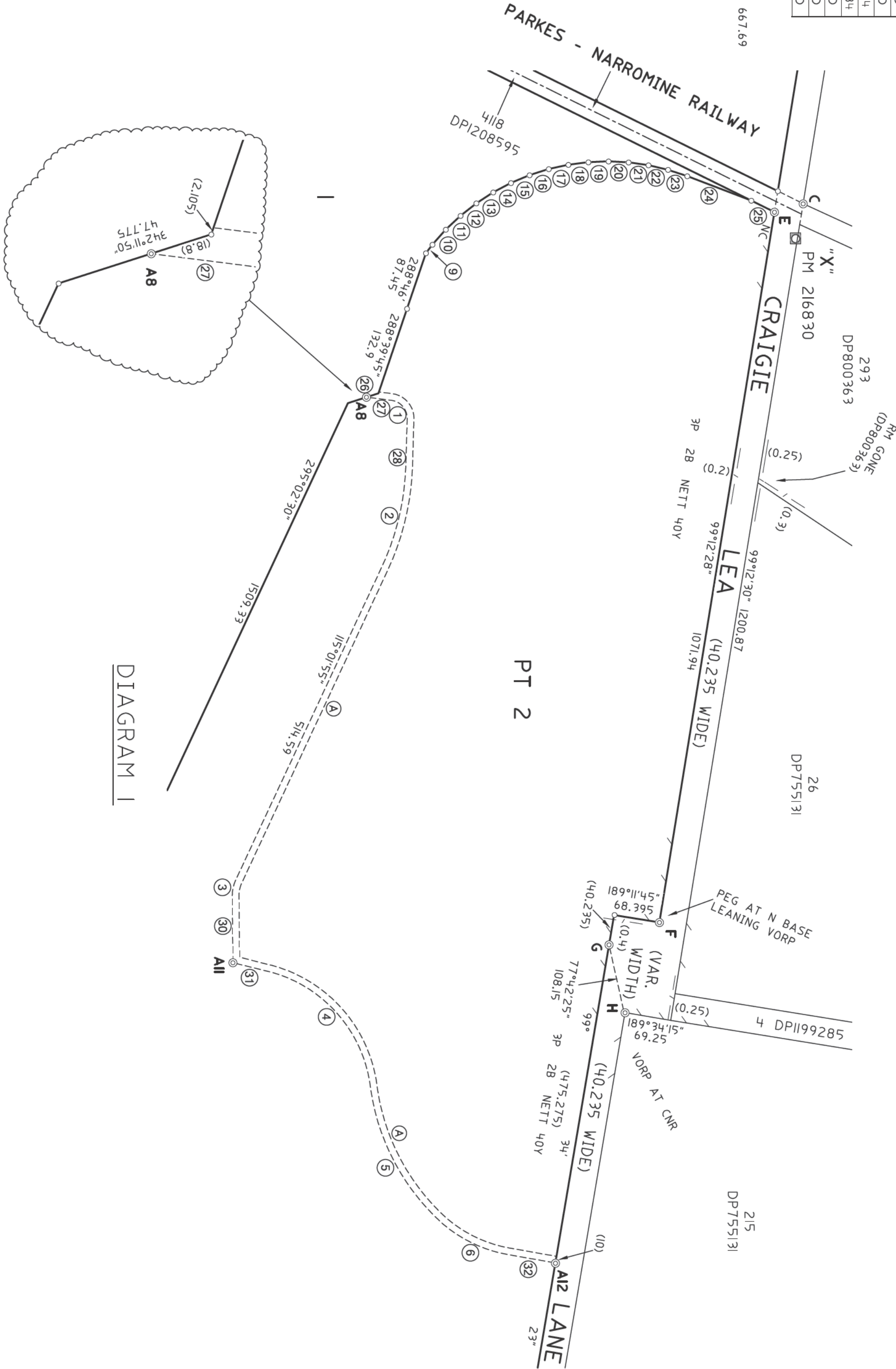
CO-ORDINATE SCHEDULE						
MARK	M.G.A. CO-ORDINATES		CLASS	PU	METHOD	STATE
	EASTING	NORTHING				
PM 65647	612124.97	6426918.80	D	N/A	CORSNRK	FOUND
PM 188312	611898.910	6424800.122	B	0.02	SCIMS	FOUND
PM 216830	613106.482	64262791.527	B	0.02	SCIMS	FOUND
PM 216831	616554.374	6426159.698	B	0.02	SCIMS	FOUND
PM 199923	616134.38	6424083.10	D	N/A	CORSNRK	FOUND
PM 216513	610740.165	6424984.165	D	N/A	CORSNRK	PLACED
DATE OF SCIMS CO-ORDINATES: 14/05/2023			MGA ZONE: 55			
COMBINED SCALE FACTOR: 0.999718			MGA DATUM: GDA2020			



SCHEDULE OF REFERENCE MARKS		
CNR, BEARING	DIST.	FROM ORIGIN
C	45°09'	0.72 GI ROD FD DP800365
E	183°58'	13.56 GIP PLACED
F	298°35'	1.635 GIP PLACED
G	48°58'	15.89 BOX FD 1991-1884
H	29°33'	6.82 BOX FD 1657-1884
A8	313°42'	10.84 GIP PLACED
A11	270°04'	12.92 GIP PLACED
A12	180°00'	1 GIP PLACED

CNR E - CNR A8 155°36'20" 667.69

CONNECTIONS



Number	Chord Bearing	Chord Distance	Arc Length	Radius
1	49°26'45"	36.34	39.86	27.01
2	103°22'45"	155.165	156.24	384.11
3	102°15'20"	23.45	23.645	53.015
4	47°48'20"	241.315	258.27	203.695
5	61°43'	226.42	231.03	332.915
6	25°13'20"	107.58	108.85	205.06

SCHEDULE OF ARCS

Number	Bearing	Distance
9	307°39'50"	16.12
10	311°36'25"	30
11	316°44'20"	30
12	321°52'15"	30
13	327°00'05"	30
14	332°07'50"	30
15	337°15'50"	30
16	342°23'40"	30
17	347°31'25"	30
18	352°39'25"	30
19	357°47'15"	30
20	2°55'	30
21	8°02'55"	30
22	13°10'50"	30
23	18°18'40"	30
24	20°52'35"	102.16
25	26°18'23"	38.53
26	342°11'50"	47.775
27	7°10'	37.485
28	91°43'35"	70.13
30	89°28'45"	99.76
31	14°04'30"	44.83
32	10°00'55"	71.57

DIAGRAM 1

ORIGINAL PORTION MARKS ARE GONE UNLESS SHOWN
SFP - DENOTES ROUND STEEL FENCE POST AT CORNER
ORP - DENOTES GIN IN OLD ROUND POST AT CORNER
NC - DENOTES NAIL IN CONC. FOOTING AT CORNER

Ⓐ RIGHT OF ACCESS 10 WIDE

Surveyor: PHILIP H. SEARL
Date of Survey: 15/05/2023
Surveyor's Ref: 123487-01A
EXN23/009 Report

PLAN OF SUBDIVISION OF LOTS 16, 17, 232 & 233 IN DP755131 & LOT 1 IN DP1198931

LGA: NARROMINE
Locality: NARROMINE
Subdivision No: 2023/701
Lengths are in metres. Reduction Ratio 1:5000

Registered
22/08/2023

DP1294897

SCHEDULE OF SHORT LINES		
Number	Bearing	Distance
33	42°40'35"	48.23
34	279°12'55"	47.395
35	279°12'55"	57.83
36	26°18'23"	92.295
37	116°18'20"	3.84

SCHEDULE OF REFERENCE MARKS		
CNR	BEARING	DIST.
FROM		
ORIGIN		
T	206°18'	I
U	80°08'	1.225
W	26°18'	0.5
Z	296°18'	1.38
AI	230°56'	2.07
A2	135°35'	1.42
A3	24°04'	0.67

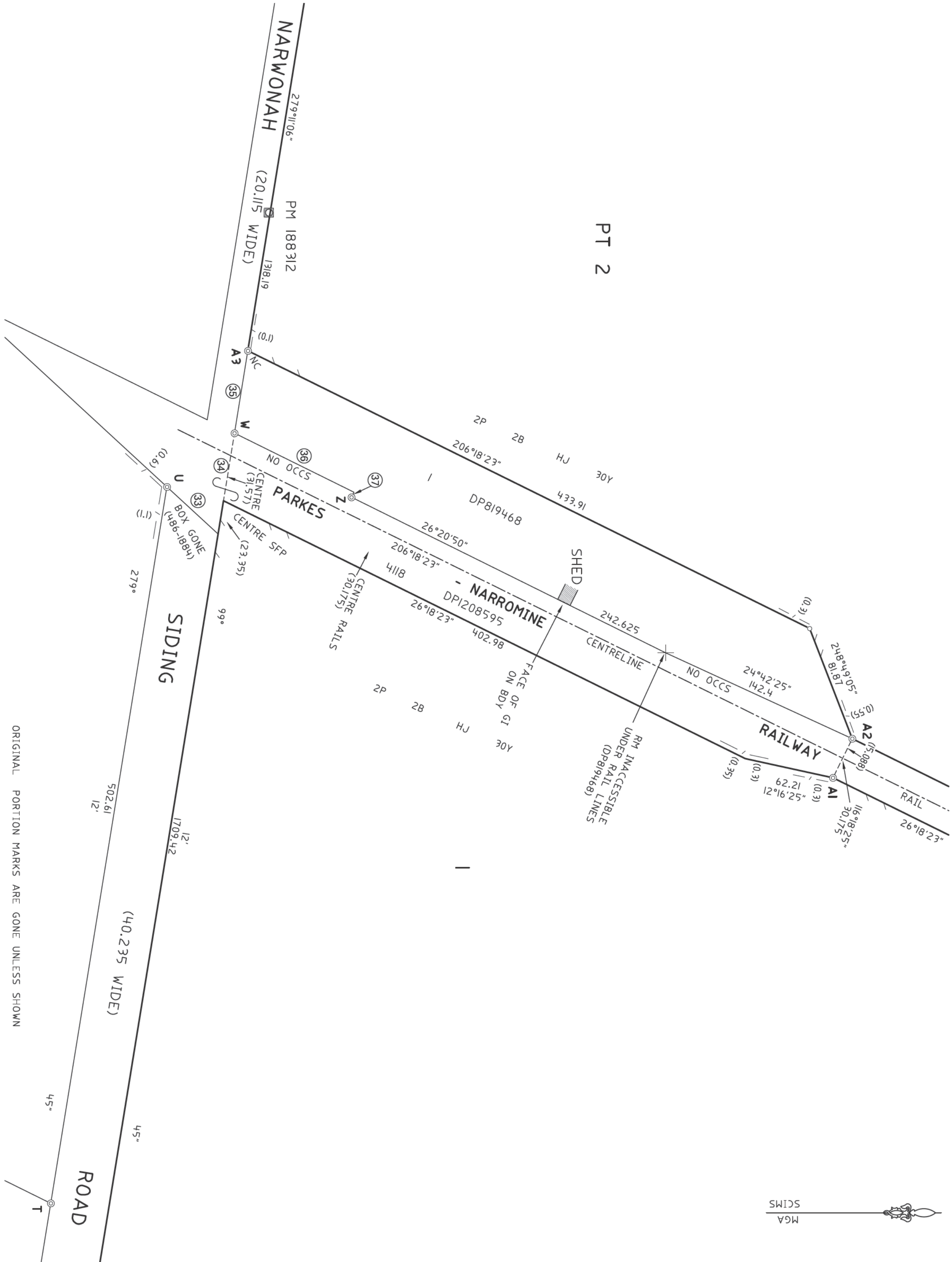


DIAGRAM 2

ORIGINAL PORTION MARKS ARE GONE UNLESS SHOWN
SFP - DENOTES ROUND STEEL FENCE POST AT CORNER
ORP - DENOTES GIN IN OLD ROUND POST AT CORNER
NC - DENOTES NAIL IN CONC. FOOTING AT CORNER




Surveyor: PHILIP H. SEARL
Date of Survey: 15/05/2023
Surveyor's Ref: 123487-01A
EXN23/009 Report


PLAN OF SUBDIVISION OF LOTS 16, 17, 232 & 233 IN DP755131 & LOT 1 IN DP198931

LGA: NARROMINE
Locality: NARROMINE
Subdivision No: 2023/701
Lengths are in metres. Reduction Ratio 1:2000

Registered
22/08/2023






DP1294897

Plan Form 6_Digital (2021)		Deposited Plan Administration Sheet Sheet 1 of 5	
 22/08/2023 OFFICE USE ONLY Registered Title System TORRENS		DP1294897	
Plan of Subdivision of Lots 16, 17, 232 & 233 in DP755131 and Lot 1 in DP1198931		LGA NARROMINE LOCALITY NARROMINE PARISH WENTWORTH COUNTY NARROMINE	
Survey Certificate Survey I, Philip Harold Searl of Premise Australia P/L 154 Peisley St Orange 2800, a surveyor registered under Surveying and Spatial Information Act 2002, certify that: The land shown in the plan was surveyed in accordance with the Surveying and Spatial Information Regulation 2017, is accurate and the survey was completed on: 15/05/2023 Urban/Rural Rural Datum Line X-Y Signature  Dated 18 Aug 2023 Surveyor Identification No. SU001972 Surveyor registered under the Surveying and Spatial Information Act 2002.		Crown Lands NSW/Western Lands Office Approval I, _____ (Authorised Officer) in approving this plan certify that all necessary approvals in regard to the allocation of the land shown herein have been given. Signature _____ Date _____ File Number _____ Office _____	
		Subdivision Certificate (Check One) <input type="checkbox"/> Authorised Person <input checked="" type="checkbox"/> General Manager <input type="checkbox"/> Registered Certifier I, Jane Redden certify that the provisions of section 6.15 of the <i>Environmental Planning and Assessment Act 1979</i> have been satisfied in relation to the proposed subdivision, new road or reserve set out herein. Signature  Consent Authority Narromine Shire Council Date of Endorsement 08/08/2023 Subdivision Certificate Number 2023/701 File Number 007.2023.00000701.001	
Plans Used in the preparation of this survey See Sheet 2 for Plans Used		Statement of intention to dedicate public roads, create public reserves and drainage reserves, acquire/resume land.	
Surveyor's Reference 123487-01A		Signatures, Seals and Section 88B Statements should appear on the following sheet(s)	

Plan Form 6_Digital (2021)		Deposited Plan Administration Sheet	Sheet 2 of 5
Registered	 22/08/2023	OFFICE USE ONLY	DP1294897
Plan of Subdivision of Lots 16, 17, 232 & 233 in DP755131 and Lot 1 in DP1198931		<p>This sheet is for the provision of the following information as required:</p> <ul style="list-style-type: none">• A schedule of lots and addresses – See 60(c) SSI Regulation 2017• Statements of intention to create and release affecting interests in accordance with section 88B Conveyancing Act 1919• Signatures and seals- see 195D Conveyancing Act 1919• Any information which cannot fit in the appropriate panel of sheet 1 of the administration sheets.	
Subdivision Certificate Number			
2023/701			
Date of Endorsement			
8 August 2023			
Plans Used			
DP233201, DP499096, DP564834, DP569413, DP747703, DP800363, DP819468, DP1046775, DP1198931, DP1208595, 1325.1884, 1657.1884, 1767.1884, 1768.1884, 17690.1603, 1991.1884, 1992.1884, 2326.1884, 430.1884, 431.1884, 486.1884, 487.1884, 649.1884, 655.1884, 742.1884, 757.1884, 928.3030			
Surveyor's Reference 123487-01A			

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Downloaded from NSW LRS Connect on 16/06/2023 07:33 AM

Plan Form 6_Digital (2021)		Deposited Plan Administration Sheet		Sheet 5 of 5
Registered	 22/08/2023	OFFICE USE ONLY		
Plan of Subdivision of Lots 16, 17, 232 & 233 in DP755131 and Lot 1 in DP1198931		DP1294897		
Subdivision Certificate Number 2023/701		This sheet is for the provision of the following information as required: <ul style="list-style-type: none">• A schedule of lots and addresses - See 60(c) SSI Regulation 2017• Statements of intention to create and release affecting interests in accordance with section 88B Conveyancing Act 1919• Signatures and seals- see 195D Conveyancing Act 1919• Any information which cannot fit in the appropriate panel of sheet 1 of the administration sheets.		
Date of Endorsement 8 August 2023				
Executed on behalf of the Corporation named below by the authorised person(s) whose signature(s) appear below pursuant to the authority specified				
Company Name: AUSTRALIAN RAIL TRACK CORPORATION LIMITED				
Company ACN or ABN: 75 081 455 754				
Authority: SEC 127 OF THE CORPORATIONS ACT 2001				
Signature: 		Signature: 		
Name: 		Name: 		
Position: DIRECTOR		Position: Company Secretary		
Surveyor's Reference 123487-01A				

PLAN FORM 2

Plan Drawing only to appear in this space

OFFICE USE ONLY

Signatures and seals only.

De Krumm
Krumm

to Mortgage under Mortgage No.
2877327 Westpac Banking
Corporation hereby consents to
the within Plan of Subdivision.

Narramine
84-86
DARLING ST.
NARRAMINE
NSW.

3/6/87

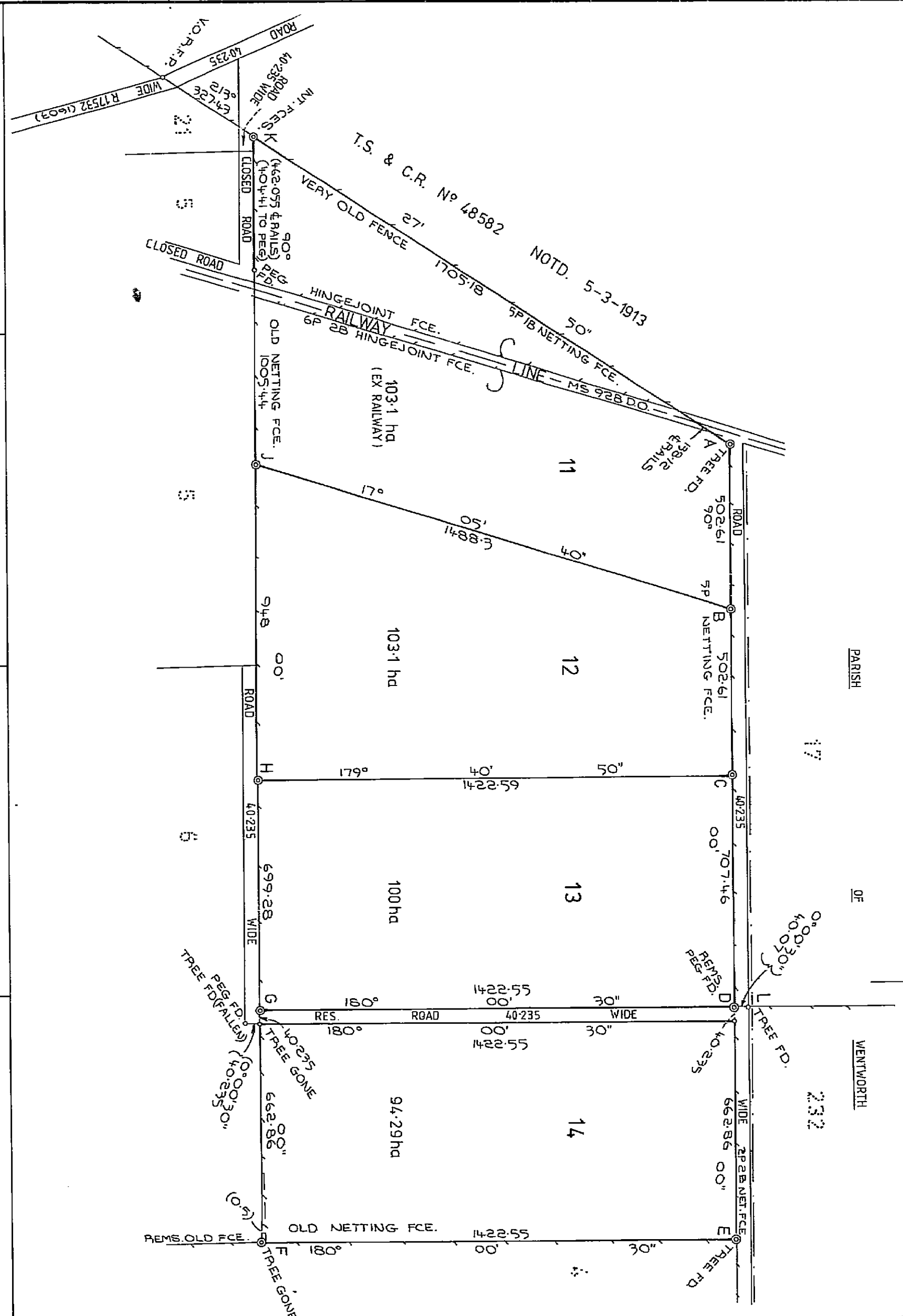
WESTPAC BANKING CORPORATION
by Leonard Raymond Krumm
Att. 2 who is
personally known to me
John Robert Senior
3/6/87

Council Clerk's Certificate

I hereby certify that -
(a) the requirements of the Local Government Act, 1919
have been complied with by the applicant in relation to the
proposed SUBDIVISION
(b) the requirements of the Local Government Act, 1919
have been complied with by the applicant in relation to the
proposed SUBDIVISION
Subdivision No. 1482
Date 26-10-82
Signed *[Signature]* Council Clerk

REFERENCE	MARKS	(FD) (N486 1884)
A { 287° 55'	DEAD BOX	6.64
B { 70° 55'	G.I. ROD	1.225
C { 197° 05' 40"	G.I. ROD	1
D { 179° 41'	G.I. ROD	0.715
E { 180° 00'	G.I. ROD	1
F { 84° 48'	BOX	7.645
G { 181° 37'	G.I. ROD	0.92
H { 0° 00'	G.I. ROD	10.45
I { 270° 00'	G.I. ROD	1
J { 359° 41'	G.I. ROD	1
K { 17° 06'	G.I. ROD	0.9
L { 90° 00'	G.I. ROD	0.64
M { 19° 56'	OAK	5.07

(FD) (N431 1884)



WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

10	20	30	40	50	60	70	Table of mm	110	120	130	140
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This negative is a photograph made as a permanent
record of a document in the custody of the
Registrar General this day, 9th July, 1987



DP 747703

Registered: *[Signature]* 8.7.1987

C.A.: No 14/82 OF 26/10/1982

Title System: TORRENS

Purpose: SUBDIVISION

Ref. Map: PARISH*

Last Plan: _____

PLAN OF SUBDIVISION OF
PORTIONS 1 & 2

Reduction Ratio 1: 10,000
Lengths are in metres.

Map/Sheet: 444 NARRAMINE

Locality: NARRAMINE

Parish: FROST

County: NARRAMINE

This is a true and correct copy of the plan as shown to me by the Surveyor General.

(Delete if inapplicable)

Signature: *[Signature]* HANLEY WILLIAM BOWE

Surveyor registered under Surveyor Act, 1920, as amended.

1. R. LANGFORD & ASSOC. P.O. BOX 373, DUBBO.

of a survey registered under the Surveyor Act, 1920, as amended, hereby certify that the survey represented in this plan is accurate and has been made in accordance with the provisions of the Surveyor Act, 1920, and was completed on 10-5-1987.

Panel for use only for statements of intention to dedicate public roads or to create public reserves, drainage reserves, easements or restrictions as to use.

N O O 4 A I A

Plan Form 2—This form must NOT be used where it is intended to dedicate public roads or public reserves or create drainage reserves, easements, or restrictions as to use—See Form 3. WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION.

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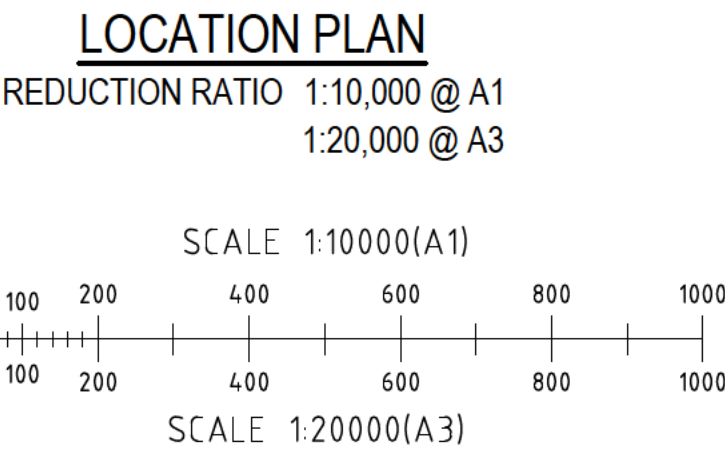
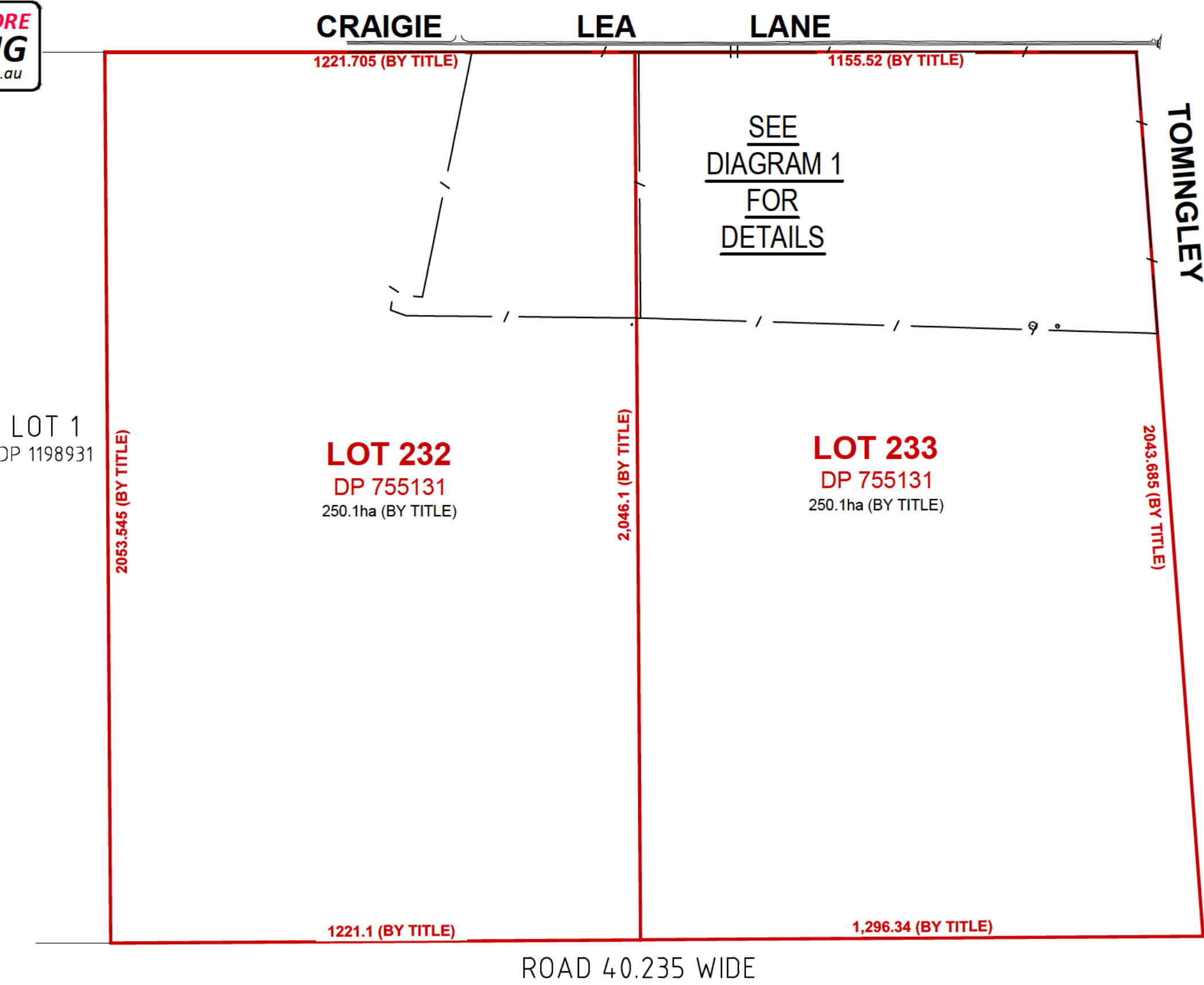
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Appendix C - Detail Survey



DATE OF SURVEY : 3rd APRIL 2023
SURVEY BY : R. Boylan

DATUM : AUSTRALIAN HEIGHT DATUM (A.H.D.)
ORIGIN : PM 216831 RL 246.421m (S.C.I.M.S.)
MAJOR CONTOUR INTERVAL : 1 METRE
MINOR CONTOUR INTERVAL : 0.25 METRES

- NOTES:
- THE BOUNDARY INFORMATION SHOWN ON THIS PLAN BEEN PLOTTED AS REQUIRED UNDER DIVISION 1, SECTION 9(1) OF THE "SURVEYING AND SPATIAL INFORMATION REGULATION 2017". IT HAS NOT BEEN DETERMINED BY AN ACCURATE BOUNDARY SURVEY.
 - A DETAIL & LEVEL SURVEY IS NOT A "LAND SURVEY" AS DEFINED BY THE SURVEYING AND SPATIAL INFORMATION ACT 2002 IF ANY CONSTRUCTION OR DESIGN WORK WHICH RELIES ON CRITICAL SETBACKS FROM THE STREET OR BOUNDARIES IS PLANNED, IT WOULD BE IMPERATIVE TO CARRY OUT FURTHER SURVEY WORK TO DETERMINE THE BOUNDARY DIMENSIONS.
 - THE LOCATIONS AND DEPTHS OF UNDERGROUND SERVICES ARE NOT ASSURED BY BARNSON. SERVICE AUTHORITIES SHOULD BE CONSULTED BEFORE ANY EXCAVATION, DEMOLITION OR CONSTRUCTION COMMENCES.
 - THERE MAY BE UNDERGROUND SERVICES THAT HAVE NOT BEEN SHOWN HEREON.
 - BARNSON TAKES NO RESPONSIBILITY FOR LOSSES, DAMAGES OR INJURIES TO ANY PERSON OR ORGANISATION THAT MAY OCCUR DUE TO THE RELIANCE ON THIS PLAN FOR THE LOCATION OF UNDERGROUND SERVICES.

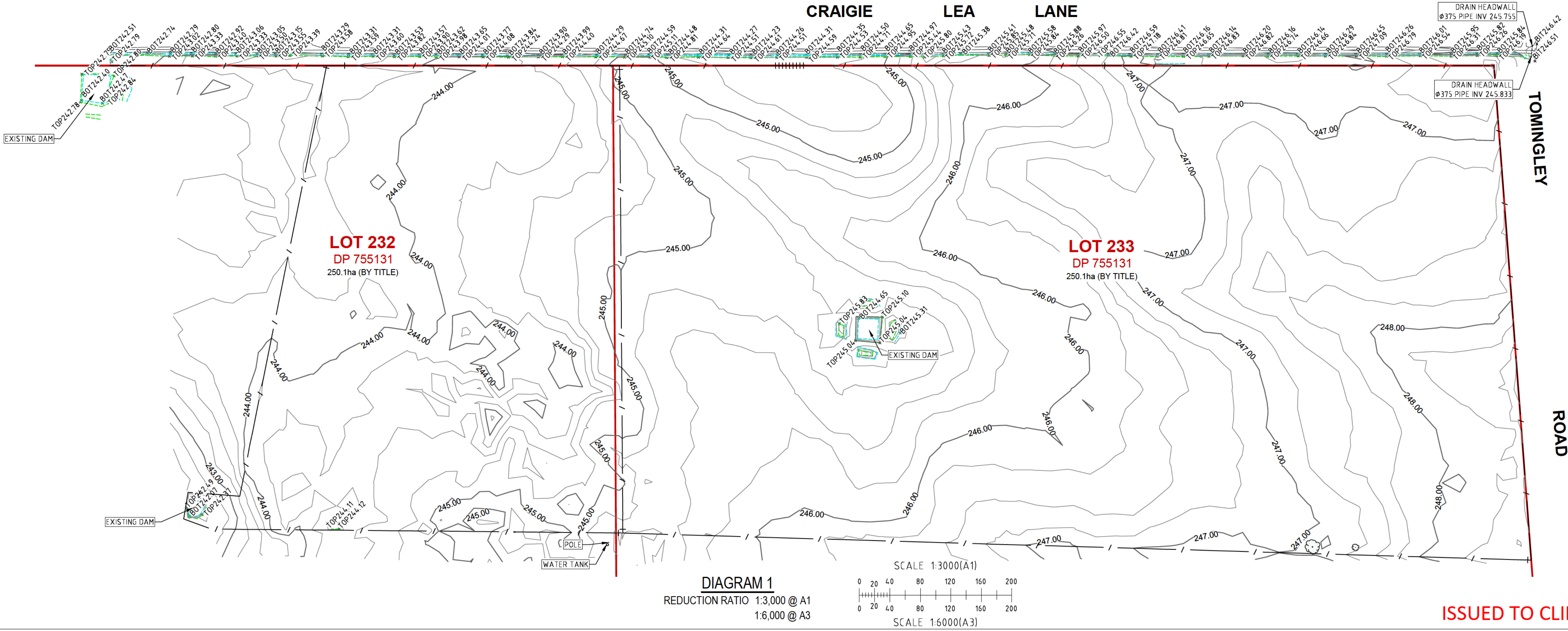
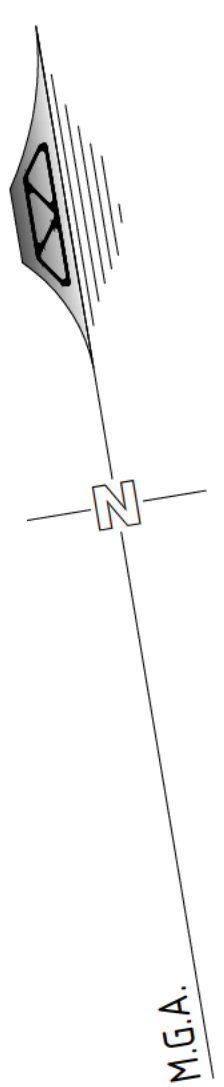
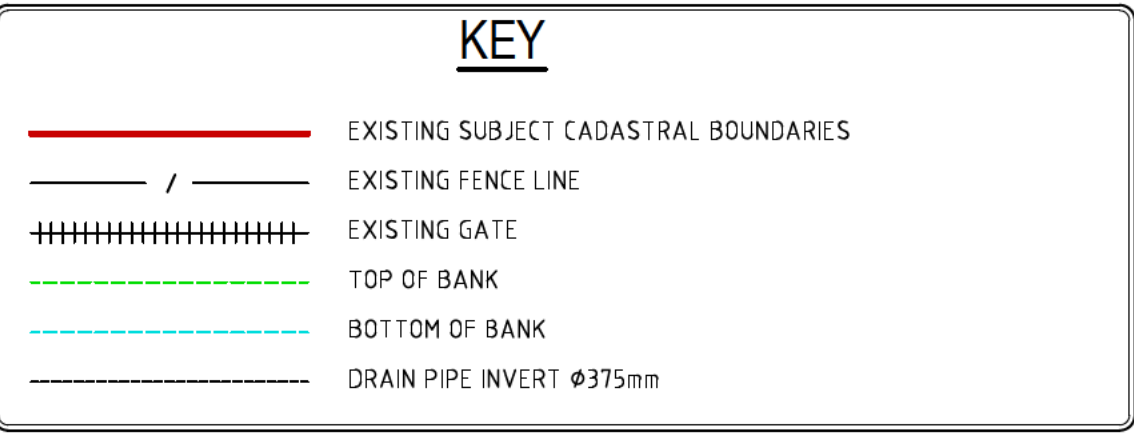
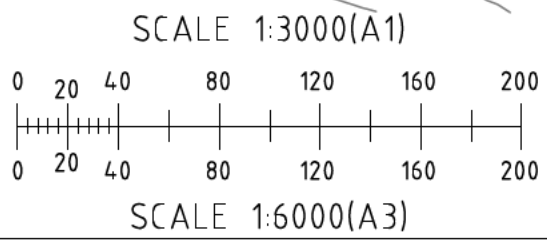


DIAGRAM 1
REDUCTION RATIO 1:3,000 @ A1
1:6,000 @ A3



ISSUED TO CLIENT

BARNSON PTY LTD

phone 1300 BARNSON (1300 227 676)
email generalenquiry@barnson.com.au
web barnson.com.au

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Rev	Date	Description
A	11-04-2023	ISSUED TO CLIENT

Project
**LEVEL AND DETAIL SURVEY OVER
PART OF LOTS 232 & 233 IN DP 755131**
Site Address
397 CRAIGIE LEA LANE
NARROMINE NSW 2821
Client
NARROMINE SHIRE COUNCIL

Drawing Title
LEVEL AND DETAIL SURVEY PLAN

Survey	RB	Original Sheet Size	A1
Drawn	JS		
Check	RB	Revision	A

Certification
Project No
Drawing No

40038
L01



APPENDIX F

Narowanah MDC REF (Hydrology and Hydraulic Report)

Narwonah Material Distribution Centre

REVIEW OF ENVIRONMENTAL FACTORS

ARTC

**INLAND
RAIL**
An Australian Government Initiative

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Appendices

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- Appendix B Heritage Impact Assessment
- Appendix C Aboriginal Archaeological Survey Report
- Appendix D Consultation Materials
- Appendix E Lighting Assessment
- Appendix F Noise and Vibration Assessment

Abbreviations

AEP	Annual exceedance probability
ACHAR	Aboriginal Cultural Heritage Assessment Report
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
ARTC	Australian Rail Track Corporation
ASR	Archaeological Survey Report
AUL	Auxiliary left turn lane
BAL	Basic left turn treatment
BAM	Biodiversity Assessment Method
BAR	Biodiversity Assessment Report
BC Act	Biodiversity Conservation Act 2016
BDAR	Biodiversity Development Assessment Report
BFPL	Bush Fire Prone Land
BOS	Biodiversity Offsets Scheme
CEMP	Construction environmental management plan
CHR	Channelised right turn lane
CLM Act	Contaminated Land Management Act 1997
CNVMP	Construction Noise and Vibration Management Plan
CPESC	Certified Professional in Erosion and Sediment Control
CSEMP	Communication and Stakeholder Engagement Management Plan
CSSI	Critical State Significant Infrastructure
Cth	Commonwealth
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DEC	Department of Environment and Conservation
DECC	Department of Energy and Climate Change
DECCW	Department of Environment, Climate Change and Water
DNG	Derived native grassland
DPC	Department of Premier and Cabinet
DPE	NSW Department of Planning and Environment
EEC	Endangered ecological community
EIP	Engagement Implementation Plan
EIS	Environmental Impact Statement
EP&A Act	Environmental Planning and Assessment Act 1979
EP&A Regulation	Environment Planning and Assessment Regulation 2021
EPA	NSW Environment Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPL	Environment Protection Licence
ESD	Ecologically sustainable development
FM Act	Fisheries Management Act 1994
ha	Hectare
HIA	Heritage Impact Assessment
I2S	Illabo to Stockinbingal
IAP2	International Association for Public Participation
ICNG	Interim Construction Noise Guideline

ICOMOS	International Council on Monuments and Sites
ILUA	Indigenous Land Use Agreements
Inland Rail	Inland Rail
ISC	Infrastructure Sustainability Council
KFH	Key Fish Habitat
km	Kilometre
KTP	Key threatening process
kV	Kilovolt
kVa	Kilovolt-amps
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LLS	Local Land Services
LWR	Long Welded Rail
m	Metre
MDC	Material Distribution Centre
ML	Megalitres
MNES	Matters of national environmental significance
N2N	Narromine to Narrabri
NEPC	National Environment Protection Council
NML	Noise management levels
NNTT	National Native Title Tribunal
NOx	Nitrogen oxides
NPI	National Pollutant Inventory
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NS2B	North Star to Border
OEH	NSW Office of Environment and Heritage
proponent	Australian Rail Track Corporation
proposal	The construction and operation of the MDC, and the subdivision of Lot 16 DP755131, Lot 17 DP755131, Lot 1 DP1198931, Lot 232 DP755131 and Lot 233 DP755131 to create two lots.
proposal site	The area to be used for the construction and operation of the MDC (Lot 16 DP755131, Lot 1 DP1198931, Lot 232 DP755131 and Lot 233 DP755131)
PCT	Plant Community Type
PMF	Probable Maximum Flood
PMST	Protected Matters Search Tool
POEO Act	Protection of the Environment Operations Act 1997 (NSW)
PS SEPP	State Environmental Planning Policy (Planning Systems) 2021
RAPs	Registered Aboriginal Parties
RBL	Rating Background Level
RCP	Rail Corridor Program
REF	Review of Environmental Factors
S2P	Stockinbingal to Parkes
SAP	Special Access Point
SEARs	Secretary's Environmental Assessment Requirements
SEPPs	State Environmental Planning Policies
SES	State Emergency Service
SHR	State Heritage Register
SIS	Species Impact Statement

Attachment No. 1

SISD	Safe Intersection Sight Distance
SLR	SLR Consulting Australia Pty Ltd
SSD	State Significant Development
SSI	State Significant Infrastructure
SWMP	Site Waste Management Plan
T&I SEPP	State Environmental Planning Policy (Transport and Infrastructure) 2021
TECs	Threatened ecological communities
TfNSW	Transport for NSW
TIA	Traffic Impacts Assessment
TLM	Track Laying Machine
TMP	Traffic Management Plan
UXO	Unexploded ordnance
WAL	Water access licence
WoNS	Weed of national significance
WM Act	Water Management Act 2000 (NSW)

NARWONAH MATERIAL
DISTRIBUTION CENTRE

ARTC

INLAND
RAIL 
An Australian Government Initiative

Certification

Certification by preparing officer

This Review of Environmental Factors (REF) provides a true and fair review of the proposal in relation to its likely effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposed activity and provides sufficient information to determine that the activity as described in this REF will not or is not likely to significantly affect the environment. Accordingly, no Environmental Impact Statement (EIS) and/or Species Impact Statement (SIS) are required.

Name CP Soin, TA Environment and Approvals Lead

Company Inland Rail ARTC

Signature 

Date 10 June 2022

Certification by ARTC Delivery Director

The project is titled: Narwonah Material Distribution Centre Review of Environmental Factors

Subject to approval, proposal commencement is anticipated to be: Late Q2/Early Q3 2022

I confirm that I have reviewed and accept the REF, including the scope of works as detailed, and will:

- Construct and operate the project as described in the REF;
- Ensure all legislative requirements related to approvals, consultation and notification are fulfilled;
- Implement all listed environmental management measures;
- Seek advice from ARTC environment staff as required and report all non-conformances and incidents;
- Undertake audits and/or environmental site inspections; and
- Appropriately communicate REF requirements to project personnel.

Name & Position Andrew Dean, Program Manager Rail

Signature 

Andrew Dean (Jun 10, 2022 11:32 GMT+10)

Date 10 June 2022

Certification by ARTC Reviewing Environmental Advisor

I confirm that I have:

- I have reviewed the REF in accordance with legislative requirements and it meets the requirements of the REF Guidance Note (ENV-FM-021);
- The management measures listed in the REF are suitable to mitigate the impact of works; and
- The activity as described, is unlikely to significantly affect the environment.

Name & Position Ben Lippett, Program Environment Lead - Approvals

Signature 

Ben Lippett (Jun 10, 2022 11:28 GMT+10)

Date 10 June 2022

1. Introduction

1.1 About Inland Rail

The Australian Government has committed to delivering a significant piece of national transport infrastructure by constructing a high-performance and direct interstate freight rail corridor between Melbourne and Brisbane, via central-west New South Wales (NSW) and Toowoomba in Queensland. Inland Rail is a major national program that will enhance Australia's existing national rail network and serve the interstate freight market.

The Inland Rail route, which is about 1,700 kilometres (km) long, involves:

- ▶ using the existing interstate rail line through Victoria and southern NSW
- ▶ upgrading about 400 km of existing track, mainly in western NSW
- ▶ providing about 600 km of new track in NSW and south-east Queensland.

The Inland Rail Program has been divided into 13 sections, 7 of which are in NSW.

The objectives of the Inland Rail Program are to:

- ▶ provide a rail link between Melbourne and Brisbane that is interoperable with train operations to Perth, Adelaide, and other locations on the standard-gauge rail network, to serve future rail freight demand, and stimulate growth for inter-capital and regional/bulk rail freight
- ▶ provide an increase in productivity that will benefit consumers through lower freight transport costs
- ▶ provide a step-change improvement in rail-service quality in the Melbourne to Brisbane corridor and deliver a freight rail service that is competitive with road
- ▶ improve road safety, ease congestion and reduce environmental impacts by moving freight from road to rail
- ▶ bypass bottlenecks within the existing metropolitan rail networks, and free up train paths for other services along the coastal route
- ▶ act as an enabler for regional economic development along the Inland Rail corridor.

Further information on Australian Rail Track Corporation (ARTC) and Inland Rail can be found at artc.com.au and inlandrail.com.au.

1.2 The proponent

ARTC is the proponent for the proposal and has a program to deliver Inland Rail. ARTC is an Australian Government-owned statutory corporation that manages more than 8,500 km of rail track in NSW, Queensland, South Australia, Victoria and Western Australia. ARTC is responsible for:

- ▶ selling access to the rail network to train operators
- ▶ capital investment in the network
- ▶ managing train operations across the network
- ▶ maintaining the network
- ▶ developing new business.

1.3 The proposal

The Narwonah Material Distribution Centre (MDC) forms a key component of the Inland Rail Program. It is in regional NSW, south of the township of Narromine (see Figure 1).

The proposed MDC will be used for temporary track material storage and management prior to their distribution to multiple Inland Rail projects and sections across NSW, including Narromine to Narrabri (N2N), North Star to Border (NS2B), Illabo to Stockinbingal (I2S), Stockinbingal to Parkes (S2P) and potentially other projects along the Inland Rail route.

ARTC is seeking to commence detailed design and construction from Q2 2022 so it can be receiving material by Q3 2022.

The proposal also involves the subdivision of Lot 16 DP755131, Lot 17 DP755131, Lot 1 DP1198931, Lot 232 DP755131 and Lot 233 DP755131 to create two lots (Lot A and Lot B). The MDC would be located on the section of Lot B to the east of the Parkes to Narromine (P2N) rail line, in the new subdivision (see Figure 2).



FIGURE 1: PROPOSAL LOCATION

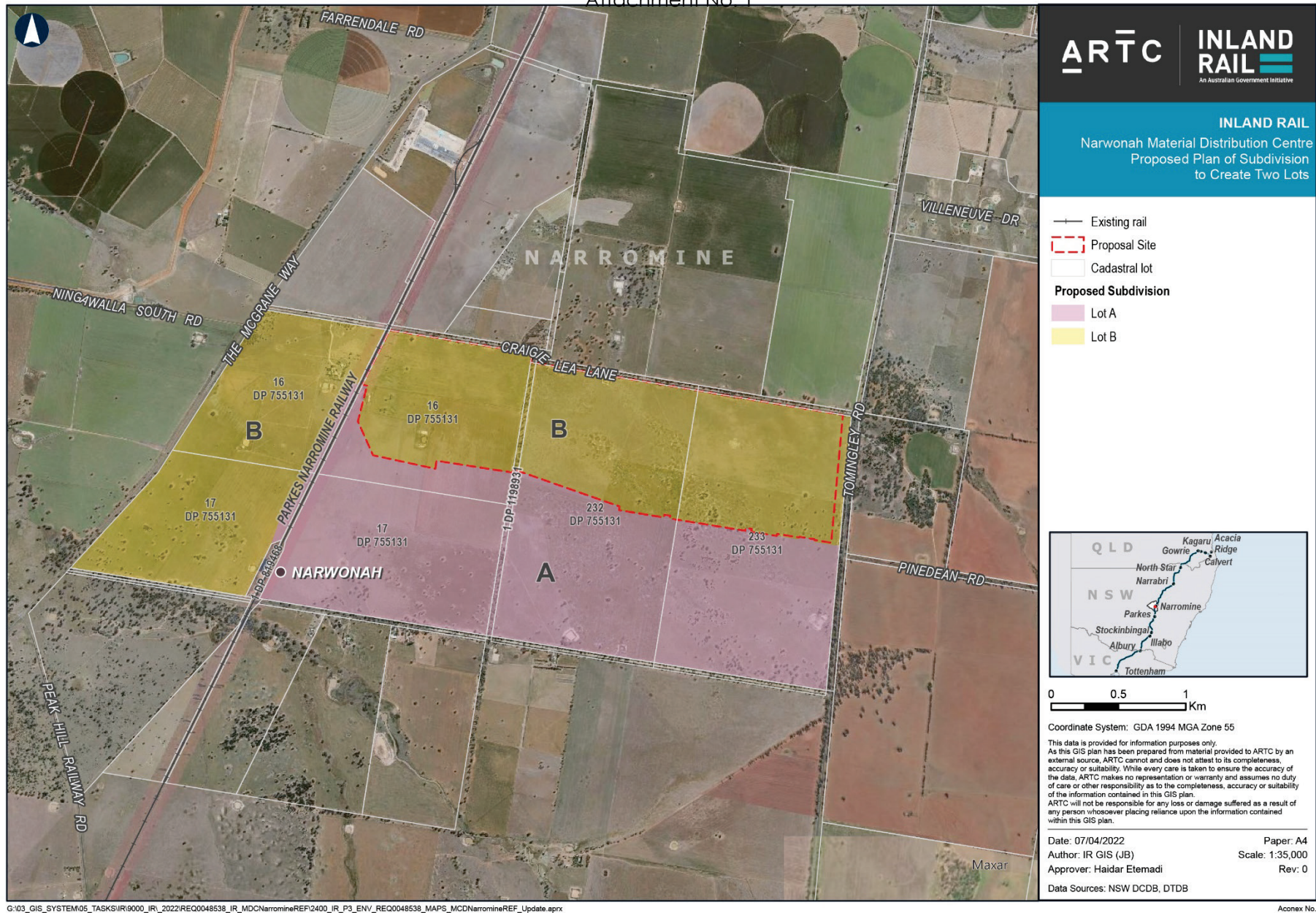


FIGURE 2: PROPOSED PLAN OF SUBDIVISION

1.4 Purpose of this report

ARTC has prepared this Review of Environmental Factors (REF) to consider the environmental factors listed in section 171(2) of the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation). The REF will allow ARTC to discharge its responsibilities under section 5.5 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) by allowing it to, ‘*examine to the fullest extent possible all matters affecting, or likely to affect the environment, by reason of the (proposal’s) activities*’. The REF, therefore, helps ARTC determine if the proposal can be carried out while protecting and enhancing the environment as per objectives of the EP&A Act. ARTC is both the proponent and determining authority for the proposal.

The findings of this REF will be used to determine:

- ▶ whether the proposal is likely to have a significant environmental impact
- ▶ the significance of any impact on listed species and the requirement for a Species Impact Statement (SIS), Biodiversity Development Assessment Report (BDAR), or an Environmental Impact Statement (EIS)
- ▶ whether the proposal will impact a matter of national environmental significance (MNES) requiring a referral to be made to the Commonwealth Government under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- ▶ control measures to reduce and manage the likely impacts of the proposal.

This REF has been prepared in accordance with:

- ▶ Clause 171 of the EP&A Regulation
- ▶ ARTC’s Code of Practice for Environmental Impact Assessment of Development Proposals in NSW, January 2016
- ▶ ARTC’s Work Instruction for Review of Environment Factors (Version 2), February 2022.

2. Needs and options considered for the proposed MDC

2.1 Needs and objectives

The proposed MDC is required to allow for the timely delivery, stockpiling, handling and distribution of track construction materials (rail, ballast and sleepers) to support multiple Inland Rail projects and sections, including N2N, NS2B, I2S, S2P and potentially other Inland Rail projects.

The key objectives of the proposed MDC are to:

1. allow for the continued production of the materials at the suppliers' yards at a sustainable rate to meet the consumption demand once track construction commences
2. avoid significant volumes of road freight; therefore, enhancing road safety, reducing environmental impacts, network strain and simplifying the delivery process
3. allow for more controlled and safer material storage and handling operations to be undertaken, using a purpose-built and rail-accessible MDC; therefore, minimising potential quality issues and material damage
4. limit the number of times materials are required to be handled and transported prior to installation works
5. provide flexibility to the overall Inland Rail Program through the ability to reallocate materials to other Inland Rail projects and sections depending on demand
6. support the construction process through the storage of materials at a centralised location, which allows for the implementation of more efficient and environmentally responsible construction methodologies.

2.2 Alternatives and options

The track material supply for the Inland Rail projects can be provided in two ways:

- ▶ traditional procurements—where materials are delivered to numerous small stockpiles along the Inland Rail alignment, as required, to supply the track construction works
- ▶ pre-construction procurement—where materials are delivered to an MDC, allowing distribution to the worksites via rail and reducing the impact of multiple intermediate stockpiles along the Inland Rail alignment. This is the preferred option for the reasons outlined in the below subsection.

Alternative options for the MDC location were considered based on desktop analysis, site visitations and other factors, such as size availability, accessibility of site to existing rail corridors, ownership arrangements and conduciveness to overall delivery strategy. These options included the following:

- ▶ the proposal site (as described in this REF)
- ▶ locations at Curban and North Star. Both were determined to be unviable due to the size, access, and rail delivery restrictions they each imposed
- ▶ the area located immediately to the south of the proposal site. This was identified for potential use as part of the N2N Project, in the N2N Project EIS; however, it is planned to be used by the civil-works contractors constructing the N2N Project for their camp and laydown area.

2.3 Preferred option

The preferred option, that is the proposed MDC on the proposal site, is justified through achieving the key objectives as detailed in Table 1 below.

TABLE 1: JUSTIFICATION OF THE PREFERRED OPTION

Key objective	Justification
1. Allow for the continued production of the materials at the suppliers' yards at a sustainable rate to meet the consumption demand once track construction commences	<p>Given the large amount of track materials required across the Inland Rail Program, and that consumption rates are set to significantly exceed production rates, the traditional procurement arrangement of delivering materials at the time of construction is non-viable, as this approach requires:</p> <ul style="list-style-type: none"> ▶ sufficient storage at the production facilities ▶ the ability to meet and maintain production rates within a reduced production window ▶ adequate train paths to the rail corridor via the already congested rail network. <p>There is a limited amount of available storage within the rail and sleeper suppliers' yards that will be rapidly exhausted once production commences; as such, alternative storage arrangements need to be implemented in line with this proposal.</p>

Key objective	Justification
	<p>While a traditional procurement approach may reduce the overall required storage time of rail and sleepers, the inherent lead times of this process may result in an absence of available materials to complete construction when required, resulting in construction timeframes extending significantly. This would result in prolonged impacts to amenity of nearby sensitive receivers resulting from typical construction activities. Early delivery of materials, where feasible, minimises this construction risk by building stockpiles of sufficient volumes for use, while continuing to replenish stores throughout construction.</p> <p>Further analysis of the implications of the production and demand requirements for each material type is provided below.</p> <p>Concrete sleepers</p> <p>There are approximately 1.3 million concrete sleepers still required to be produced for the Inland Rail Program, from precast facilities in Wagga and Rockhampton. Approximately 690,000 of which are required for the N2N, S2P, NS2B and S2P. Given this large quantity, and the suppliers other client-supply obligations, it is critical that the Inland Rail Program provides suppliers with a required production schedule that can be sustained over the course of the Inland Rail Program. Commencing supplier production early, and delivering materials to the MDC, will alleviate the large peaks and troughs in production requirements that would otherwise occur if materials were supplied on time along the alignment. Large demand fluctuations in a supplier production schedule may cause:</p> <ul style="list-style-type: none"> ▶ supplier resourcing issues ▶ loss of trained personnel in periods of slower production ▶ quality issues that result when inexperienced personnel are used as the production demand increases, following periods of slower production ▶ inability to meet the required production requirements due to capacity or other client-supply obligations. <p>Rail</p> <p>The preparation and welding of short rail into Long Welded Rail (LWR) strings is the longest path activity for the supply of rail for track construction. Once track construction commences, rail will be consumed in the order of approximately 3500 metres (m)/day, based on the preferred Track Laying Machine (TLM) methodology. Each 330-m LWR string comprises 12 x 7.5 m short rail strings that are required to be prepared, welded and ground, prior to being stockpiled as LWR, and ready for load out to the track construction work front. To meet the consumption demand, approximately half of the overall required quantity of LWR needs to have been fabricated and stockpiled prior to commencing track construction. As such, a purpose-built rail welding and storage facility is required.</p> <p>Ballast</p> <p>The volume of ballast (3.4 million tonnes (t)) that is required for the Inland Rail Program, necessitates careful procurement planning. It is critical that the rail construction contractors work collaboratively with the civil works contractors to ensure that sufficient rock material can be sourced to meet the Program's requirements. The MDC will allow for ballast material to be produced in parallel with the production of civil earthworks and pavement materials as it will be able to progressively be delivered and stored at the proposed MDC. This will allow:</p> <ul style="list-style-type: none"> ▶ ballast materials to be economically sourced from farther afield due to the ability to deliver to the MDC via rail ▶ the prevention of over-crushing of rock source material, that will be suitable for ballast, to produce civil pavement products.
<p>2. Avoid significant volumes of road freight; therefore, enhancing road safety, reducing environmental impacts and network strain, and simplifying the delivery process</p>	<p>A clear objective is to minimise, so far as is practicable, the potential social and environmental impacts resulting from the transportation of the track materials. The existing rail network accesses the proposal location, which was chosen to maximise the potential for the delivery of materials by rail, greatly reducing the number of material deliveries that will be required by road. Rail-based transport is only possible when delivering to an MDC or to brownfield areas of the alignment prior to the commencement of the civil works, and subsequent removal of the existing track. Rail-based delivery aims to minimise:</p> <ul style="list-style-type: none"> ▶ heavy vehicle movements on the road network ▶ strain on the road haulage and logistics industry ▶ negative environmental impacts ▶ increased traffic through local communities ▶ negative community impacts and perception relating to increased road traffic ▶ damage to road network and resultant repair costs.

Key objective	Justification												
	<p>The below table provides a high-level comparison of the anticipated number of truck deliveries required for the supply of materials for N2N, NS2B, A2I, I2S and S2P, if train delivery cannot be achieved.</p> <table><tr><th>Product</th><th>Quantity</th><th>Deliveries (one-way movements)</th></tr><tr><td>Sleepers</td><td>690,000</td><td>8,600 truck deliveries OR 93 train movements</td></tr><tr><td>Short Rail</td><td>30,000 x 27.5 m lengths rail</td><td>2,515 truck deliveries OR 157 train movements</td></tr><tr><td>Ballast</td><td>1.4 million tonnes</td><td>32,900 truck deliveries OR 465 train movements</td></tr></table> <p>Notes:</p> <ul style="list-style-type: none">▶ Sleeper road transport by semi-trailer—80 sleepers/truck▶ Short rail transport by semi-trailer—12 rails/truck▶ Ballast transport by truck & dog—42.5t per truck▶ Sleeper rail transport—7488 sleepers/train▶ Short rail transport by train—192 rails/train▶ Ballast transport by rail—3000t per train	Product	Quantity	Deliveries (one-way movements)	Sleepers	690,000	8,600 truck deliveries OR 93 train movements	Short Rail	30,000 x 27.5 m lengths rail	2,515 truck deliveries OR 157 train movements	Ballast	1.4 million tonnes	32,900 truck deliveries OR 465 train movements
Product	Quantity	Deliveries (one-way movements)											
Sleepers	690,000	8,600 truck deliveries OR 93 train movements											
Short Rail	30,000 x 27.5 m lengths rail	2,515 truck deliveries OR 157 train movements											
Ballast	1.4 million tonnes	32,900 truck deliveries OR 465 train movements											
3. Allow for more controlled and safer material storage and handling operations to be undertaken, using a purpose-built and rail-accessible MDC; therefore, minimising potential quality issues and material damage	<p>The construction and operation of the MDC of its size will have a more controlled materials handling processes, resulting in:</p> <ul style="list-style-type: none">▶ a reduction in the level of damage caused to materials through their excessive handling, as they will be able to be delivered directly to the MDC from the supplier, and will not need relocating until they're used in track construction▶ reduced plant and personnel costs associated with handling of materials▶ controlled welding conditions▶ more controlled, and safer, processes for storing and handling of materials, particularly sleepers and LWR, through using purpose-built unloading/loading gantry cranes and construction plant▶ enhanced safety through the reduction in working and receiving deliveries within an operating rail corridor▶ reduction in material waste and subsequent disposals through greater control over material quality, and more efficient and effective handling techniques.												
4. Limit the number of times materials are required to be handled and transported prior to installation works	<p>It is anticipated that the Inland Rail Program will likely be able to operate, on average, three supply trains per month, for both sleepers and rail, within the existing rail network. Given the quantum of materials and the number of train deliveries required (see above table), this will be insufficient to service the construction demand requirements if early production is not implemented; as such, the early production, delivery and stockpiling of materials is needed in order to meet construction consumption requirements.</p> <p>The construction and operation of an MDC allows for materials to be delivered and stockpiled once, until they are loaded onto work trains for incorporation into the new track. Without an operational MDC, materials will need to be stockpiled at numerous locations along the alignment. These locations will be located away from the alignment until such time as the civil works has been completed; as such, using stockpiles along the alignment will introduce several additional handling operations; from the supplier to intermediate stockpiles, then to adjacent the alignment (following the civil works), before then being distributed along the alignment for incorporation into the new track.</p>												
5. Provide flexibility to the overall Inland Rail Program through the ability to reallocate materials to other Inland Rail projects depending on demand	<p>The current civil works schedules for the remaining projects of the Inland Rail Program will be subject to change as each of the individual work packages is designed and subsequently constructed; as such, the overall sequence in which each of the civil works packages will be completed will also change to allow for the commencement of track construction.</p> <p>Failure to construct a central MDC will require materials to be delivered, predominantly by road, to small stockpiles along the alignment. These deliveries will, therefore, be scheduled in line with the Inland Rail Program sequence, which has the potential to change. Delivering materials to an MDC prior to transporting them to a construction site will:</p> <ul style="list-style-type: none">▶ alleviate demand stresses on supplier schedules, which may result if materials were delivered directly to construction sites in the incorrect sequence▶ allow for a smooth and easily forecast supplier production schedule, enabling ongoing regular material deliveries without the effects of a changing construction sequence												

Key objective	Justification
6. Support the construction process through the storage of materials at a centralised location, which allows for the implementation of more efficient and environmentally responsible construction methodologies.	<ul style="list-style-type: none"> ▶ allow for materials to be reallocated to different projects in line with a fluid Inland Rail Program schedule, as required ▶ greatly reduce the requirement for using road transport for any material relocations resulting from sequence changes. <p>Failure to construct a central MDC will require altering the rail construction method for several Inland Rail projects and sections, from a significant automated TLM to a predominantly manual methodology requiring more plant, longer construction timeframes, increased material handling, increased manual handling and safety risks.</p> <p>While this may still occur in small, localised instances, this was deemed to be non-viable as the preferred method due to:</p> <ul style="list-style-type: none"> ▶ the large amount of material road deliveries this would require ▶ supply and demand constraints ▶ the increased amount of land disturbance to construct smaller material laydowns along the alignment ▶ design and construction of the civil works for the Inland Rail projects not yet having been undertaken—areas would not yet be available along the alignment to receive the materials that are required to be delivered from the suppliers.

3. Description of the proposal

The proposal includes the construction and temporary operation of a MDC. The proposed MDC will primarily be used for track material (concrete sleepers, rail and ballast) storage and management, prior to their distribution to multiple Inland Rail projects and sections. The following activities will take place at the MDC:

- ▶ rail logistics and welding, including short rail delivery and stockpiles, flash-butt welding and grinding stations, and LWR stockpiles
- ▶ sleeper logistics, including sleeper stockpiling and handling
- ▶ ballast logistics, including stockpile and handling
- ▶ TLM and work train provisioning
- ▶ storage of turnouts and catchpoints, and other pre-cast materials, as required (e.g., culverts, level crossing panels)
- ▶ installation of mainline turnouts and catchpoints from exiting ARTC corridors
- ▶ stabling roads for work trains, ballast trains, track plant and locomotives
- ▶ office and amenities for MDC operation and maintenance personnel
- ▶ heavy vehicle access to material stockpiles
- ▶ construction plant laydown
- ▶ civil and rail plant maintenance facilities.

The proposed MDC is not considered to be an ancillary development as it is essentially a separate Inland Rail project that will be servicing multiple critical State Significant Infrastructure (CSSI) and non-CSSI Inland Rail projects (see section 4.4.2 of this REF for further details).

The proposal also involves the subdivision of Lot 16 DP755131, Lot 17 DP755131, Lot 1 DP1198931, Lot 232 DP755131 and Lot 233 DP755131 to create two lots: Lot A (476.15 hectares (ha)) and Lot B (558.05 ha) (see Figure 2). The MDC would be located on the section of Lot B to the east of the P2N line, in the new subdivision.

The subdivision is a development that forms part of the proposal. It will separate the land to allow Lot A to be specifically used to build the N2N Project under its own contract, while part of Lot B will be used to specifically build the MDC under a different contract. These proposals form distinct elements of the Inland Rail Program; they will have different construction and operational timeframes.

This means the subdivision is needed for the purpose of a railway, which is a form of development where ARTC does not need to obtain consent. Sections 4.2.1 and 4.4.1 describe why ARTC can develop railways and related infrastructure without consent.

In addition to facilitating the use of the proposal site for the MDC, the subdivision will allow for flexibility in dealing with the MDC after any Inland Rail-based requirements have been fulfilled.

Any use of the proposal site following completion of ARTC's use in connection with Inland Rail construction works does not form part of the proposal, and would need to be considered and assessed separately.

There is no current proposal for the land use of Lot A and Lot B.

3.1 Proposal location

The proposal will be situated to the north of the future N2N alignment within the Narromine Shire Council local government area (LGA). The proposal location is approximately 38 km west of the city of Dubbo, NSW and approximately 7 km south of the Narromine township (NSW) (see Figure 1).

The location of the proposed MDC has been determined based on the avoidance of conflict with infrastructure and topographic features of the area. It avoids any recorded significant environmental and cultural heritage values or resources. It is also a favourable location for to support multiple Inland Rail projects and sections.

3.2 Proposal site

The proposal site is the area to be used for the construction and operation of the MDC (see Figure 3). The proposal site is located on four properties, including Lot 16 DP755131, Lot 1 DP1198931, Lot 232 DP755131 and Lot 233 DP755131, all of which are currently owned by ARTC. The total area of the proposal site is approximately 328.61 ha.

The various aspects of the existing environment of the proposal site are detailed in section 6 of this report.

The indicative outline of the subdivided proposal site is set out in Figure 2.

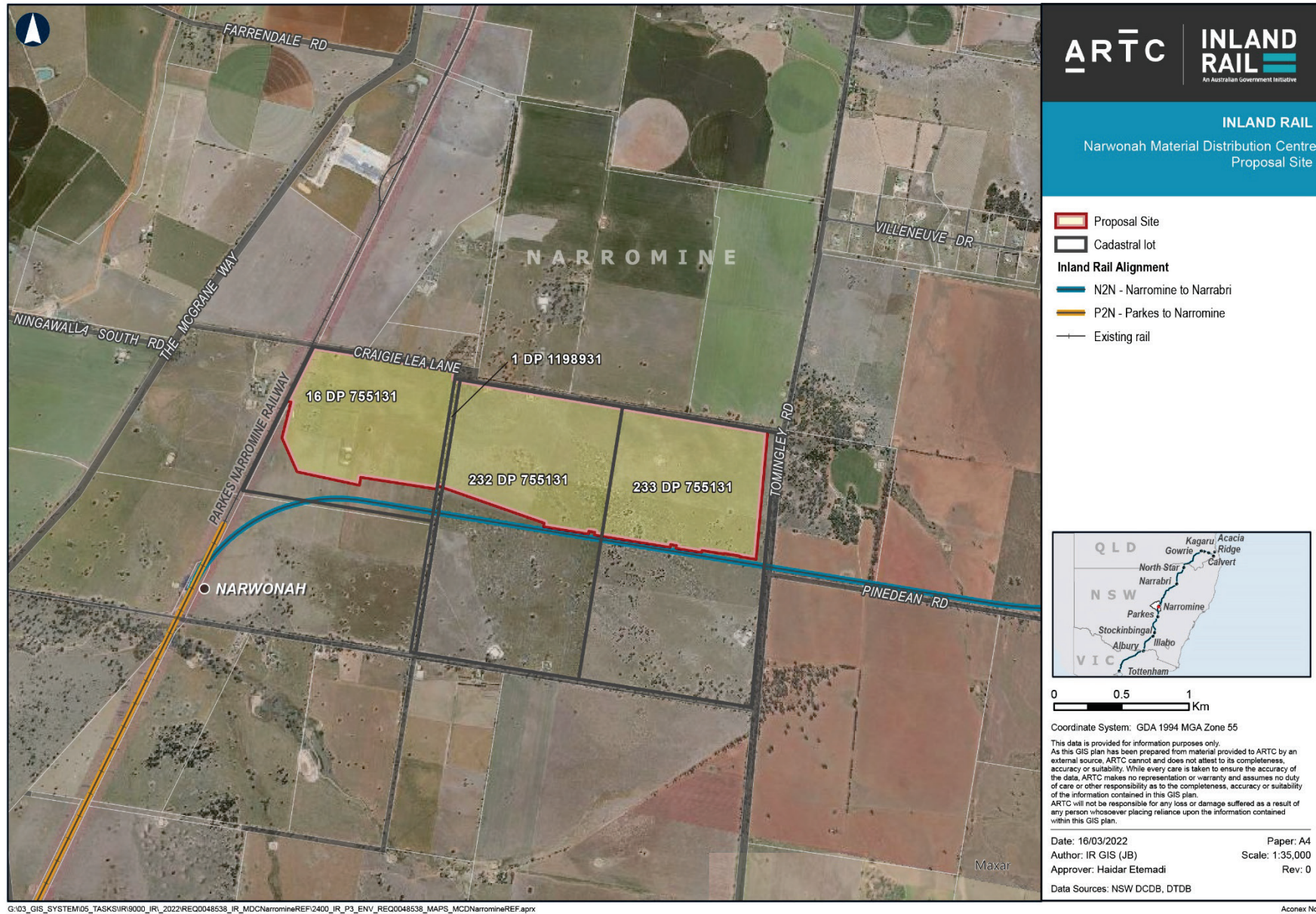


FIGURE 3: PROPOSAL SITE

3.3 Key design features

The proposed MDC is currently at conceptual design and will be further refined at detailed design, with the consideration of the outcomes identified throughout the assessment and approval process.

The present conceptual design of the proposed MDC is planned to cater for various functional requirements, which are outlined in Table 2 and illustrated in the Conceptual Layout Plan (Figure 4).

TABLE 2: FUNCTIONAL REQUIREMENTS OF THE MDC

Functional requirements	Details
Access	<ul style="list-style-type: none"> ▶ Standard-gauge track access from the existing Hunter Valley line through a mainline turnout ▶ Standard-gauge track access throughout the proposal site for the receipt/delivery and unloading/loading of material ▶ Heavy vehicle truck access to and throughout proposal site, including separate plant access to stockpiles.
Rail welding	<ul style="list-style-type: none"> ▶ Flash-butt welding station ▶ Rail preparation and grinding (underfoot, web, profile) stations ▶ Rail conveyor system to move rail shorts progressively along LWR production line, allowing simultaneous prep/welding/grinding at progressive workstations ▶ Transfer LWR via gantry to stockpile and subsequent loading of material supply trains to service a progressive rail construction front.
Delivery and storage	<ul style="list-style-type: none"> ▶ Mobile gantry crane unloading, and storage from sleeper and rail delivery wagons and/or heavy vehicles as required ▶ Delivery and stockpiling of ballast by train and heavy vehicles ▶ Potential under train wagon ballast discharge and conveyor system ▶ Additional sleeper 'spill-over' storage, as required, with vehicle access to be loaded from gantry crane and relocated to 'spill over' storage location.
Semi-permanent/demountable buildings and storage	<ul style="list-style-type: none"> ▶ Road plant and on-track maintenance bays (including bunding) ▶ Offices ▶ General materials storage (e.g. shipping containers/covered areas) ▶ Crib and ablution facilities ▶ Fuel storage (including bunding) ▶ Generators/power (including three-phase power for welding) ▶ Lighting to allow for 24/7 operation ▶ Water storage (potable/dust suppression) ▶ Plant storage areas ▶ Adequate signage and fencing to manage site access.

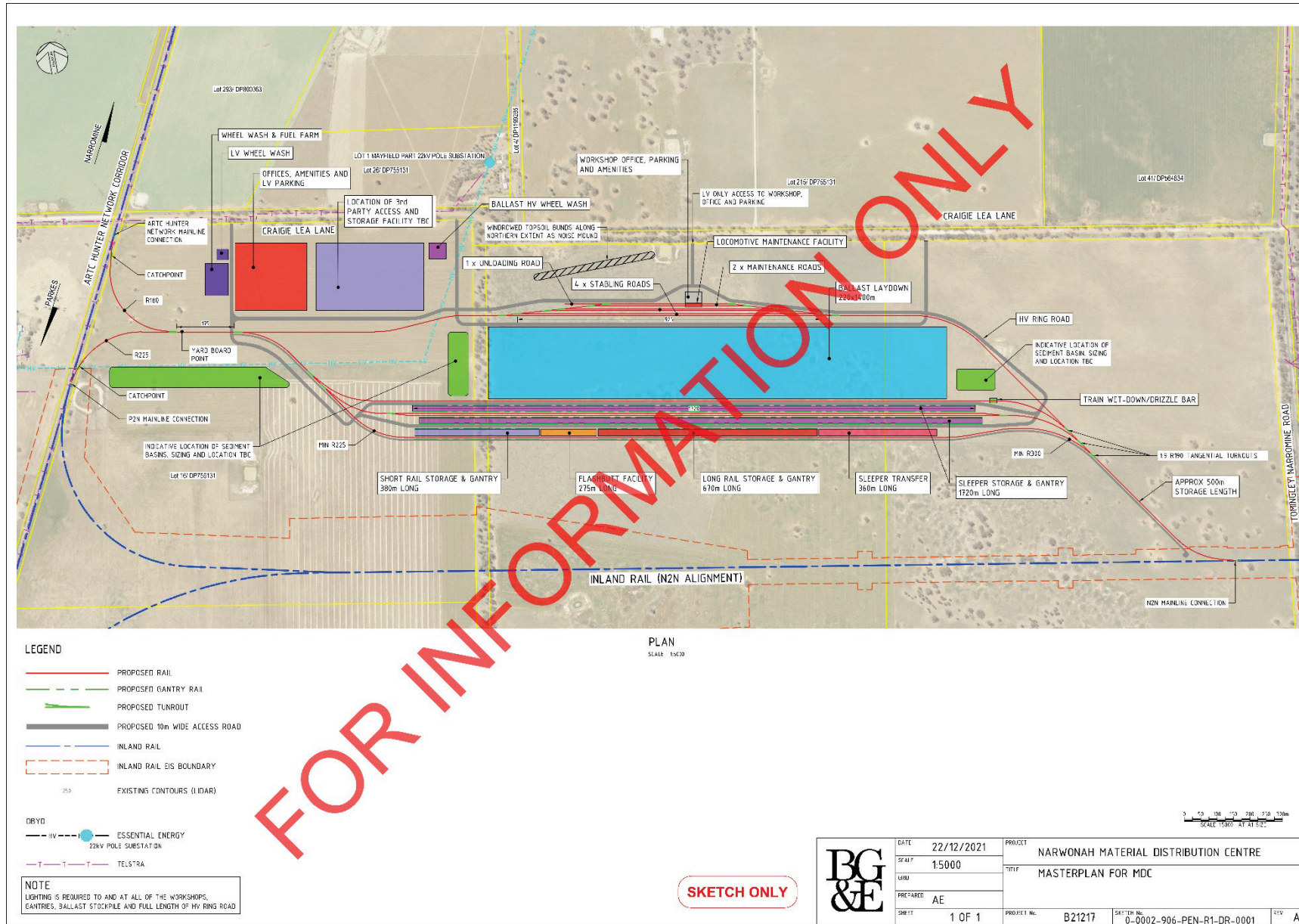


FIGURE 4: MDC CONCEPT LAYOUT

3.4 Construction activities

A complete and detailed construction methodology for the MDC will be prepared by the nominated construction contractor. It will be based on the detailed design of the proposed MDC and consider the appropriate environmental mitigation measures.

A high-level set of activities expected to be involved in the construction of the MDC is listed below:

- ▶ structural and engineering fill placement—material will be collected onsite to be used as general and structural fill, with these borrow locations being in areas of cut that will then be used as a hardstand area for site offices and laydown
- ▶ strengthening of some internal roads and rail track structure—pavement material and ballast will be sourced from local quarries
- ▶ track construction including placement of ballast, sleepers and rail—the track will be constructed using specialist excavator attachments, loaders, trucks and track-mounted resurfacing machines, and will connect to the existing rail corridor
- ▶ installation of steel structures (gantries, portal frames)—the portal frame installation involves concrete foundations being installed, with cranes placing the steel structures for fixing
- ▶ installation of insitu concrete elements for the flash-butt welding stations, rail handling rollers, and for the drop pits to be used for rollingstock maintenance
- ▶ vegetation clearing and grubbing
- ▶ stripping of topsoil
- ▶ bulk earthworks and subgrade treatment
- ▶ installation of diversion drains and erosion control
- ▶ installation of electrical connection and site distribution infrastructure
- ▶ installation of fuel storage infrastructure
- ▶ set up of offices and amenities.

3.5 Operation activities

When an Inland Rail project or work component requires material for use in construction it will be loaded onto work trains at the MDC and placed directly into their final design location via a material train (containing rail and sleepers to feed directly into the automated TLM) and ballast trains (to distribute ballast through bottom-dumping directly into track).

Table 3, below, outlines the anticipated delivery, management and distribution of the materials at the proposal site.

TABLE 3: DELIVERY, MANAGEMENT AND DISTRIBUTION OF MATERIAL

Material	Delivery and management of material
Concrete sleepers	<ul style="list-style-type: none"> ▶ Concrete sleepers will be delivered by rail, from Rockhampton and Wagga, and unloaded from the delivery rake using a track-mounted mobile gantry crane. Sleepers will be stored on hardwood dunnage within the nominated cleared areas of the proposal site. ▶ Additional sleeper spill-over storage will be accessed via truck as required, with sleepers unloaded from the delivery rake, using the gantry crane, and transferred to the spill-over storage location via truck and forklift. ▶ Concrete rail sleepers will be loaded onto supply trains to service a progressive rail construction front.
Rail	<ul style="list-style-type: none"> ▶ Rail shorts (27.5 m) are delivered by rail, from Whyalla, South Australia, and unloaded from the delivery rake using a track-mounted mobile gantry crane. ▶ Rail shorts are then transferred via gantry to atop an automated feeding table system, which feeds them onto a hydraulic roller conveyor system. ▶ The rail short ends are prepared for welding, through 'sand' blasting/grinding and then fed along the roller conveyor system to flash-butt welder unit. ▶ The rail conveyor system propels rail shorts progressively along LWR production line, allowing simultaneous prep/welding/grinding at progressive workstations. ▶ 330-m-long LWRs will be fed along conveyor system and then transferred to storage with linked stationary gantry cranes. They will then be loaded onto the supply consist for transport to TLM.

Material	Delivery and management of material
Ballast	<ul style="list-style-type: none"> ▶ Ballast will be delivered to the proposal site by rail, and stockpiled prior to later loading and ▶ potential under train wagon ballast discharge and conveyor system ▶ ballast haul roads, including for high-volume delivery of ballast ▶ front-end loader and dump truck handling, and transportation around site ▶ ballast wagon loading (potentially inclusion of conveyor loading system).

3.6 Plant, equipment and material

Plant and equipment anticipated to be used for the construction of the MDC include:

- ▶ all-terrain forklifts/Franna cranes
- ▶ articulated dumper trucks
- ▶ ballast regulator and tamper
- ▶ bulldozers (bush rake)
- ▶ compactors and rollers
- ▶ concrete agitators
- ▶ concrete pumps
- ▶ crawler cranes
- ▶ excavators
- ▶ front-end loaders
- ▶ fuel pods
- ▶ generators
- ▶ graders
- ▶ Hi-Rail dump trucks
- ▶ light vehicles
- ▶ mobile flash-butt welder
- ▶ portable office/amenities
- ▶ road stabiliser
- ▶ road trains
- ▶ scrapers
- ▶ side-tippers
- ▶ skid-steers
- ▶ sleeper laying excavator with octopus attachment
- ▶ track geometry trolley
- ▶ truck & dogs
- ▶ tub grinder/mulcher graders
- ▶ water trucks (body, semis, road trains & articulated).

The following materials would be imported to the proposal site for the construction of the MDC:

- ▶ concrete and reinforcement
- ▶ concrete sleepers, rail, turnouts, catchpoints, including associated signaling
- ▶ geosynthetics
- ▶ drainage materials (concrete box culverts/pipes and corrugated steel pipes)
- ▶ plastic conduits and associated materials
- ▶ imported quarry materials (general fill, structural fill, road base, ballast, rip-rap, drainage stone)
- ▶ construction and potable water.

Plant and equipment anticipated to be used during the operation and maintenance of the MDC include:

- ▶ all-terrain forklifts/Franna cranes
- ▶ articulated dumper trucks
- ▶ compactors and rollers.
- ▶ excavators
- ▶ flash-butt welder
- ▶ front-end loaders
- ▶ fuel pods
- ▶ generators
- ▶ graders
- ▶ light vehicles
- ▶ loading/unloading ballast conveyors
- ▶ locomotives.
- ▶ rail-mounted gantry cranes
- ▶ road trains
- ▶ shunt tractor
- ▶ side-tippers
- ▶ skid-steers
- ▶ truck and dogs
- ▶ water cart, for dust suppression
- ▶ wheel
- ▶ work trains

3.7 Haulage and traffic

3.7.1 Train movements during operation

Train deliveries to and from the operational MDC, from both the material suppliers and to the Inland Rail construction fronts, are anticipated to occur on the basis outlined in Table 4.

TABLE 4: TRAIN MOVEMENTS DURING OPERATION

Materials	Train movement	Occurrence
Deliveries from suppliers		
Sleepers	1 inbound & outbound train (2 movements)	Weekly (ongoing)
Rail	1 inbound & outbound train (2 movements)	Weekly (ongoing)
Ballast	1 inbound & outbound train (2 movements)	Daily (ongoing)
Deliveries to construction fronts		
Rail and sleepers	1 inbound & outbound work train (2 movements)	Daily (during rostered workdays)
Ballast	4 inbound & outbound ballast trains (8 movements)	Daily (during rostered workdays)

3.7.2 Road vehicle movements during construction and operation

In addition to the train movements outlined above, road vehicle movements during operation and construction of the MDC are expected to consist of the following:

Construction phase:

- ▶ up to 10 light vehicles and one or two minibuses—daily (24 movements)
- ▶ up to 20 heavy vehicles inbound for delivery of materials or disposal of waste—daily (40 movements).

Operation phase:

- ▶ up to 10 light vehicles and six minibuses—daily (32 movements)
- ▶ up to 10 heavy vehicles inbound per week for materials deliveries (points machines, sleepers, turnouts, etc.)—weekly (20 movements)
- ▶ up to four front-end loaders and two forklifts constantly working.

3.8 Water usage

The proposed MDC would require approximately 75 megalitres (ML) of water for construction use (moisture conditioning) and for dust suppression. Water may be sourced from several locations from privately owned, commercially licensed bores in Narromine. These sources have been reviewed and are considered satisfactory, pending commercial agreements with the bore owners.

3.9 Utilities

No utility adjustments would be required as part of the proposal; however, utilities may be brought in, particularly main power, where this is more efficient than generators.

Office and lighting would be connected and powered by nearby 22 kilovolt (kV) distribution via a property pole with pole-mounted transformer and substation. Larger machinery and plant (such as gantries) would be generator powered.

3.10 Workforce

Approximately 100 personnel are anticipated onsite at any one time during construction the operation of the MDC. This will include a mix of people working the yard (welding and material handling), and office-based logistics staff managing, coordinating and administering various operational aspects.

3.11 Working hours

Construction hours

Construction activities, including site establishment and unloading activities, would be sought to be undertaken during the recommended standard hours for construction work as per the *NSW Interim Construction Noise Guideline* (ICNG) (Department of Environment and Climate Change (DECC), 2009), which will be:

- ▶ 7:00 am to 6:00 pm Monday to Friday
- ▶ 8:00 am to 1:00 pm Saturday

Works may be undertaken outside the recommended standard hours, however, which include, but are not limited to, the following:

- ▶ works where the proponent has negotiated agreements with directly affected residents and sensitive land uses
- ▶ low-impact noise activities can occur, including:
 - ▶ construction that causes LAeq (15 minutes) noise levels:
 - no more than 5 dB(A) above the rating background level at any residence in accordance with the ICNG
 - no more than the 'noise affected' noise management levels (NMLs) specified in Table 3 of the ICNG at other sensitive land uses
 - ▶ construction that causes:
 - continuous or impulsive vibration values, measured at the most affected residence, are no more than the preferred values for human exposure to vibration specified in Table 2.2 of *Assessing Vibration: a technical guideline* (Department of Environment and Conservation (DEC), 2006)
 - intermittent vibration values, measured at the most affected residence, are no more than the preferred values for human exposure to vibration, specified in Table 2.4 of *Assessing Vibration: a technical guideline*
- ▶ the delivery of oversized plant or materials that are subject to excess mass or dimension restrictions to transport along public roads
- ▶ emergency work to avoid the loss of life or damage to property, or to prevent environmental harm
- ▶ maintenance and repair of public infrastructure where disruption to essential services and/or considerations of worker safety do not allow work within standard hours
- ▶ public infrastructure works that shorten the length of the project and are supported by the affected community
- ▶ works where a proponent demonstrates and justifies a need to operate outside the recommended standard hours.

Operation hours

Operational activities, including welding, loading and distribution, will be undertaken 24 hours a day, 7 days a week.

3.12 Duration of works

The MDC is expected to be built from June 2022 and to be operational from September 2022 until approximately 2027.

3.13 Decommissioning

Upon completion of the Inland Rail corridor works, ARTC will consider the most effective ongoing use of the proposal site or Lot B and decommission the MDC according to what its proposed future use would be.

3.14 Operational rail line

Trains delivering materials for the operational MDC would enter the proposal site via a mainline turnout from the Hunter Valley line. The delivery and storage of the rail materials within the MDC would not change existing operational arrangements of the Hunter Valley line, other than temporary impacts on rail traffic during delivery. The low frequency of use of the existing line would allow delivery sequencing to occur without impact on existing services.

4. Statutory requirements

This section details the planning and environmental legislation applicable to the proposal and any associated legislative requirements.

4.1 Commonwealth Legislation

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The purpose of the EPBC Act is to, among other things, provide for the protection of the environment, especially MNES and to conserve Australian biodiversity values.

The EPBC Act is primarily concerned with 'actions'. Under the EPBC Act, an action includes a proposal, a development, an undertaking, an activity or a series of activities, or an alteration of any of these things, and it would include the proposal. An action that the Commonwealth Minister for the Environment determines 'has, will have or is likely to have a significant impact' on MNES or an action taken on Commonwealth land that 'has, will have or is likely to have a significant impact on the environment' more broadly is a 'controlled action' and may not be conducted without prior approval from the Minister for the Environment.

Potential MNES of relevance to this assessment include:

- ▶ threatened species and ecological communities
- ▶ migratory species.

Threatened biota and migratory species recorded or likely to occur in the study area have been identified and assessments of significance in accordance with the EPBC Act *Significant Impact Guidelines 1.1* (Department of the Environment and Energy (DEE, 2013)) have been prepared for threatened biota listed under the EPBC Act that would be impacted, or are likely to be impacted, by the proposal. A discussion of the findings is presented in section 6.1. The significant impact assessments concluded that the impacts of the proposal are not considered significant. Despite these results, a referral to the Department of Agriculture, Water and the Environment (DAWE) was undertaken by precaution on the 28th of April 2022.

4.1.2 Native Title Act 1993

The *Native Title Act 1993* (Cth) (Native Title Act) recognises that First Nations people have rights and interests to land and water that derive from their traditional laws and customs. Native title may be recognised in places where First Nations people continue to follow their traditional laws and customs, and have maintained a link with their traditional Country.

Native title is managed through native title claims, Indigenous Land Use Agreements (ILUA) or future act agreements. An ILUA (once registered on the Register of Indigenous Land Use Agreements) is a formal, binding agreement, negotiated between native title groups and other parties who use or manage the land and water resources.

The National Native Title Register, Register of Native Title Claims, Unregistered Claimant Applications Register, and Register of Indigenous Land Use Agreements were searched in November 2021 for reported native title claimants in the Narromine Shire Council LGA. There are currently no native title applications, claims, determinations or ILUA present in the proposal site as at that date.

4.2 New South Wales Legislation

4.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act aims to promote the orderly and economic use and development of land, and facilitate ecologically sustainable development through the integration of relevant economic, environmental and social consideration during the environmental planning and assessment process.

The EP&A Act regulates the carrying out of 'development', which is defined in Section 1.5 of the EP&A Act to include (among other things) the erection of a building, the carrying out of a work, the subdivision of land, and any other act, matter or thing that may be controlled by an environmental planning instrument that is made under the EP&A Act.

The EP&A Act provides several pathways for the assessment and (if required) the approval of development. It also allows planning instruments to be formed, such as State environmental planning policies (SEPPs) and local environmental plans (LEPs). The instruments also control development in NSW, while providing additional forms of environmental protection; they helped determine which pathway applies to the proposal.

Specifically, clause 2.91 of State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&I SEPP) (discussed further below) states that development for the purpose of a 'railway' or 'rail infrastructure facilities', which would include the proposal, can be undertaken by, or on behalf of, a public authority without development consent.

Schedule 1 of the EP&A Regulation prescribes ARTC as a 'public authority' with the rights to develop a 'railway' or 'rail infrastructure facilities' without consent. This means they are the 'determining authority' for such proposals, providing the proposal does not trigger any alternative pathway.

Section 5.5 of the EP&A Act requires that a determining authority 'examines and takes into account to the fullest extent possible all matters affecting or likely to affect the environment', in relation to any activity, before approving or carrying that activity out.

If an activity is 'likely to significantly affect the environment', the proponent would need to prepare an EIS. This would make the activity SSI by means of section 2.13 and Schedule 3 clause 1 of State Environmental Planning Policy (Planning Systems) 2021 (PS SEPP), which would mean it needs approval from the Minister for Planning and Homes, under Division 5.2 of the EP&A Act.

This REF has been prepared to fulfil the relevant requirements of Part 5 of the EP&A Act. Furthermore, clause 171 of the EP&A Regulation details the 'factors to be considered concerning the impact of an activity on the environment'. All relevant factors for consideration are addressed in sections 6 and 7 of this REF, and a checklist is provided in section 8.2. The assessment in this REF concludes that the proposal would not have a significant impact on the environment or threatened species, populations or ecological communities or their habitats and, therefore, should be assessed under Division 5.1 of the EP&A Act.

4.2.2 Protection of the Environment Operations Act 1997

The underlying objectives of the *Protection of the Environment Operations Act 1997* (NSW) (POEO Act) is to reduce pollution and regulate the storage, treatment and disposal of waste in NSW. The POEO Act establishes the procedures for issuing licences for environment protection; imposes controls on various environmental aspects such as waste, air, water, and noise pollution control; and requires notifications of incidents and other matters.

The POEO Act provides that an Environment Protection Licence (EPL) is required where any scheduled activity (as described in Schedule 1) is to be undertaken.

The proposal does not involve any of the scheduled activities listed in Schedule 1, clause 33 of the POEO Act; this means, a specific EPL is not needed to either construct or operate the MDC. Further, the MDC would also not need to operate under the wider EPL provisions ARTC holds for its 'railway infrastructure operations' (i.e. EPL 3142).

Though the proposal can be carried out without the need for an EPL, various construction and operational management measures (see section 7) would be used to prevent and minimise pollution and waste generation, consistent with the objectives of this Act and its supporting regulations.

4.3 Other key legislation

4.3.1 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (NSW) (BC Act) provides protection for certain biota of conservation significance in NSW. The BC Act: provides for the listing of threatened species and communities; conservation of Areas of Outstanding Biodiversity Value; promotes ecological sustainable development; establishes a framework to avoid, minimise and offset the impacts of proposed development (i.e. the Biodiversity Offsets Scheme (BOS)); and establishes a scientific method for assessing the likely impacts on biodiversity values and calculating measures to offset those impacts (i.e. the Biodiversity Assessment Method (BAM)).

Section 7.3 of the BC Act requires that the significance of the impact on threatened species, populations and endangered ecological communities listed under the BC Act, are assessed using a five-part test. Where a proposal is 'likely to significantly affect' the environment, or threatened species or ecological communities, the proponent must prepare a SIS in accordance with the Secretary's Environmental Assessment Requirements (SEARs), or, if the proponent so elects, a BDAR (which must be prepared in accordance with the BOS and BAM). The proponent must also prepare an EIS.

A Biodiversity Assessment Report (BAR) was prepared for the proposal and is provided in Appendix A. The findings of the BAR are discussed in section 6.1.

The assessments concluded that the proposal is not likely to have a significant impact on Areas of Outstanding Biodiversity Value, threatened ecological communities (TECs) or threatened species listed under the BC Act, or on MNES under the EPBC Act, as discussed in section 6.1. Neither a SIS nor a BDAR is required for the proposal.

4.3.2 Biosecurity Act 2015

The *Biosecurity Act 2015* (Cth) (Biosecurity Act) seeks to prevent, eliminate and manage biosecurity risks in NSW. The Biosecurity Act shares biosecurity responsibilities between government, industry and communities.

For the proposed activities, the key responsibilities that arise under the Biosecurity Act are the avoidance of weed and pathogen dispersal occurring because of vehicle movement through the corridor and surrounding properties, and import of soil/material. It is also to control attracting pest species onsite.

Priority weeds are regulated under the Biosecurity Act, with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Some priority weeds have additional management obligations that may apply generally, or under specific circumstances.

Any identified weed species within the proposal site are the subject of a general biosecurity duty that requires any person who deals with the plant to ensure the biosecurity risk of the weed is prevented, eliminated or minimised, so far as is reasonably practicable. Regional measures for many species include the requirement that land managers should mitigate the risk of new weeds being introduced to their land.

The provisions of the Biosecurity Act have been considered as part of the BAR (Appendix A) for the proposal, which is summarised in section 6.1.

4.3.3 Contaminated Land Management Act 1997

The *Contaminated Land Management Act 1997* (NSW) (CLM Act) creates processes for investigating, managing and remediating contaminated land that poses a risk to human health and the environment.

Consideration of the provisions and requirements of the CLM Act are provided in the assessment of soil and contamination in section 6.1.

4.3.4 Fisheries Management Act 1994

The objectives of the *Fisheries Management Act 1994* (NSW) (FM Act) are to conserve, develop and share the fishery resources of the state for the benefit of present and future generations. It provides for the listing of threatened species, populations and ecological communities, key threatening processes, and otherwise sets out requirements for the preparation of a SIS.

The proposal site does not contain any watercourses that provide suitable habitat for threatened fish listed under the FM Act. The species predicted to occur in the locality are associated large river systems and, as a result, can be reliably excluded from occurring within the proposal site.

The proposal is not expected to impact on key fish habitat, marine vegetation or present any obstruction to fish passage.

4.3.5 Heritage Act 1977

The *Heritage Act 1977* (NSW) (Heritage Act) provides for the identification, registration and conservation of the state's heritage, and the protection of 'relics'.

Section 22 of the Heritage Act establishes the State Heritage Register (SHR). There were no items found within the proposal site, or within 3 km of the proposal site, that are listed on the SHR; therefore, a permit to carry out activities within the curtilage of an item listed on the SHR under Section 60 of the Heritage Act is not required.

Section 170 of the Heritage Act requires all government agencies to maintain a Heritage and Conservation Register that lists all heritage assets and an assessment of the significance of each asset. There were no items found within the proposal site or within 3 km of the proposal site that are listed on Section 170 Registers, including State Heritage Inventory, the ARTC and Transport for NSW (TfNSW) inventories.

The Heritage Act also provides protection for relics. The Heritage Impact Assessment (HIA) assessed that any archaeological remains within the proposal site would not reach the threshold of local significance; therefore, neither an excavation (under Section 140 of the Heritage Act) or exemption (under Section s139(4) of the Heritage Act) is required for the proposed MDC works to proceed under the Heritage Act.

Considerations of the provisions and requirements of the Heritage Act is provided in the HIA report (Appendix B) and summarised in section 6.3.

4.3.6 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NSW) (NPW Act) provides for the control and management of all national parks, historic sites, nature reserves, wetlands and other stage reserves. It also provides for the protection of 'Aboriginal objects' and 'Aboriginal places'.

Section 86 of the Act lists offences relating to the harming or desecrating of Aboriginal objects. If any identified Aboriginal object or Aboriginal place may be harmed during the proposed MDC, an approval under Sections 87(1) and 90(2) of the NPW Act will be required.

No Aboriginal sites or places were listed in the proposal site.

Consideration of the provisions and requirements of the NPW Act is provided in the Aboriginal Archaeological Survey Report (ASR) (see Appendix C) and summarised in section 6.3.

4.3.7 Roads Act 1993

The *Roads Act 1993* (NSW) (Roads Act) regulates the carrying out of various activities that impact the function of roads, and sets out the rights of those who pass along and access public roads.

Section 138 of the Roads Act requires consent from the relevant road authority for the carrying out of work in, on or over a public road. Clause 5(1) in Schedule 2 of the Roads Act states that public authorities do not require consent for works on unclassified roads. ARTC is not a public authority for the purposes of the Roads Act.

The proposed MDC is unlikely to result in temporary road closures or diversions during its construction and operation phases.

4.3.8 Waste Avoidance and Resource Recovery Act 2001

The *Waste Avoidance and Resource Recovery Act 2001* (NSW) (WARR Act) is aimed at minimising the consumption of waste resources and controlling the management and disposal of any waste materials onsite.

It promotes the waste hierarchy to avoid resource consumption and implement resource recovery in the form of material reuse and recycling in preference to waste disposal. The WARR Act acknowledges that certain material present either human or environmental risk, requiring classification, treatment and disposal, in accordance with specific waste-management provisions.

The MDC generates waste mainly during the construction phase. The principles of the waste management hierarchy and other relevant waste management requirements would be implemented onsite.

Further assessment of waste generation is in section 6.11.

4.3.9 Water Management Act 2000

The *Water Management Act 2000* (NSW) (WM Act) addresses the sustainable management of surface waters in NSW and the integration of water management with other environmental management practices.

It is currently proposed that construction water will be sourced from existing bores. Under the WM Act, a water access licence (WAL) is typically required to take water from a very broad range of sources, including bores, aquifers and natural waterways. In some cases, and depending on the proposed construction methodology and water requirements, ARTC or its construction contractor may be able to source water from third parties' entitlements, relying on those parties' WALs. In other cases, ARTC or the construction contractor may need to obtain their own WAL to source construction water.

The following water management work approvals under the WM Act may be required by the construction contractor based on the final construction method and resourcing water:

- ▶ Water supply works approval (s.91B of the WM Act). This authorises the holder to construct and use a specified water supply work at a specified location (from a river, lake or aquifer). Water supply works include, but are not limited to, water pumps, bores and dams.
- ▶ Drainage work approval (s.91C of the WM Act). This authorises the holder to construct and use a drainage work.
- ▶ Flood work approval (s.91D of the WM Act). This authorises the holder to construct and use a work located near a river, estuary, or within a floodplain, which is likely to affect the flow of water to or from a river, estuary or lake, or distribution or flow of floodwater in times of flood.

Temporary dewatering and construction activities that interfere with aquifers may need one or more of the above approvals and a WAL under the WM Act. While the WM Act also separately provides for aquifer interference approvals, the provisions of the WM Act addressing those approvals have not yet commenced operation.

4.4 Environmental planning instruments

4.4.1 State Environmental Planning Policy (Transport and Infrastructure) 2021

The T&I SEPP aims to assist in the effective delivery of public infrastructure across NSW. The aim is achieved by improving regulatory certainty and efficiency through a consistent planning pathway and more flexibility in location for infrastructure and services. It also identifies the applicable environmental assessment and approval process for infrastructure and services.

Clause 2.91(1) permits development for the purpose of railway or rail infrastructure facilities to be carried out by, or on behalf of, a public authority without development consent, on any land. The proposal comprises development for the purposes of a railway or rail infrastructure facilities, within the meaning of clause 2.91.

In addition, the subdivision is development for the purpose of railway or rail infrastructure facilities as it facilitates the use of the proposal site for the MDC, by allowing the creation of a specific lot for the MDC. This, in turn, will facilitate the use of the MDC to support Inland Rail, as well as providing flexibility to facilitate any further ongoing use.

The proposed activities are not located on land reserved under the *National Parks and Wildlife Act 1974* (NSW) and its operation is not inconsistent with the operation of State Environmental Planning Policy (Resilience and Hazards) 2021 or State Environmental Planning Policy (Planning Systems) 2021. Therefore, the proposal can progress as development without consent as there are no other legal provisions that would affect the planning pathway.

4.4.2 State Environmental Planning Policy (Planning Systems) 2021

The PS SEPP provides details of projects that will be considered State Significant Development (SSD), SSI and critical CSSI.

The PS SEPP provides that, for this proposal to be considered SSI, it must have a capital investment value of more than \$50 million or be likely to significantly affect the environment.

The proposal has a capital investment value below \$50 million and is not likely to have a significant impact on the environment; therefore, it does not classify as SSI. The proposal has been assessed under Division 5.1 of the EP&A Act.

Schedule 5, Clause 7, declares various Inland Rail projects to be CSSI, and includes ancillary development. Clause 7 defines 'ancillary development' to be development that is ancillary to any other CSSI development under Clause 7. The proposal is not considered to meet this definition as it is a separate Inland Rail project which will be servicing multiple other Inland Rail projects and sections, some of which are CSSI and some of which are not. Furthermore, the proposal will be built under a different contract to the Inland Rail projects and have different construction and operational timeframes.

4.4.3 Narromine Local Environmental Plan 2011

The proposal is located within the Narromine Shire Council LGA. The proposal site is located within the Primary Production (RU1) zone under the Narromine Local Environmental Plan 2011 (LEP). Works described as 'freight transport facilities' are permitted, with consent, within zone RU1. Freight transport facility is defined under the Narromine LEP as a facility used principally for the bulk handling of goods for transport by road, rail, air or sea, including any facility for the loading and unloading of vehicles, aircraft, vessels or containers used to transport those goods and for the parking, holding, servicing or repair of those vehicles, aircraft or vessels or for the engines or carriages involved.

Clause 1.9(1) of the LEP states *'the plan is subject to the provisions of any State environmental planning policy that prevails over this Plan as provided by section 3.28 of the EP&A Act'*. As the proposal is permitted without consent under the T&I SEPP (see section 4.4.1), the prohibition of development within a specific zone under the LEP does not apply; however, zoning remains to be considered to evaluate land use consistency.

The two proposed lots that the subdivision would create on the proposal site would meet the principal development standards under clause 4.1 of the Narromine LEP, by remaining within the minimum lot size (400 ha) for zone RU1.

4.5 Statutory position of the proposal

In accordance with the provisions of the T&I SEPP, the proposal does not require development consent and is assessable under Division 5.1 of the EP&A Act. ARTC is the proponent and the determining authority for the proposal.

An EPL is not required for the proposal site as the proposed MDC does not involve a scheduled activity, as per clause 33 'Railway activities—railway infrastructure construction' or any other clause under Schedule 1 of the POEO Act. Additionally, for similar reasons, and because its scope and provisions do not apply to a separate project essentially at a separate location (i.e. the proposed MDC), ARTC's existing operational rail licence (EPL 3142) does not apply to the proposal.

This REF helps fulfil ARTC's obligation under Division 5.1 of the EP&A Act to examine and consider, to the fullest extent possible, all matters affecting, or likely to affect, the environment by reason of the activity.

The proposal is not likely to have a significant impact on MNES, nor is it likely to significantly affect any Commonwealth or NSW-listed threatened species, populations or ecological communities, or their habitats; however, the proposal was referred to DAWE for assessment to confirm the proposal is not a 'controlled action'.

The proposed MDC is not considered to be an ancillary development, as defined under Schedule 5 of the PS SEPP, as it is essentially a separate Inland Rail project, which will be servicing multiple CSSI and non-CSSI Inland Rail projects.

5. Stakeholder and community consultation

This section outlines the community and stakeholder consultation undertaken for the proposal.

5.1 Overall objectives

ARTC is committed to engaging with local communities in an open and collaborative manner, and in accordance with International Association for Public Participation (IAP2) core principles.

ARTC's goals for engagement are outline in Table 5.

TABLE 5: ARTC INLAND RAIL GOALS OF ENGAGEMENT

Goal	How this will be achieved for the proposal
Build trust	<ul style="list-style-type: none"> ▶ Ongoing engagement with landowners regarding investigations, field studies and the acquisition process; and ensure the engagement team continues to value and remain engaged (where appropriate) in the landowner relationship ▶ Demonstrate to communities how their feedback has been considered in the REF and the feasibility design through an iterative consultation process—show them the changes we have made ▶ Regularly engage with stakeholders and ensure the conversation is advancing and action items are being closed out.
Build credibility	<ul style="list-style-type: none"> ▶ Identify how Inland Rail can benefit the community ▶ Support the Social Performance team to enhance positive impacts ▶ Decide on specific design and alignment elements requested by the community and then communicate the reasoning to the community ▶ Engage stakeholders and communities on the issues that are important to them, seek their input to validate models, and have technical experts that can explain what the data means ▶ Deliver on the commitments we make to the community in a timely and appropriate way.
Build visibility	<ul style="list-style-type: none"> ▶ Have a presence on the ground in communities by attending and sponsoring local events ▶ Go to the community—don't expect them to come to us. Attend community meetings and implement an outreach program ▶ Undertake a program of well-advertised consultation at times and venues that are suitable for the community.

5.2 Stakeholder identification

Key stakeholders that would be directly and indirectly impacted by the proposal have been identified using desktop analysis and site visitations. The key stakeholders for the MDC include:

- ▶ Federal, state and local elected representatives
- ▶ government agency technical officers
- ▶ council officers
- ▶ state government agencies, including:
 - ▶ State Emergency Service (SES)
 - ▶ Siding Spring Observatory
 - ▶ TfNSW
 - ▶ DPE Water
 - ▶ Heritage NSW
- ▶ Narromine Chamber of Commerce
- ▶ N2N Community Consultative Committee
Narromine sub-committee
- ▶ Indigenous stakeholders
- ▶ emergency services
- ▶ community groups
- ▶ community action groups
- ▶ directly impacted and adjacent property owners
- ▶ general community
- ▶ media.

5.3 Consultation process and activities

5.3.1 Engagement approach

An Engagement Implementation Plan (EIP) has been developed for the proposal, with the objectives to ensure:

- ▶ external stakeholders are clearly identified, and their specific needs are understood and managed
- ▶ all stakeholders understand and are aware of the proposal, and work to increase acceptance of Inland Rail in the region
- ▶ the social licence to operate (reputation and trust) is built and maintained through the engagement of external stakeholders
- ▶ engagement and communication activities are transparent, equitable and accessible, with adequate opportunities for stakeholders to comment or provide input
- ▶ the delivery of engagement is targeted at mitigating identified stakeholder risks, so that the proposal can be delivered on budget and schedule
- ▶ effective dialogue with the Inland Rail team to build relationships with stakeholders
- ▶ all stakeholders, including relevant Indigenous parties and bodies, are aware of the statutory consultation process, timeframes and opportunities to provide feedback
- ▶ stakeholders are aware of the Inland Rail Program and understand the early field studies, environmental approvals and design development process
- ▶ involvement of the community in negotiable decision points to build trust and buy-in with Inland Rail about the design of the proposal
- ▶ the potentially affected landowners contact Inland Rail directly with concerns about the design, have trust in Inland Rail to assist them to resolve their concerns, and include their feedback into the design and approval process
- ▶ stakeholder and community cooperation
- ▶ understanding and acceptance of the design through meaningful interactions and appropriate engagement.

5.3.2 Government agency consultation

ARTC issued letters advising the following parties of the proposal on 7 December 2021:

- ▶ DPE (Water)
- ▶ TfNSW
- ▶ Heritage NSW.

A second letter was sent to the same parties on 7 April 2022 to provide notification of the expansion of the scope of the REF to include the subdivision of land. DPE (Water) advised a review of the REF will be undertaken during public exhibition. TfNSW provided written preliminary advice regarding traffic assessment to be considered in the REF.

The DPE and the Environment Protection Authority (EPA) were informed of the proposal on 23 and 24 February 2022, respectively. Sentiment towards the proposal was generally positive from the DPE and EPA. The EPA confirmed the proposal does not meet the threshold of needing an EPL for railway activities (see section 4.2.2).

The Narromine Shire Council-elected representatives and technical officers were engaged to ensure they have a clear understanding of the proposal. The engagement has included formal written correspondence, emails and meetings. Sentiment towards the proposal was generally positive.

5.3.3 Community and landowner consultation

The Inland Rail Stakeholder Engagement team have continued engagement with landowners adjoining the proposal site, and the local community, that commenced during the N2N feasibility stage.

Landowners within 2 km of the proposal site have been provided verbal and written advice of the intent to establish the facility, including details of the proposed features. Landowners were also offered a face-to-face meeting should they wish to discuss the proposal. The team held face-to-face or online meetings with five landowners.

Landowner sentiment overall was neutral. Issues raised included property management, potential for agistment and/or leasing, impact on local roads, and supply opportunities.

In addition, the Stakeholder Engagement team shared information about the proposal with the broader community via the media (see Appendix D), Inland Rail's established social media channels, an article in the N2N Project

electronic newsletter, a project fact sheet on the Inland Rail website (see Appendix D), a presentation to the Narromine sub-committee of the Narromine to Narrabri Community Consultative Committee, and a pop-up consultation stand outside Kierath's Shopping Square (see advertisement in Appendix D), attended by 24 people.

Broad community sentiment overall was neutral to positive. Issues raised included the N2N Project alignment, employment and supply opportunities.

5.3.4 First Nations consultation

Consultation with the Aboriginal community and the Registered Aboriginal Parties (RAPs) has been ongoing throughout the development of the proposal.

Representatives from the RAPs were present at all field surveys and will be present at test investigations.

ARTC representatives met with the Narromine Local Aboriginal Land Council (LALC) on 25 January 2022 and advised of the proposal. Key issues raised discussed included indigenous employment opportunities. Regular ongoing engagement with the LALC is planned.

5.3.5 T&I SEPP Notification

Part 2.2 of the T&I SEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. This is detailed in Table 6 below.

TABLE 6: T&I SEPP CONSULTATION REQUIREMENTS

Issue	T&I SEPP clause	Potential impact	Yes / No
Council related infrastructure or services			
Stormwater	T&I SEPP cl.2.10(1)(a)	Are the works likely to have a substantial impact on the stormwater management services which are provided by council?	No
Traffic	T&I SEPP cl.2.10(1)(b)	Are the works likely to generate traffic to an extent that will strain the capacity of the existing road system in a local government area?	No
Sewerage system	T&I SEPP cl. 2.10(1)(c)	Will the works involve connection to a council owned sewerage system? If so, will this connection have a substantial impact on the capacity of any part of the system?	No
Water usage	T&I SEPP cl. 2.10(1)(d)	Will the works involve connection to a council owned water supply system? If so, will this require the use of a substantial volume of water?	No
Temporary structures	T&I SEPP cl. 2.10(1)(e)	Will the works involve the installation of a temporary structure on, or the enclosing of, a public place which is under local council management or control? If so, will this cause more than a minor or inconsequential disruption to pedestrian or vehicular flow?	No
Road and footpath excavation	T&I SEPP cl. 2.10(1)(f)	Will the works involve more than minor or inconsequential excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance?	No
Local heritage			
Local heritage	T&I SEPP cl.2.11	Is there is a local heritage item (that is not also a State heritage item) or a heritage conservation area in the study area for the works? If yes, does a heritage assessment indicate that the potential impacts to the heritage significance of the item/area are more than minor or inconsequential?	No
Flood liable land			
Flood liable land	T&I SEPP cl.2.12 and 2.13	Will the works have impacts on flood liable land?	Yes
Public authorities other than councils			
National parks and reserves	T&I SEPP cl.2.15(2)(a)	Is the proposal adjacent to land reserved under the National Parks and Wildlife Act 1974 or to land acquired under Part 11 of that Act?	No
National parks and reserves	T&I SEPP cl.2.15(2)(b)	Is the proposal on land in Zone E1 National Parks and Nature Reserves or in a land use zone that is equivalent to that zone, other than land reserved under the National Parks and Wildlife Act 1974?	No

Issue	T&I SEPP clause	Potential impact	Yes / No
Navigable waters	T&I SEPP cl.2.15(2)(c)	Does the proposal comprise a fixed or floating structure in or over navigable waters?	No
Artificial light	T&I SEPP cl.2.15(2)(d)	Would the proposal increase the amount of artificial light in the night sky and that is on land within the dark sky region as identified on the dark sky region map?	Yes
Defence communications buffer land	T&I SEPP cl.2.15(2)(e)	Is the proposal on defence communications facility buffer land within the meaning of clause 5.15 of the Standard Instrument?	No
Mine subsidence land	T&I SEPP cl.2.15(2)(f)	Is the proposal on land in a mine subsidence district within the meaning of the <i>Mine Subsidence Compensation Act 1961</i> ?	No

Based on the proposed activities, potential issues relevant to flood-labile land and artificial light have been identified, and the associated public authorities have been notified and provided with an opportunity to comment on the proposal.

Flood-labile land

The proposal site is subject to flood-labile land; however, the proposed activities are anticipated to include appropriate drainage provisions and not result in alteration to the flood patterns to more than a minor extent. A letter of notice was sent to Narromine Shire Council and the SES under Clauses 2.12 and 2.13 of the T&I SEPP, respectively, on 29 November 2021.

Artificial light

The proposal site is located on lands within the dark sky region, as identified on the dark sky region map, and works at night are proposed that will potentially increase the amount of artificial light in the night sky.

A letter of notice was sent to the Director of the Siding Spring Observatory under Clause 2.15(2)(d) of the T&I SEPP, on 29 November 2021. Any nightworks with artificial light pollution would only be commenced with consent from the Director or consideration of any response from the Director received within 21 days after the letter of notice is provided.

The Director of the Siding Spring Observatory provided a response letter on 8 December 2021, requesting the proposal to consider good lighting principles listed in Section 4.1 of the Dark Sky Planning Guidelines when the centre is operated at night. A lighting assessment has been undertaken for the proposed MDC (see Appendix E), which concluded that the light fittings and design of the MDC used in the modelling exercise meet the recommendations of the Dark Sky Planning Guideline.

5.3.6 Ongoing engagement

ARTC is committed to communicating with stakeholders throughout the life of the proposal.

This engagement will be aligned with ARTC's Program-wide engagement goals. Following project approval, a detailed Communication and Stakeholder Engagement Management Plan (CSEMP) will be prepared for the construction and operation of the MDC.

A range of communication tools and techniques will be used to establish and maintain stakeholder relationships, and continue meaningful engagement.

The engagement tools and activities used during the construction and operation phase would include:

- ▶ landowner meetings
- ▶ stakeholder meetings
- ▶ project update e-newsletters
- ▶ factsheets
- ▶ videos
- ▶ feedback channels: 1800 number, email address, web form, interactive mapping tool
- ▶ notifications
- ▶ local events
- ▶ site tours
- ▶ maps and visualisations.

6. Environmental assessment

Assessment of the existing environment has been undertaken for the following environment aspects to identify the baseline, potential impacts and the required control measures prior to and during construction, operation and (where appropriate) decommissioning of the proposal:

- ▶ noise and vibration
- ▶ Indigenous and non-Indigenous heritage
- ▶ biodiversity
- ▶ surface water (hydrology, flooding and water quality)
- ▶ air quality
- ▶ traffic and access
- ▶ land use and property
- ▶ socio-economic
- ▶ landscape character and visual amenity
- ▶ soil and contamination
- ▶ waste
- ▶ hazard and risk.

The assessment of each key environmental aspect has been completed with a consistent approach by:

1. undertaking a desktop review and or field assessment to define the baseline environment
2. carrying out assessment of the MDC's predicted impacts during construction, operation and (where appropriate) decommissioning
3. developing control measures to avoid, minimise, or otherwise manage impacts.

Information regarding regional context and the existing conditions of the rail corridor and surrounding environment have been referred from the N2N EIS where the existing rail corridor and surrounding land (including aspects of the proposal site) were considered as part of the assessment for the N2N Project. The N2N EIS can be accessed and viewed at planningportal.nsw.gov.au/major-projects/project/41351.

6.1 Biodiversity

The potential impacts of the proposal on biodiversity are assessed in the Narwonah Material Distribution Centre Biodiversity Assessment Report (BAR) (see Appendix A). The potential impacts and safeguards to avoid, mitigate or manage impacts are summarised in this section.

6.1.1 Assessment methodology

A detailed methodology for the biodiversity assessment is provided in the BAR in Appendix A. The following provides an overview of the methodology used:

- ▶ A desktop assessment was completed of the existing environment within a 10-km search radius area to identify threatened flora and fauna species, populations and ecological communities (threatened biota) listed under the BC Act and FM Act, and MNES listed under the EPBC Act, that could be expected to occur in the locality based on previous records, known distribution ranges, and habitats present.
- ▶ An assessment of likelihood of occurrence for threatened and migratory species and vegetation community profiles was prepared.
- ▶ Identification of plant community types was completed using existing mapping available from the SEED portal and the results of rapid ground-truthing surveys conducted in September 2018 as part of the BDAR prepared for the N2N Project.
- ▶ Seasonal field surveys were conducted in the locality as part of the BDAR assessments for the N2N Project between September 2018 and November 2020. Additional surveys were undertaken of the proposal site on 5–6 July 2021 and targeted surveys were completed for Sloane's Froglet in Gilgai, and koala and raptors in road reserves near the proposal site in August 2021.
- ▶ Threatened species surveys were completed for species with the potential to occur and methods included surveys within previously conducted plots, and surveys using random meander transects in areas of suitable potential habitat where possible.
- ▶ Habitat assessments were completed and include surveys for hollow bearing tree, rocks, caves, overhangs, dens and burrows, and evidence of foraging, animal tracks or animal remains.
- ▶ A detailed review was carried out of detailed fauna surveys, which were completed as part of the N2N BDAR. These surveys included diurnal surveys, active searches, opportunistic/incidental observations, spotlighting, call playback and targeted searches.

- ▶ Plot/transect surveys were also conducted onsite with reference to the BAM (Department of Planning, Industry and Environment (DPIE), 2020a). The results of these vegetation plots were used to determine plant community types and vegetation quality and condition.
- ▶ Native vegetation cover, extent and connectivity were assessed using aerial photography. Air photo interpretation was used to identify and record distinct vegetation patches, determine the broad condition state of vegetation types and the location and extent of vegetated habitat corridors.
- ▶ Weather observations during the survey period were taken from the Dubbo weather station about 35 km from the proposal site.

6.1.2 Existing environment

The proposal is located within the Macquarie River catchment that forms part of the larger Murray-Darling basin. The majority of the site is largely agricultural, and contains cleared lands from cropping and grazing. Small patches of semi-intact native vegetation is present along existing fence lines, as scattered trees, or along adjacent road reserves. Small dams occur throughout the proposal site.

The proposal does not cross any important listed wetlands or any Ramsar wetlands. The nearest Ramsar wetland is the Macquarie Marshes Nature Reserve but is a considerable distance to the west and is unlikely to be impacted by the proposal.

The climate of the proposal site is warm and temperate with an average rainfall of about 579 millimetres (mm). The lowest rainfall typically occurs in June and the highest rainfall occurs in January, although there is little difference between the months. January is the hottest month, with the overall average of 25.5 °C and average maximum of 32.8 °C. July is the coldest month, with an overall average of 9.5 °C and average minimum of 3.6 °C.

The proposal is located in the Bogan-Macquarie subregion, which is part of the Darling Riverine Plains IBRA Bioregion and crosses one NSW (Mitchell) landscape region, identified as the Boggy Cowal Alluvial Plains.

Plant community types

Regional vegetation mapping of the Macquarie catchment identified one native vegetation community in the proposal site identified as the Poplar Box/Bullock woodland on grey-brown clay flats. One additional plant community type (PCT) was identified in areas next to the proposal site identified as Mugga Ironbark/Dwyer's Red Gum/Black Cypress Pine woodland on gravelly slopes. On-ground surveys conducted for the proposal identified four PCTs within and adjacent to the proposal site (see Figure 5) and include:

- ▶ PCT 27: Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South bioregion and listed under the BC Act as Weeping Myall Woodland
- ▶ PCT 49: Partly derived Windmill Grass–Copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South bioregion
- ▶ PCT 88: Pilliga Box - White Cypress Pine–Buloke shrubby woodland in the Brigalow Belt South Bioregion
- ▶ PCT 244: Poplar Box grassy woodland on alluvial clay–loams soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).

There is also a large portion of exotic grassland present on the western portion of the proposal site and a portion on the eastern section is dominated by introduced groundcover species due to past disturbance from cropping. Weed species present in these areas include African Boxthorn (*Lycium ferocissimum*) and Saffron Thistle (*Carthamus lanatus*). The African Boxthorn is identified as a priority weed species and a weed of national significance (WONS). This species has a general biosecurity duty that requires any person who deals with the plant to ensure the biosecurity risk of the weed is prevented, eliminated or minimised, so far as is reasonably practicable. Regional measures for many species include the requirement that land managers should mitigate the risk of new weeds being introduced to their land.

Threatened flora

A total of 44 native flora species and 11 introduced species were recorded during surveys on the proposal site. Of these, 16 species are *Poaceae* (grasses). No threatened flora species were recorded in the proposal site, or in the locality during surveys for the N2N BDAR.

Threatened fauna

One threatened fauna species; the Grey-crowned Babbler, was recorded within the proposal site during surveys. Based on the results of the desktop assessment and habitat assessment during field surveys, a total of 29 threatened fauna species (identified in Table 7) are 'possible' or 'likely' to occur within the proposal site. The proposal site does not contain any watercourses that provide suitable habitat for fish listed under the FM Act. No migratory fauna species are likely to occur in the proposal site.

TABLE 7: THREATENED FAUNA SPECIES RECORDED OR AS POSSIBLE OR LIKELY TO OCCUR

Common name	Scientific name	BC Act status	EPBC Act status	Likelihood of occurrence	Likelihood of impact
Birds					
Barking Owl	<i>Ninox connivens</i>	V	-	Possible	Low
Black Breasted Buzzard	<i>Hamirostra melanosternon</i>	V	-	Possible	Low
Black Falcon	<i>Falco subniger</i>	V	-	Possible	Low
Black-chinned Honeyeater (eastern subspecies)	<i>Melithreptus gularis</i>	V	-	Possible	Low
Brown Treecreeper (eastern subspecies)	<i>Climacteris picumnus victoriae</i>	V	-	Possible	Moderate
Diamond Firetail	<i>Stagonopluera guttata</i>	V	-	Possible	Moderate
Dusky Woodswallow	<i>Artamus cyanopterus</i>	V	-	Possible	Moderate
Flame Robin	<i>Petroica phoenicea</i>	V	-	Possible	Moderate
Gilbert's Whistler	<i>Pachycephala inornata</i>	V	-	Possible	Moderate
Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis</i>	V	-	Recorded	High
Grey Falcon	<i>Falco hypoleucos</i>	E	-	Possible	Low
Hooded Robin (south-eastern form)	<i>Melanodryas cucullata</i>	V	-	Possible	Moderate
Little Eagle	<i>Hieraaetus morphnoides</i>	V	-	Possible	Low
Little Lorikeet	<i>Glossopsitta pusilla</i>	V	-	Possible	Low
Masked Owl	<i>Tyto novaehollandiae</i>	V	-	Possible	Low
Painted Honeyeater	<i>Grantiella picta</i>	V	V	Possible	Low
Pied Honeyeater	<i>Certhionyx variegatus</i>	V	-	Possible	Low
Scarlet Robin	<i>Petroica boodang</i>	V	-	Possible	Moderate
Spotted Harrier	<i>Circus assimilis</i>	V	-	Possible	Low
Square-tailed Kite	<i>Lophoictinia isura</i>	V	-	Possible	Low
Superb Parrot	<i>Polytelis swainsonii</i>	V	V	Possible	Low
Turquoise Parrot	<i>Neophema pulchella</i>	V	-	Possible	Low
Varied Sittella	<i>Daphoenositta chrysoptera</i>	V	-	Possible	Moderate
Mammals					
Corben's Long-eared Bat	<i>Nyctophilus corbeni</i>	V	V	Possible	Moderate
Koala	<i>Phascolarctos cinereus</i>	V	E	Possible	Moderate
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	V	-	Possible	Low
Little Pied Bat	<i>Chalinolobus picatus</i>	V	-	Possible	Moderate
Northern Free-tailed Bat	<i>Ozimops lumsdenae</i>	V	-	Possible	Moderate
Yellow-bellied Sheathtail-Bat	<i>Saccolaimus flaviventris</i>	V	-	Likely	Moderate

Key: M – migratory, V – vulnerable, E – endangered

Threatened ecological communities

One PCT fulfils the requirements under the BC Act as a threatened ecological community (TEC) and includes a small woodland patch of Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South bioregion, which is classified as endangered.

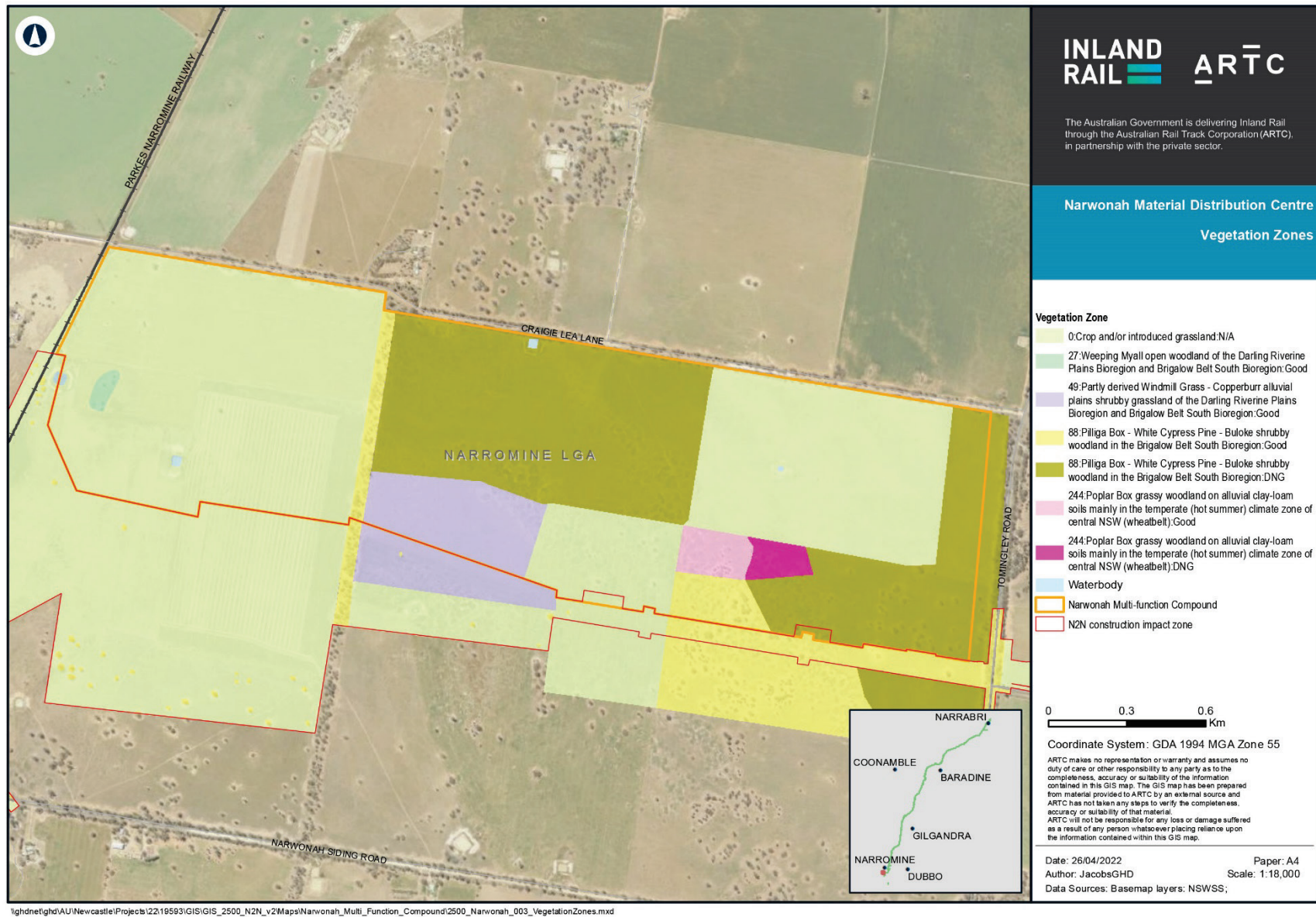


FIGURE 5: VEGETATION ZONES

6.1.3 Potential impact

Construction

Vegetation clearance

Construction of the proposal would remove about 328.19 ha of vegetation. Of this, about 181.89 ha of vegetation is comprised of cropland and introduced vegetation. The remaining 146.30 ha is comprised of native vegetation and includes four PCTs identified in the field survey. Table 8 summarises the impacts to vegetation from the proposal.

TABLE 8: IMPACTS TO VEGETATION COMMUNITIES

PCT ID	PCT name	BC Act Status	EPBC Act Status	Area of clearing (ha)
27	Weeping Myall open woodland of the Darling Riverine Plains bioregion and Brigalow Belt South Bioregion	Comprises a component of Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Penepine, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions endangered ecological community (EEC)	Does not conform to the EPBC Act listing for Weeping Myall TEC	1.07
49	Partly derived Windmill Grass–Copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	-	-	17.86
88	Pilliga Box – White Cypress Pine – Buloke shrubby woodland in the Brigalow Belt South Bioregion (Woodland)	-	-	10.07
88	Pilliga Box – White Cypress Pine – Buloke shrubby woodland in the Brigalow Belt South Bioregion (DNG)	-	-	109.51
244	Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt) (Woodland)	Does not conform to the BC Act listing for the Brigalow TEC	Does not conform to the EPBC Act listing for the Poplar Box TEC	4.71
244	Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt) – Derived Native Grassland	Does not conform to the BC Act listing for the Brigalow TEC	Does not conform to the EPBC Act listing for the Poplar Box TEC	3.08
Total amount native vegetation				146.30
N/A	Introduced vegetation	-	-	181.89
Total vegetation clearance				328.19

Threatened ecological communities

The proposal would involve the removal of around 1.07 ha of the Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Penepine, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions EEC listed under the BC Act. The community does not conform to the EPBC Act listing for the community. An assessment of the likely significance of impacts of the proposal on Myall Woodland, pursuant to Section 7.3 of the BC Act (five-part test), has been prepared and found that the proposal would be unlikely to have a significant impact on this community.

Threatened flora

No threatened flora species listed under the BC Act or the EPBC Act have been recorded, or are assumed present within the proposal site, and, subsequently, none are likely to be impacted directly or indirectly by the proposal.

Fauna habitat and connectivity

The removal of native vegetation, as summarised in Table 8, would impact fauna habitats, due to the removal of foraging and breeding habitat of fauna species, including threatened species, listed under the BC Act and EPBC Act (see Table 7). Terrestrial habitat resources impacted would include mature trees that provide foraging resources, such as nectar and fruit, woody debris, leaf litter and hollows, as well as roosting and nesting habitat. Aquatic habitat impacted would include farm dams and gilgais located on the proposal site that contain habitat for commonly occurring frog species and common wetland bird species. While habitat would be removed for the proposal, alternate foraging (and/or breeding) habitat would remain in patches of woodland to the east of the proposal and in other nearby dams and aquatic habitat along the Macquarie River, about 8 km north of the proposal.

No areas of Key Fish Habitat (KFH) are mapped within the proposal site. The proposal would not alter natural flow regimes of rivers and streams, and their floodplains and wetlands.

The proposal is in a highly fragmented rural landscape with roads surrounding the proposal. Vegetation clearance required for the proposal would sever some fauna movement corridors, such as the corridor located along the fence line in the centre of the property; however, narrow roadside and fence line corridors are present elsewhere in the area, and connectivity would be retained in these areas.

Fauna injury or mortality

Fauna injury or death has the greatest potential to occur during construction when vegetation clearing would take place. The extent of this impact would be proportionate to the extent of vegetation that is cleared. Less mobile species (e.g. ground-dwelling reptiles), or those that are nocturnal and nest or roost in trees during the day (e.g. arboreal mammals and microbat species), may find it difficult to rapidly move away from the clearing activities when disturbed.

More mobile native fauna, such as adult birds, and larger terrestrial mammals and reptiles that may be sheltering in vegetation in the proposal site, are more likely to evade injury during construction activities. A range of fauna species are at risk of vehicle strike during construction. Fauna at risk of injury and mortality include terrestrial fauna, as well as birds, bats and gliders.

Threatened fauna

An assessment of the likelihood of occurrence of threatened fauna predicted to occur in the locality found that there are 16 threatened fauna species identified in Table 9 that have been recorded, or are assumed present, within the proposal site and, subsequently, are likely to be impacted directly or indirectly by the proposal.

TABLE 9: THREATENED FAUNA IMPACTED BY THE PROPOSAL

Species	BC Act status	EPBC Act status	Impact (ha)
Woodland birds			
Black-chinned Honeyeater (eastern subspecies)	V	-	15.85
Brown Treecreeper	V		15.85
Diamond Firetail	V		328.16
Dusky Woodswallow	V		15.85
Flame Robin	V		15.85
Gilbert's Whistler	V		15.85
Grey-crowned Babbler (eastern subspecies)	V		15.85
Hooded Robin (south-eastern form)	V		15.85
Painted Honeyeater	V	V	15.85
Scarlet Robin	V		15.85
Varied Sittella	V		15.85

Species	BC Act status	EPBC Act status	Impact (ha)
Microbats			
Corben's Long-eared Bat	V	V	15.85
Little Pied Bat	V		15.85
Northern Free-tailed Bat	V		15.85
Yellow-bellied Sheath-tail-Bat	V		328.16
Arboreal mammals			
Koala	V	E	15.85

Assessments of significance pursuant to Section 7.3 of the BC Act (five-part test) have been prepared for these species and found that the proposal is unlikely to directly or indirectly impact on these species.

Assessments of significance were also prepared for threatened biota listed under the EPBC Act. The proposal is unlikely to have a significant impact on any biota listed under the EPBC Act, such as the Koala, Painted Honeyeater or Corben's Long-eared Bat.

Migratory species

No important habitat for any migratory species would be impacted by the proposal. Any migratory species that may occur would be transient individuals and would not rely on the limited wetland or woodland habitat present in the proposal site.

Indirect impacts

A summary of the potential indirect impacts associated with construction of the proposal is provided in Table 10.

TABLE 10: INDIRECT IMPACTS ON BIODIVERSITY VALUES

Impact	Description
Weed invasion and edge effects	<p>'Edge effects' refers to increased noise and light or erosion and sedimentation at the interface of intact vegetation and cleared areas. Edge effects could result from vegetation clearance activities and may result in impacts such as changes to vegetation type and structure, increased growth of exotic plants, increased predation of native fauna or avoidance of habitat by native fauna.</p> <p>The proposal site and adjoining land have been extensively cleared for agriculture and weed invasion, and edge effects are already present. Impacts from the proposal would, therefore, be limited, given the existing modification of the proposal site.</p>
Weeds, pests, diseases and pathogens	<p>Construction activities, particularly the movement of construction vehicles, have the potential to introduce weed and pest species, and diseases and pathogens. Weed species are effective competitors for food and habitat resources, and have the potential to exclude native species and modify the composition and structure of vegetation communities. Weed species present in the proposal site include African Boxthorn (<i>Lycium ferocissimum</i>) and Saffron Thistle (<i>Carthamus lanatus</i>). The proposal has the potential to result in further spread of these weed species into native vegetation where they are not yet established or where they occur at low densities.</p> <p>Diseases and pathogens can be introduced or spread to site via dirt or organic material attached to machinery, vehicles, equipment and employees. Plant pathogens (such as <i>Phytophthora</i> (<i>Phytophthora cinnamomi</i>), and Myrtle Rust (<i>Uredo rangellii</i>) may result in the dieback or modification of native vegetation and damage to fauna habitats.</p> <p>The potential for significant or new impacts associated with these pathogens is relatively low, given the existing development presence and extent of human visitation across the proposal site and surrounding study area.</p>
Light, noise and vibration	<p>Light, noise and vibration can indirectly affect breeding, foraging and roosting activities where fauna are located close to construction activities, particularly in environments that are not already subject to these effects. Fauna are currently subject to varying levels of disturbance from light, noise and vibration. Individuals that nest or den in trees could abandon their nests and dens as a result of noise and vibration during construction. While there would be localised increases in light, noise and vibration during construction, these are unlikely to have a significant impact.</p>
Sedimentation and erosion	<p>Loose soil generated by construction activities may increase the risk of sedimentation and run-off on aquatic habitats in the study area in times of high rainfall. The risk of erosion and sedimentation is generally low due to the lack of ephemeral aquatic habitats in the study area.</p>

Key threatening processes

A key threatening process (KTP) is a process that threatens, or may threaten, the survival, abundance or evolutionary development of a native species or ecological community. KTPs that may be exacerbated by the construction and operation of the proposal, and which would require the implementation of mitigation measures to limit impacts, include:

- ▶ clearing of native vegetation
- ▶ removal of hollows
- ▶ removal of dead wood and dead trees
- ▶ aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners (*Manorina melanoccephala*)
- ▶ infection of frogs by amphibian chytrid causing the disease chytridiomycosis
- ▶ infection of native plants by *Phytophthora cinnamomic*
- ▶ introduction and establishment of Exotic Rust Fungi of the order *Pucciniales* pathogenic on plants of the family Myrtaceae
- ▶ invasion of native plant communities by exotic perennial grasses
- ▶ competition from various feral pests
- ▶ human-caused climate change.

Operation

The proposal would be operated and maintained by ARTC until it is decommissioned. Potential operational impacts of the MDC are discussed in Table 11.

TABLE 11: OPERATIONAL IMPACTS OF THE MDC

Impact	Description
Injury and mortality	Operation of the MDC will create a novel strike risk in the area via the movement of trains, truck and other machinery. This would include impacts on terrestrial fauna that may cross tracks and roads. Given the clearing of vegetation in the proposal site and adjacent N2N construction impact zone, noise and vibration of works, fauna is likely to move away from the proposal site, or use vegetated corridors along roads in the area.
Noise	Operation of the MDC would introduce regular noise and vibration into the proposal site, through the movement of trains, trucks and machinery, and through activities such as welding and loading of materials. As described above, noise has been shown to have a variety of impacts on fauna, including changing foraging behaviour, impacting breeding success and changing species occurrences. Species less tolerant to disturbance may be displaced from remaining vegetation in adjacent areas. Other more resilient fauna species typical of disturbed areas are likely to become accustomed to the noise.
Fire	Activities at the MDC will create a risk of fire from sparks. The risk of fires spreading to adjacent habitat areas would be expected to be minimal given the cleared N2N corridor and MDC, and surrounding agricultural land; however, a residual risk of fire does exist. The risk of fires spreading to adjacent areas would be minimised through a fire hazard management plan and other measures to contain and control the outbreak of fire.
Biosecurity	Operation of the MDC has the potential to spread weeds and pests. The surroundings of railways (e.g. verges and embankments) often host a high diversity of non-native species, in many cases due to their transportation as stowaways in or on trains. Introduction and spread of weeds can impact agricultural land and native vegetation. Mitigation measures to minimise the risk of weed introduction and spread are provided in section 6.1.4.

6.1.4 Mitigation and management measures

Table 12 lists the mitigation and management measures that will be implemented during the construction, operation and (where appropriate) decommissioning of the proposed MDC to minimise impacts to biodiversity.

TABLE 12: BIODIVERSITY CONTROL MEASURES

Control measures	Proposed MDC phase
<p>A flora and fauna management sub-plan will be prepared prior to construction, and implemented as part of the Construction Environmental Management Plan (CEMP).</p> <p>The plan will be prepared in accordance with the relevant guidelines, legislation and standards, and will include but not be limited to:</p> <ul style="list-style-type: none"> ▶ establishing protocols for the staged clearing of vegetation and safe tree felling and log removal to reduce the risk of fauna mortality ▶ an unexpected finds protocol ▶ processes for notification of a wildlife rescue organisation (e.g. WIRES) in case any injured fauna are found. All animals encountered will be treated humanely, ethically, and in accordance with relevant codes under the <i>Prevention of Cruelty to Animals Act 1979</i> (NSW). 	Design and Pre-construction
Measures to suppress dust, prevent erosion and sedimentation will be implemented during clearing and site work.	Construction / Operation
Temporary and permanent stockpiles are to be located within cleared areas (and not within areas of adjoining native vegetation) or within the dripline of trees.	Construction / Operation
All workers will be provided with an environmental induction prior to starting work onsite. This will include information on the ecological values of the site, protection measures to be implemented to protect biodiversity, and penalties for breaches.	Pre-clearing
<p>A suitably qualified ecologist is to be present during clearing activities for habitat identified during pre-clearing surveys, in order to identify areas to be avoided, and manage the rescue or relocation of fauna as necessary.</p> <p>If a Koala is observed in the area during vegetation clearing, works are to cease and not recommence until the Koala has moved on of its own accord or with the assistance of an ecologist.</p>	Pre-clearing
<p>A weed and pest species management protocol will be prepared as part of the CEMP to manage weeds and pathogens during site activities. It will include, but not be limited to, the following:</p> <ul style="list-style-type: none"> ▶ process to identify, control and remove all priority weeds in accordance with the requirements of the <i>Biosecurity Act 2015</i> ▶ process to minimise the introduction and spread of weeds, such as exclusion areas for native vegetation, driving instructions, etc. ▶ communication of responsibilities of all site personnel regarding the management of weeds and pathogens, through site inductions and toolbox talk meetings ▶ measures to ensure all trucks transporting weed waste from the site are covered to avoid the spread of weed-contaminated material. Disposal must be documented and evidence of appropriate disposal must be kept. 	Pre-clearing
So far as is practicable, suitable bush rock habitat, hollow-bearing logs or limbs, and woody debris will be relocated to nearby adjacent areas outside of the proposal site footprint by the supervising ecologist or contractor.	Pre and during clearing
Disturbance of vegetation will be limited to the minimum necessary to undertake the proposal. Clearing boundaries and any features to be retained, e.g. hollow bearing trees, need to be clearly marked on-ground before clearing commences.	During clearing
All machinery entering the site must be appropriately washed down and disinfected, as far as is practicable, prior to mobilisation onsite to prevent the potential spread of weeds, Cinnamon Fungus (<i>Phytophthora cinnamomi</i>) and Myrtle Rust (<i>Pucciniales fungi</i>), in accordance with the national best practice guidelines for <i>Phytophthora</i> (O'Gara et al., 2005) and the Myrtle Rust factsheet (DPI, 2015b) for hygiene control. Weed inspections of vehicles should also be undertaken and documented as part of the CEMP.	Prior to any plant or machinery being brought onto the site, where practicable
Protocols to prevent introduction or spread of chytrid fungus will be implemented following hygiene guidelines for wildlife, protocols to protect priority biodiversity areas in NSW from <i>Phytophthora cinnamomi</i> , myrtle rust, amphibian chytrid fungus and invasive plants (DPIE, 2020b).	Pre-clearing, during construction and operation

Control measures	Proposed MDC phase
<p>Sediment controls are to be established around the proposal site perimeter as a minimum, in accordance with the Blue Book and the contractor's environmental management plan.</p> <p>Measures will be implemented to minimise the risk of movement of materials in the event of a significant rainfall, such as covering stockpiles with impervious covers (tarps) or temporary trenching upslope of stockpiles to divert surface runoff around stockpiles.</p> <p>In the event of forecast heavy rainfall, additional measures will be implemented or works will be postponed to prevent the potential for sediment laden run-off into adjacent properties or waterways.</p>	Pre-clearing, during construction and operation

6.2 Noise and vibration

A noise and vibration assessment has been undertaken and summarised in the below subsection. The full report is contained in Appendix F.

6.2.1 Assessment methodology

The noise and vibration assessment involved:

- ▶ reviewing the existing operational noise and vibration assessment previously completed relevant to the proposal site, including the N2N EIS Technical Report 8: Noise and Vibration Assessment (Construction and operations)
- ▶ identifying the noise and vibration assessment study area, which, for this assessment, is the area within a 2 km radius around the proposal site
- ▶ identifying noise and vibration-sensitive receivers
- ▶ identifying existing background noise levels near the proposed MDC, based on the previous noise monitoring conducted by ARTC as part of the N2N EIS
- ▶ establishing the noise and vibration assessment criteria and management levels to provide a basis for assessing the potential impacts throughout the construction and operation phases of the proposed MDC
- ▶ developing a noise and vibration model based on seven representative construction/operation scenarios to predict airborne noise generated during construction and operation
- ▶ completing noise modelling to predicted construction noise levels associated with the proposed MDC
- ▶ assessing the potential for noise and vibration to exceed the applicable criteria and impact to sensitive receivers during construction and operation of the proposed MDC
- ▶ identifying the main potential noise and vibration sources during construction and operation
- ▶ identifying and recommending noise and vibration management and mitigation measures to minimise impacts during construction, operation and (where appropriate) decommissioning of the proposed MDC.

6.2.2 Existing environment

The proposal site is situated within a rural setting and surrounded by a total of 20 residential receivers and two industrial receivers, which have been identified as sensitive receivers, within a 2-km radius. The closest sensitive receiver is approximately 170 m to the north the proposal site. Other buildings within the 2-km radius that have not been considered as sensitive receivers include industrial buildings, garages, sheds, etc. It is noted that the residential dwellings on Craigie Lea Lane, to the immediate west of the P2N rail line, are proposed to be acquired by the Inland Rail Program and, therefore, are not included as a sensitive receiver for this assessment.

Existing background noise levels were based on noise monitoring results previously established as part of the N2N EIS. The EIS identifies two noise logger locations, M01 and M13, located within 2 km of the proposed MDC where noise levels were monitored in November 2018. These locations are north of Craigie Lea Lane along the P2N rail line and Tomingley Road, respectively.

The Rating Background Levels (RBLs) are presented in Table 13. These noise levels measured are representative of the acoustic environment in 2022 and have been applied to sensitive receivers within the study area. An RBL level of 35 decibels A (dBA) for day, and 30 dBA for evening and night has been adopted across the study area for the purposes of this assessment to avoid any potential under-prediction of construction noise impacts.

TABLE 13: EXISTING NOISE LEVELS

Noise monitoring ID (as per N2N EIS)	Noise monitoring location	Rating background noise level (L _{A90} dB(A))		
		Day ¹	Evening ¹	Night ¹
M1	North of Craigie Lea Lane along the P2N rail line	35 ²	37	34
M13	Near Tomingley Road, to the east of the	35 ²	30 ²	30 ²

6.2.3 Potential impact

The potential noise and vibration impacts discussed in this subsection account for the impacts likely to be caused throughout construction, operation and (where appropriate) decommissioning of the proposed MDC.

Sensitive receivers likely to be impacted, particularly throughout the operation of the MDC, are generally within 2 km of the proposal site and are mapped in the noise and vibration assessment report (refer Appendix D of the Noise and Vibration Assessment Report contained in Appendix F of this REF).

Construction impacts

Noise impact

The main sources of noise considered for the MDC during construction are vibratory rollers, dump trucks, chainsaws and bobcats.

The following potential noise impacts are anticipated during the construction of the MDC:

- ▶ Two sensitive receivers were identified where noise levels are predicted to exceed the standard hours NMLs of 45 dBA, with predicted noise level ranges of 45–50 dBA and 50–60 dBA during standard construction hours.
- ▶ On occasions where these works could occur outside standard working hours, seven sensitive receivers are predicted to exceed the out-of-hours NMLs of 35 dBA; however, it is acknowledged that works such as ground compaction and clearing are expected to occur only during standard hours. While the construction details of any unavoidable night works are currently unknown, it is expected that these works will be minimised and relatively short term.
- ▶ Up to two sensitive receivers are anticipated to be at the risk of sleep disturbance during night-time activities; however, works are generally anticipated to occur during standard hours where sleep disturbance effects are not typically considered.
- ▶ The construction road traffic noise analysis suggests that there may be a noticeable increase in road traffic noise on Tomingley Road; however, based on the predictions undertaken in the N2N EIS (Technical Report 8), the levels are expected to be compliant with the Road Noise Policy.

Vibration impact

Ground vibrations are likely to occur during construction and particularly during site preparation due to vibratory compaction; however, no adverse vibration impacts are predicted based on the offset distances between the proposal site and the closest sensitive receiver, which is located approximately 170 m north of the proposal site. The ground-borne noise levels are predicted to be compliant with the criteria (<35 dBA).

Operational impacts

Noise impact

Based on the noise modelling and assessment results, the main sources of noise at the proposal site during operation are anticipated to be generated during rail preparation, including grinding and sandblasting.

¹ Periods as defined by the EPA's Noise Policy for Industry (EPA, 2017)

² Levels defined as the minimum in accordance with EPA's Noise Policy for Industry (EPA, 2017) where measured levels are less than 30 dBA

The following potential noise impacts are anticipated during the operation (24 hours a day, 7 days a week) of the MDC:

- ▶ daytime NMLs expected to be exceeded by up to 7 dBA at two sensitive receivers during standard operational hours
- ▶ night-time NMLs expected to be exceeded by up to 17 dBA at 11 sensitive receivers during out-of-work hours
- ▶ up to four sensitive receivers are anticipated to be at the risk of sleep disturbance during night-time activities, with the dominant components anticipated to include:
 - ▶ rail grinding and sandblasting
 - ▶ rail movements over tight rail curves and points, along with potential use of train horns for safety purposes
 - ▶ rail and ballast loading and unloading activities due to the metal-on-metal and stone 'clanging' that could occur onsite.

Vibration impact

Rail movements within the site may induce vibrations but rail-induced vibrations of slow-moving locomotives and wagons are typically negligible at distances greater than 80m from surface ballasted tracks on ground. As such, no adverse vibration impacts are predicted to result from the operation of the proposed MDC. The ground-borne noise levels are predicted to be compliant with the criteria (<35 dBA).

Decommissioning impacts

Decommissioning activities may cause potential noise impacts of a similar magnitude to construction and operation.

6.2.4 Mitigation and management measures

Mitigation and management measures are based on the current design of the proposed MDC. Refinements based on the final design of the MDC, such as the final construction and operation locations within the proposal site, may be necessary.

Table 14 lists the mitigation and management measures that will be implemented during the construction, operation and (where appropriate) decommissioning of the proposed MDC to minimise noise and vibration impacts.

TABLE 14: NOISE AND VIBRATION CONTROL MEASURES

Control measures	Proposed MDC phase
Develop and implement a Construction Noise and Vibration Management Plan (CNVMP)	Design and Pre-construction Construction/ Operation
The construction noise impact assessment in this report should be refined following any changes in design refinement, to reflect the final locations of construction activities and scheduling to inform the development of the CNVMP.	Design and Pre-construction
Building condition surveys will be undertaken for sensitive receivers within 200 m of the proposed MDC to ensure there is sufficient information to respond to any potential complaints. Surveys are to take place prior to commencement and on completion of vibration-generating works.	Design and Pre-construction
Review construction staging method to identify opportunities to schedule noisy works during the day or, where relevant, evening time period.	Design and Pre-construction
Review construction staging method to identify opportunities where simultaneous operation of noisy equipment can be separated out to operate individually.	Design and Pre-construction
Selection of quieter construction equipment should be investigated where feasible and practicable. This is especially important for any out-of-hours works where predicted noise levels indicate high levels of noise impacts to nearby sensitive receivers.	Design and Pre-construction
Staff training is to be undertaken so that unnecessary sources of noise and vibration are avoided. Training must include the understanding and adoption of the CNVMP and best-practice behaviours onsite to minimise noise and vibration. The behaviours and implementation of CNVMP should be enforced through regular checks and reminders.	Construction/ Operation
Where feasible and practicable, plant and equipment used intermittently, or no longer in use, should be throttled or shut down.	Construction/ Operation
Equipment will be operated and maintained in a manner as detailed by the manufacturer. This includes the replacement of engine covers, repair of defective silencing equipment, tightening of rattling components and repair of leakages in compressed air lines.	Construction/ Operation

Control measures	Proposed MDC phase
<p>All mechanical plant near sensitive receivers should be modified to reduce noise, where feasible and practicable, such as:</p> <ul style="list-style-type: none"> ▶ internal combustion engines are fitted with a suitable muffler in good repair, operating as per the manufacturer's specifications ▶ pneumatic tools are fitted with an effective silencer on their air exhaust port ▶ aggregate bins, loaders and chutes are lined with a rubber material to dampen the vibration of the structure ▶ suitable rubber pads on wagons, loaders and ground are installed prior to unloading of rails, ballast and sleepers to minimise short-term noise impacts. 	Construction/ Operation
<p>Localised acoustic shielding in the form of acoustic semi-enclosures and blankets will be installed to shield noisy construction equipment from the nearest residences, where practicable:</p> <ul style="list-style-type: none"> ▶ acoustic enclosures should be installed as close to the works area as possible ▶ acoustic blankets should be arranged to overlap such that no air gaps are present between blankets. <p>Acoustic shielding is particularly effective for stationary plant that is scheduled to work for lengthy periods. Guidance for acoustic enclosures should be taken from AS 2436-2010 - <i>Guide to noise and vibration control on construction, demolition, and maintenance sites</i>.</p>	Construction/ Operation
Non-tonal reversing beepers (or an equivalent mechanism) will be fitted and used on all construction vehicles and mobile plant regularly used on the site and for any out-of-hours works, where practicable.	Construction/ Operation
Site access points and roads should be sited as far as practicable from sensitive receivers.	Construction/ Operation
Delivery vehicles shall be fitted with straps rather than chains where feasible.	Construction/ Operation
Sites are to be designed so that reversing of delivery vehicles is minimised so that they can drive through the site were possible.	Construction/ Operation
<p>Where feasible and practicable:</p> <ul style="list-style-type: none"> ▶ unsealed haul roads should be regularly graded. Sealed access roads and hardstand areas should have potholes filled in a timely fashion ▶ night-time construction traffic should be limited. If unavoidable, they should be redirected away from noise-sensitive receivers, in accordance with the Construction Traffic Management Plan ▶ appropriate construction traffic speed limits should be established and enforced near noise-sensitive receivers. 	Construction/ Operation
Regular communications on the activities and progress of the proposal should be provided to the community (e.g. via newsletter, email and/or website).	Construction/Operation
The operational works staging method will be reviewed to identify opportunities to schedule noisy works during the day or, where relevant, evening.	Operation
<p>The provision of at-property treatment could be considered for any noise impacts, given the 24-hour operational duration of the MDC. This may include:</p> <ul style="list-style-type: none"> ▶ investigating potential for local at-property solid fencing ▶ offering alternative ventilation where the windows are to remain closed ▶ upgrading the acoustic performance of specific elements of the building envelope (e.g. windows and doors). <p>Note that these at-property treatments would require prior detailed investigations and assessments of the existing conditions to assess the most effective acoustic treatment. If these treatments are considered effective, works would be executed only if specific agreements between the property owners and the proponent are reached.</p>	Operation

6.3 Indigenous and non-Indigenous heritage

An Indigenous heritage assessment (as part of an ASR) and a HIA have been undertaken and summarised in the below. The ASR and the HIA reports are contained in Appendix C and Appendix B, respectively.

6.3.1 Assessment methodology

The HIA and the Indigenous heritage assessment undertaken as part of the ASR, both identified a study area that has been defined as per the boundary of the proposal site.

The heritage assessments involved desktop research, field-based research, significance of impact assessment, and identification of management and mitigation measures to minimise heritage impacts during construction and operation of the proposed MDC. Further details on the assessment methodologies are outlined below.

Indigenous Heritage

The ASR was prepared in accordance with the:

- ▶ *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (Department of Environment, Climate Change and Water (DECCW), 2010a)
- ▶ *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW, 2010b)
- ▶ *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010c)
- ▶ *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in New South Wales* (Office of Environment and Heritage (OEH), 2011).

The assessment involved:

- ▶ an overview of the Aboriginal history of the study area
- ▶ identifying Aboriginal sites and areas of archaeological potential within the study area
- ▶ identifying potential historical disturbance to ground within the study area
- ▶ undertaking desktop searches for heritage listings on the relevant registers
- ▶ undertaking a site inspection on 21 February 2022 with RAPs
- ▶ undertaking assessment of the significance of identified Aboriginal sites.

Non-Indigenous Heritage

The HIA has been prepared in accordance with the guidelines outlined by the NSW Heritage Office (now Heritage NSW), the Department of Premier and Cabinet (DPC), the DPE, and the Australian International Council on Monuments and Sites (ICOMOS).

The assessment involved:

- ▶ determining the significance of heritage items, or a potential archaeological resource is undertaken using a system of assessment centred on the Burra Charter of Australia ICOMOS
- ▶ identifying impacts on heritage significance using the document *Statement of Heritage Impact 2002*, contained in the *NSW Heritage Manual*, as a guideline. Type of impacts include direct (physical) impacts, indirect (visual) impacts and potential direct impacts
- ▶ an archaeological assessment using a specialised framework to consider the range of values of an archaeological site
- ▶ undertaking desktop searches for heritage listings on the relevant registers
- ▶ reviewing available literature to determine the historical context
- ▶ undertaking a site inspection on 21 February 2022.

6.3.2 Existing environment

Indigenous Heritage

Several sites were identified to the immediate south of the study area, on gilgai formations. Gilgais are generally described as small, ephemeral pond-like depressions, or small mounds, formed due to the presence of highly reactive soils that contract and expand in response to varying moisture conditions. These gilgais appear to continue into parts of the study area that could not be inspected during survey due to dense vegetation coverage and poor access. Detailed field survey was limited to only 36 per cent of the study area due to dense vegetation.

An Aboriginal site (Site MDC-AS01) was identified during the site visit in a localised area of heightened soil visibility, located on the north-western segment of the study area (i.e. proposal site). Site MDC-AS01 is a low-density artefact scatter located on an active bull-ant nest surrounding two peppercorn trees. It was determined that the identification was likely due to no previous farming activity in the affected location due to its proximity to mature trees.

There are no previously recorded Aboriginal sites identified within the study area and no other findings regarding Aboriginal Heritage were identified within the proposal site.

Based on local modelling, the study area is unlikely to be of greater than low–moderate archaeological potential.

Non-Indigenous Heritage

No listed items of built heritage are located within the study area or within 3 km of it. A search of archival text and plan records indicated that the study area has solely functioned as agricultural land since the late 19th century and has not been the location of significant built structures.

The significance of potential archaeological finds in the study area has been assessed as not reaching the level of local heritage threshold and the archaeological potential of the study area has been rated as low to nil.

One item of potential local heritage significance, the Craigie Lea homestead, is present approximately 200 m west of the study area.

6.3.3 Potential impact

The potential impacts to Indigenous and non-Indigenous heritage discussed in this subsection account for the impacts likely to be caused throughout construction, operation and (where appropriate) decommissioning of the proposed MDC.

Construction impacts

Indigenous Heritage

Based on the current design stage of the MDC, impacts to Site MDC-AS01 are not confirmed. Avoidance of impacts to Site MDC-AS01 is the preferred option; however, if it is not able to be achieved through design development then an Aboriginal Cultural Heritage Assessment Report (ACHAR) and Aboriginal Heritage Impact Permit (AHIP) will be required.

Areas where gilgais are evident have been assessed as being of moderate archaeological potential, and a program of archaeological sub-surface testing must be completed for these parts of the study area. Areas outside of site MDC-AS01, where no gilgais are present, have been assessed here as of low archaeological potential.

Non-Indigenous Heritage

No works are proposed within or near to any non-Indigenous heritage sites. As such, the proposed MDC is unlikely to impact on non-Indigenous heritage and no further formal archaeological or built heritage investigation is required for the study area.

Operational impacts

Indigenous Heritage

Given the nature of the operational phase of the proposed MDC and minimal ground disturbance likely to occur, impacts to Indigenous heritage are considered unlikely.

Non-Indigenous Heritage

No operational works are proposed within or near any non-Indigenous heritage sites. As such, the proposed MDC is unlikely to impact on non-Indigenous heritage and no further formal archaeological or built heritage investigation is required for the study area.

6.3.4 Mitigation and management measures

Table 15 lists the mitigation and management measures that will be implemented during the construction, operation and (where appropriate) decommissioning of the proposed MDC to avoid or minimise impacts to Indigenous heritage values.

TABLE 15: INDIGENOUS AND NON-INDIGENOUS HERITAGE CONTROL MEASURES

Control measures	Proposed MDC phase
<p>The MDC design should be formulated to avoid impacts to Site MDC-AS01, in which case, the location of MDC-AS01:</p> <ul style="list-style-type: none"> ▶ is protected with a 10-m fenced no-go zone through the period of ground-disturbing construction works ▶ is marked on site mapping ▶ restrictions regarding it must be discussed at site inductions and toolbox meetings for works in the site vicinity. <p>If impacts to Site MDC-AS01 cannot be avoided:</p> <ul style="list-style-type: none"> ▶ surface salvage of artefacts in Site MDC-AS01 must be carried out ▶ salvage of artefacts in Site MDC-AS01 must be carried out in consultation with RAPs 	Design/ Pre-Construction

Control measures	Proposed MDC phase
<ul style="list-style-type: none"> ▶ artefacts collected from Site MDC-AS01 must be subject to repatriation in accordance with consultation with RAPs ▶ an AHIP will be required to permit any impacts, including surface collection salvage, to Site MDC-AS01 ▶ an ACHAR will be required in support of the AHIP application. 	
Mature trees in Lot 1 DP 1198931 are to be inspected for evidence of cultural modification.	Design/ Pre-Construction
A program of archaeological sub-surface testing must be completed for areas where gilgais are evident in the proposal site, in accordance with the <i>Code of Practice for archaeological investigation of Aboriginal objects in NSW</i> .	Design/ Pre-Construction
<p>The following steps should be carried out to manage potential minor indirect (visual) impacts to Craigie Lea homestead:</p> <ul style="list-style-type: none"> ▶ The homestead should be inspected by a heritage specialist to determine whether the homestead retains heritage significance, or whether it has been substantially altered. ▶ If the homestead is confirmed to be of local heritage significance, or a significance assessment is not completed, design of the MDC should minimise visual impacts through reduction of height adjacent to the item, or consideration of additional screening. 	Design/ Pre-Construction
An Unexpected Heritage Finds procedure must be prepared and implemented for any ground-disturbance works.	Pre-Construction
Staff engaged in onsite works should receive a heritage induction that will make them aware of the nature of potential heritage finds and their obligations under the <i>National Parks & Wildlife Act 1974</i> and the <i>Heritage Act 1977</i> .	Pre-Construction

6.4 Surface water (hydrology, flooding and water quality)

6.4.1 Assessment methodology

The surface water impact assessment involved:

- ▶ reviewing existing technical assessments undertaken as part of the N2N EIS, including the Hydrology and Hydraulic Report and existing flood studies, to understand the existing surface water attributes
- ▶ undertaking desktop analysis to obtain further information on the existing surface water features within and surrounding the proposal site
- ▶ identifying sensitive receivers surrounding the proposal site
- ▶ undertaking a qualitative assessment, based on the general positioning of elements identified in the concept layout plan, to identify changes that might affect the existing waterways, drainage and flood impacts, and any associated impacts from the construction and operation of the proposed MDC
- ▶ recommending management and mitigation measures to minimise impacts on surface water during construction, operation and (where appropriate) decommissioning of the proposed MDC.

6.4.2 Existing environment

The proposal site is characterised by relatively flat land (0.5% grade) sloping in a north-westerly direction. Ground elevation ranges from approximately 248 mAHD (Australian Height Datum) on the east to 238 mAHD on the west (see Figure 6). Several localised depressions and small farm dams are noted within the proposal site.

The proposal site is not located within the flood planning area and, therefore, is not subject to flood-related development controls. The proposal site is, however, liable to experience temporary overland flood flows during, and/or immediately after significant rainfall events (ephemeral flowpaths). Such events may likely take the form of convective thunderstorms that generate intense rainfall across the localised catchments within a matter of hours, typically generating shallow overland flows that discharge through the site. This would likely pass within a few hours, although some ponded run-off may remain in terrain depressions.

Details of existing surface water features associated with the proposal site are outlined in Table 16.

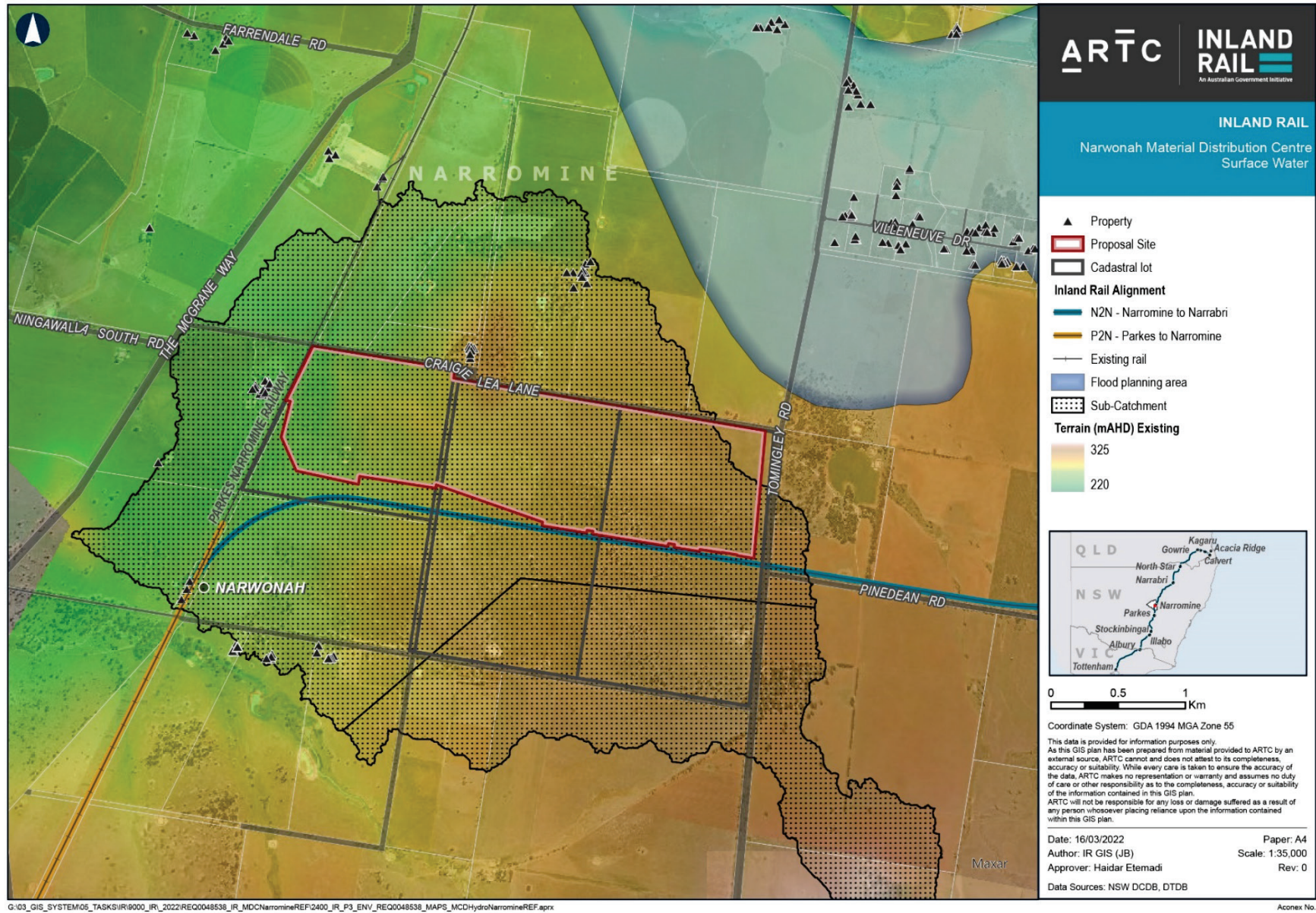


FIGURE 6: SURFACE WATER

TABLE 16: SURFACE WATER FEATURES

Aspect	Details
Catchments and watercourses	<ul style="list-style-type: none"> ▶ Surface water flows within the proposal site are characterised by non-perennial watercourses (temporary, ephemeral or intermittent), which ultimately drain towards the Macquarie River. ▶ The catchments to the proposal site are described as below and shown in Figure 6: <ul style="list-style-type: none"> ▶ approximately 4.74 km² contributes to the watercourses discharging to the west ▶ approximately 4.36 km² contributes to the watercourses discharging to the north ▶ the nearest non-perennial named watercourses are Wallaby Creek, located approximately 1 km east, and Yellow Creek, located approximately 2 km south of the proposal site ▶ the nearest perennial watercourse is Macquarie River, located approximately 9 km north of the proposal site.
Flood planning area	<ul style="list-style-type: none"> ▶ The <i>NSW Floodplain Development Manual</i> (Department of Infrastructure, Planning and Natural Resources (DIPNR), 2005) defines the flood planning area as the area of land below the flood planning level and, therefore, subject to flood-related development controls. ▶ Flood-labile land is defined synonymously with flood-prone land (i.e. land susceptible to flooding up to the Probable Maximum Flood (PMF) event). The term <i>flood-labile land</i> covers the whole floodplain and does not exclude areas below the flood planning level. ▶ The proposal site is not located within the flood planning area (see Figure 6).
Overland flood risk	<ul style="list-style-type: none"> ▶ While the proposal site is outside of flood planning area, it is subject to shallow surface flows caused by runoff from local catchments following relatively localised but intense rainfall events. ▶ The detailed flood assessment completed as part of the N2N Project includes overland flood information of the proposal site. Full details of the hydrology and flood modelling are provided in the <i>Narromine to Narrabri Project Flooding and Hydrology Assessment Technical Report</i> (2-0001-250-EAP-00-RP-0010).
Flood hazard	<ul style="list-style-type: none"> ▶ In the 1% annual exceedance probability (AEP) event, flood hazard within the proposal site is typically characterised as low (i.e. less than 0.4 m²/s), while around the access road located on the north-west, flood hazard is characterised as low to medium (i.e. less than 0.8m²/s). ▶ Existing flood hazard for the 1% AEP and PMF are shown in Figure 7.
Extents and depths	<ul style="list-style-type: none"> ▶ Flooding within most of the proposal site is characterised to be widespread, but relatively shallow, overland flows with depths up to approximately 0.5 m in the 1% AEP. ▶ Along the western boundary of the site, flows are impeded by the existing P2N line, causing flood depths of up to approximately 1 m in the 1% AEP. ▶ Existing flood extents for the 1% and PMF are shown in Figure 8.
Flow velocities	<ul style="list-style-type: none"> ▶ In the 1% AEP event, flood velocity within the proposal site is typically less than 1 m/s. ▶ Existing flood velocity distribution for the 1% AEP is shown in Figure 9.
Inundation time	<ul style="list-style-type: none"> ▶ For most of the proposal site, inundation time in the 1% AEP event is generally less than 10 hours, except at localised depressions and areas of ponding adjacent to the existing railway, where inundation time is greater.

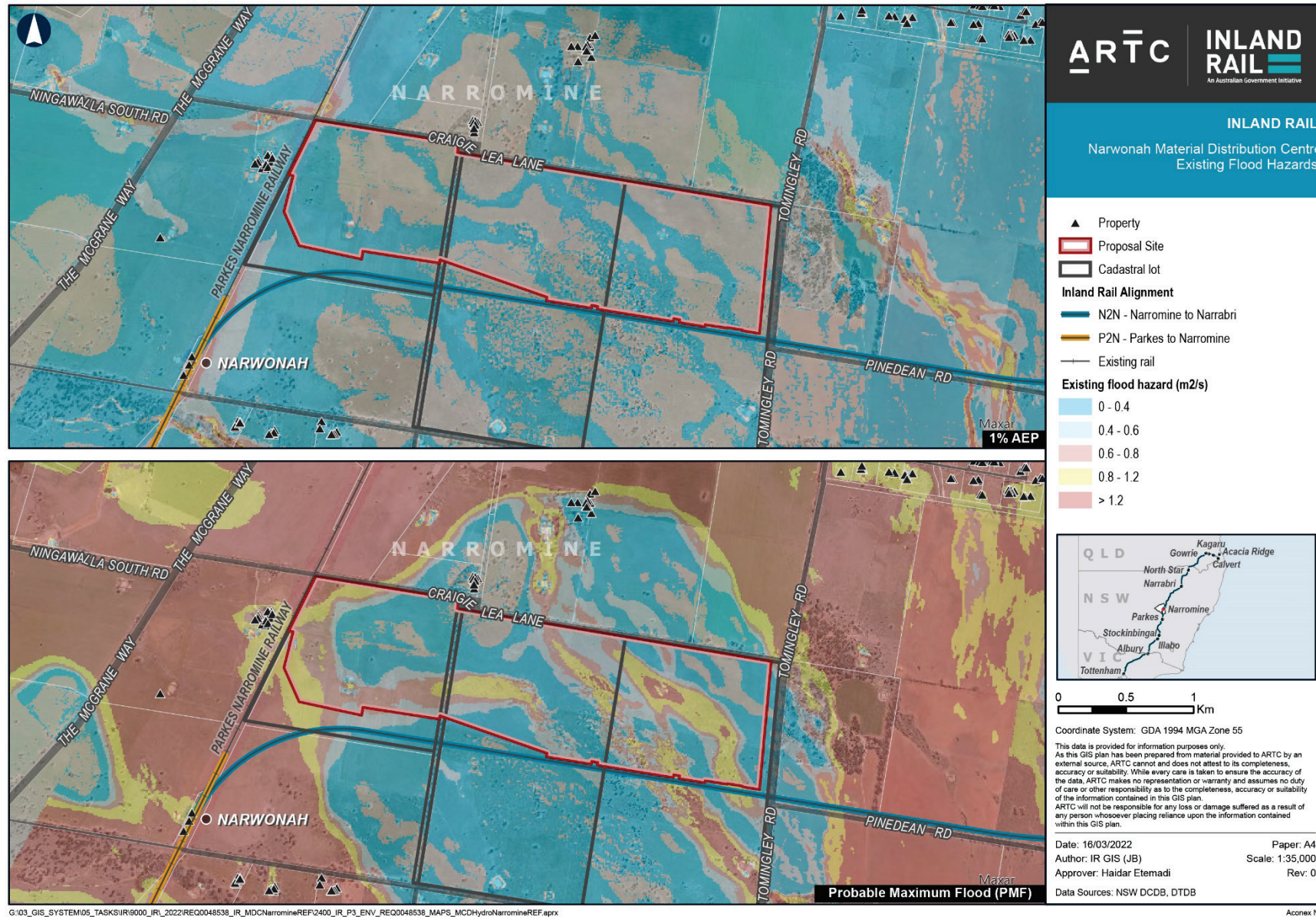


FIGURE 7: EXISTING FLOOD HAZARDS (1% AEP AND PMF)

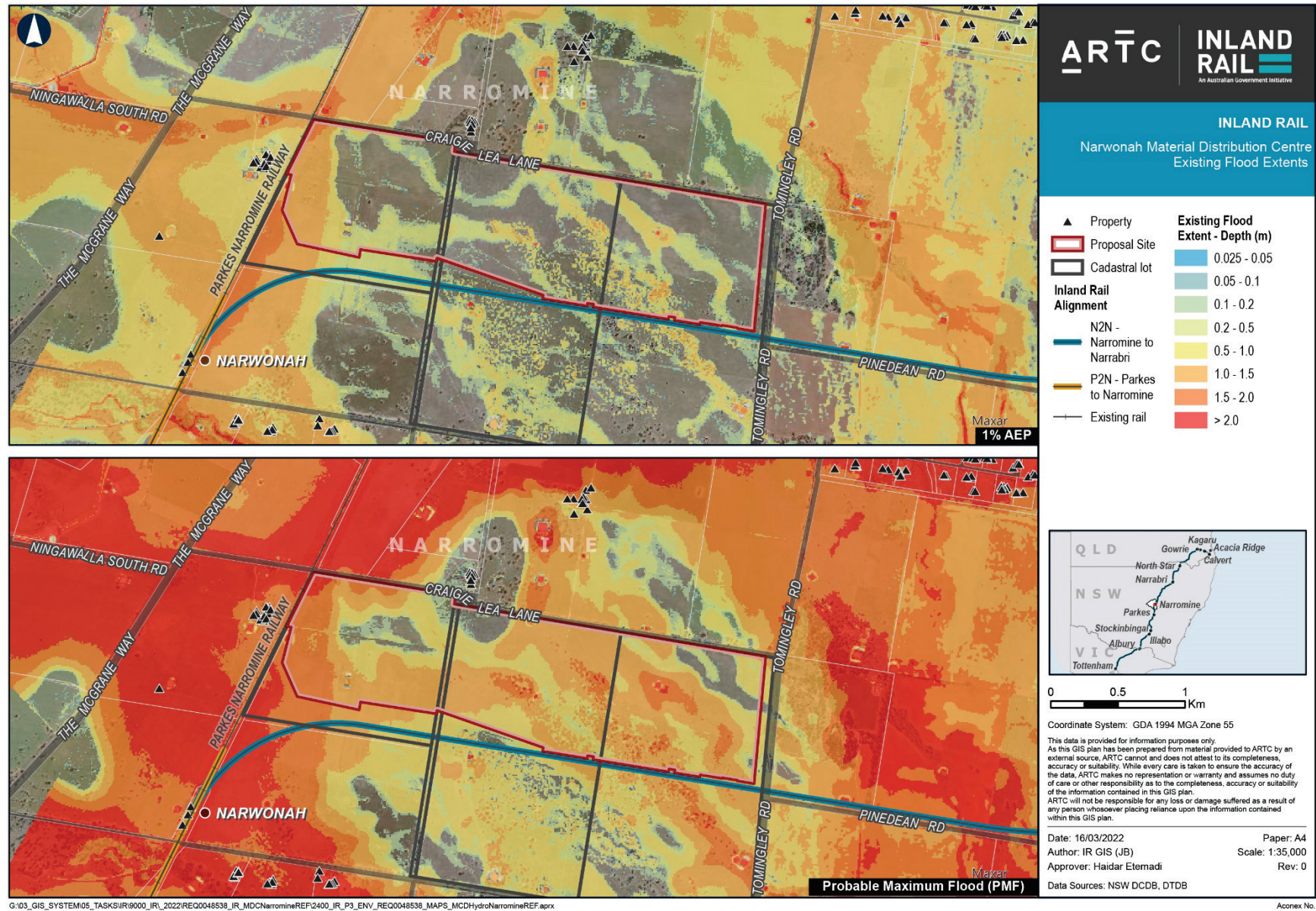


FIGURE 8: EXISTING FLOOD EXTENTS (1% AEP AND PMF)

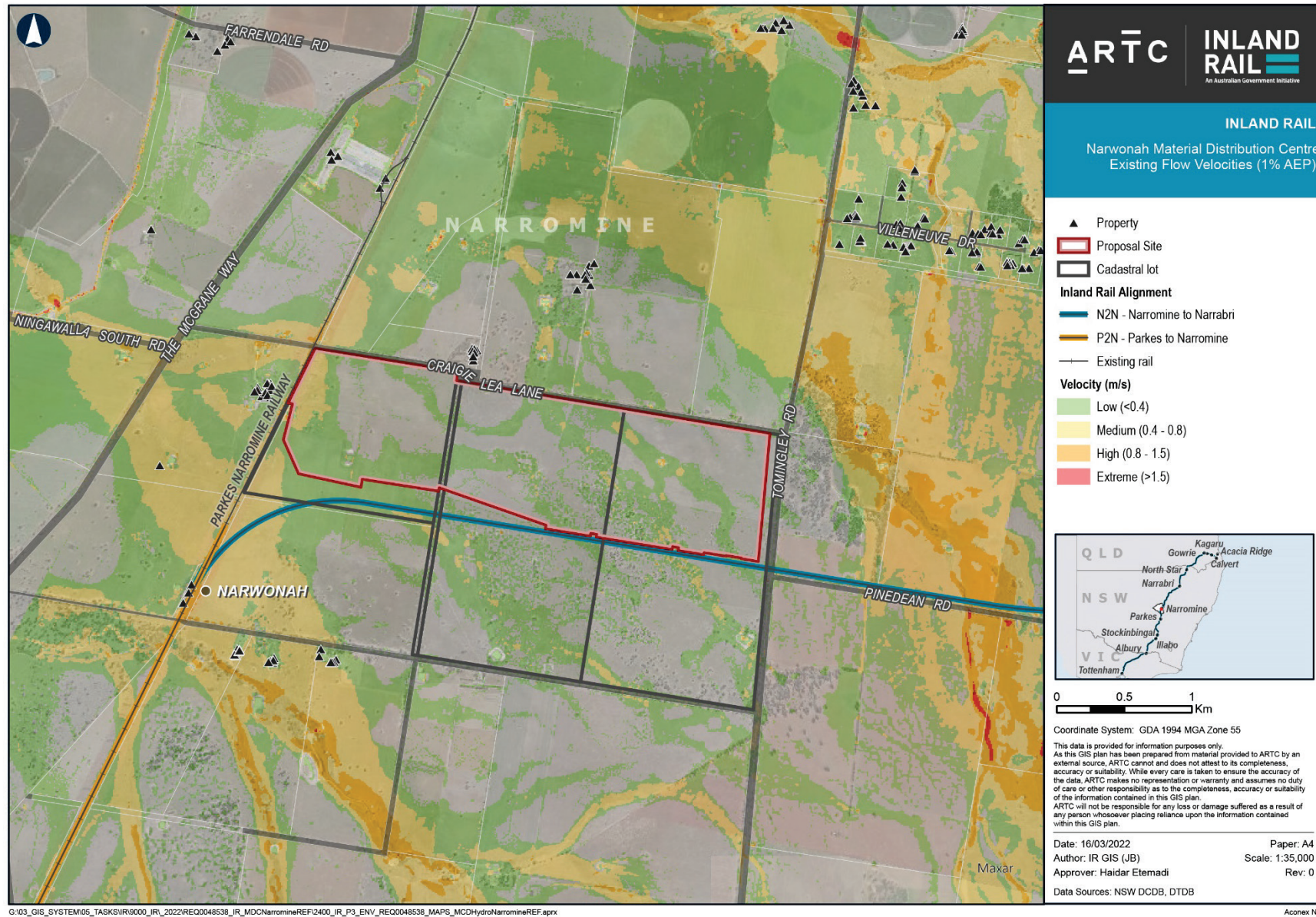


FIGURE 9: EXISTING FLOW VELOCITIES (1% AEP)

6.4.3 Potential impact

The potential impacts to surface water discussed in this subsection account for the impacts likely to be caused throughout construction, operation and (where appropriate) decommissioning of the proposed MDC.

The potential for the MDC to cause adverse surface water impact to surrounding sensitive receivers, or increased safety risks to surrounding road and rail infrastructure, can be managed through appropriate design and mitigation. The final design impacts would need to be confirmed in the detailed design phase.

Construction

The detailed construction layout and staging plans (including duration of the staging works) would be determined as part of the detailed design phase.

Potential impacts associated with construction works are likely to be similar to the operational phase (see section below), depending on the nature of the works and the staging plans. Accordingly, they would also need to be considered to an appropriate degree during the detailed design, including assessment and design calculations using existing hydraulic modelling for the MDC and surrounding area. Any unacceptable impacts arising from the proposed construction phase layout should be mitigated.

Operation

Based on the conceptual layout plan (see Figure 4), the proposed stockpile area is located downstream of the N2N alignment, within areas of overland flow paths (i.e. small, localised flow paths conveying rainfall runoff before entering creek or stream). Depending on the extent and amount of cut and fill or earthworks proposed for the stockpile area, there may be varying degrees of upstream afflux (i.e. increases in flood levels) or changes to flood extents; however, this is predicted to be localised to the proposal site extents and unlikely to extend to the N2N project area.

A sensitive receiver is located immediately downstream, north of the proposal site on Lot 26 DP755131 (see Figure 6). This property contains multiple farm dams, which intercept water from the watercourses traversing the site. Impacts to stream flow along these watercourses could occur both upstream and downstream from the re-grading of ground surface within the proposal site.

The precise magnitude and extents of flood impacts (i.e. afflux or changes to flow regime) during the operational stage of the MDC would be quantified during the detailed design phase. If any non-compliant impacts or changes to stream flow external to the proposal site were predicted, they could be addressed via modification to the site design, along with the provision of any necessary drainage infrastructure/mitigation strategies.

6.4.4 Mitigation and management measures

Mitigation and management measures are based on the current design of the proposed MDC. Refinements based on the final design of the MDC, such as the final construction and operation locations within the proposal site, may be necessary.

Table 17 lists the mitigation and management measures that will be implemented during the construction, operation and (where appropriate) decommissioning of the proposed MDC, to minimise impacts to surface water.

TABLE 17: SURFACE WATER CONTROL MEASURES

Control measures	Proposed MDC phase
Flood assessment will be undertaken based on design calculations, using existing hydraulic modelling for the MDC and surrounding area, to confirm requirements for design provisions and mitigation measures under the following scenarios: <ul style="list-style-type: none"> proposed MDC without N2N rail infrastructure in place proposed MDC with N2N rail infrastructure in place (i.e. cumulative impact assessment) if deemed required. 	Design and Pre-construction
A risk assessment will be undertaken to identify opportunities for relaxation of flood immunity/protection requirements of various site elements on a case-by-case basis (in consideration of the impacts to adjacent landholdings and receptors, and extents of infrastructure required in achieving such requirements), and in consultation with relevant parties	Design and Pre-construction
Site elements will be strategically placed to minimise impacts to overland flow conveyance and storage, in so far as is possible.	Design and Pre-construction
Appropriate cross- and open-drain features will be provided to maintain designated flow regime and avoid flow redirection and/or flood impacts on external properties. If required, adequate design allowance should be included to accommodate changes in flow distribution resulting from the N2N Project. This would also include appropriate scour protection measures.	Design and Pre-construction
Appropriate flood protection will be provided to protect hazardous material storage facilities.	Design and Pre-construction

Control measures	Proposed MDC phase
Erosion and sediment control plans and a Site Waste Management Plan (SWMP) will be developed and be signed off by a Suitably Qualified Person (e.g. a Certified Professional in Erosion and Sediment Control (CPESC)) in accordance with regulatory requirements.	Construction
Requirements for construction water (volumes, quality, demand curves, approvals requirements and lead times) would be defined during detailed design.	Construction
Any discharge of construction water (e.g. from sediment basins and excavation dewatering, etc.) to the drainage systems or receiving waters would comply with the trigger values so that the proposed MDC does not have an adverse impact on water quality.	Construction
Inspection and maintenance of any erosion and sediment controls would be carried out throughout the works to ensure they are operating effectively.	Construction and Operation
The proposed MDC would be managed in accordance with the water quality management requirements specified in state policy, procedures and guidelines.	Operation

6.5 Air quality

6.5.1 Assessment methodology

The assessment of air quality impacts involved:

- ▶ reviewing the National Pollutant Inventory (NPI) to identify any local pollutant sources at the proposed location
- ▶ identifying:
 - ▶ surrounding sensitive receivers
 - ▶ neighbouring land uses
 - ▶ sources of air emissions during construction and operation
- ▶ recommending management and mitigation measures to minimise air quality impacts during construction, operation and (where appropriate) decommissioning of the proposed MDC.

6.5.2 Existing environment

Air quality within the area of the proposal site is influenced by rural activities, vehicle and rail emissions, and limited industrial/processing activities.

No sources of significant emissions to air are listed on NPI within 25 km of the proposal site.

The proposal site is surrounded by a total of 44 residential properties in addition to several non-residential properties within a 5 km radius. The nearest residential property that is a sensitive receiver is located approximately 170 m to the north of the proposal site.

6.5.3 Potential impact

The potential impacts to air quality discussed in this subsection account for the impacts likely to be caused throughout construction, operation and (where appropriate) decommissioning of the proposed MDC.

Potential air quality impacts are expected to come from the following:

- ▶ dust generation
- ▶ combustion emission from motor vehicles and train travelling to and from the site
- ▶ use of diesel generators to provide power.

The potential impacts caused by these sources have been assessed in the below subsections.

Construction

Dust

Dust-generating activities associated with construction would occur within the proposal site, such as grading of areas of the proposal site, transport and delivery of materials/prefabricated offices, demarcation of the proposed site layout as well as the installation of hardstand in storage areas. Dust emissions are also likely to be generated from an increase in vehicles travelling along unsealed access roads.

The total amount of dust generated at any one time would depend on the soil characteristics, volume of construction activity being undertaken and the meteorological conditions.

Given the distance of sensitive receivers from potential dust-generating activities at the proposal site and unsealed access roads (nearest sensitive receiver approximately 170 m away) and the scale of activities that would generate quantum of dust, the risk of amenity/nuisance issues and human health impacts, without management measures in place, would be low and not significant.

The site preparation and construction would be undertaken in a relatively short period of time (approximately four months). Therefore, any associated dust emissions can be managed through typical mitigation measures, such as dust suppression techniques using water or chemical dust suppressants.

Exhaust emissions

Construction plant, machinery and generators onsite, as well as trucks and trains travelling to and from the proposal site, have the potential to impact local air quality. Expected numbers of train and truck movements during construction are outlined in section 3.7 of this REF. As there are no train movements, and only approximately 32 vehicles per day forecasted during the construction phase, this would not result in significant air quality impacts for nearby sensitive receivers. In addition, given the distance of sensitive receivers from the proposal site itself, the emissions from construction plant and machinery would disperse prior to any impact occurring at nearby sensitive receivers.

Under certain meteorological conditions, for example, where sensitive receivers are down-wind of generators, there is the potential for minor and temporary air quality impacts when these sources are in operation.

Operation

Dust

The potential impacts on air quality due to dust generation during operation would be lower than during the construction phase; however, dust generation will need to continue to be managed from activities such as stockpiling, ballast unloading pits, workshops where welding would be undertaken, and the transport and delivery of supplies. Mitigation measures implemented during construction to prevent dust generation and spread should also be implemented during onsite operations.

Exhaust emissions

Combustion emissions from vehicle, train and generator exhausts would continue from the construction phase to onsite operations.

- ▶ A total of up to 14 trains per day would travel in and out of the proposal site from construction fronts and suppliers (see section 3.7). Given the small frequency of movements and the limited number of sensitive receivers near the MDC, any air quality impacts would be temporary and minor. Trains may idle at the MDC while loading and unloading supplies; however, this would be minimised as much as practical. Based on the assessments undertaken for crossing loops proposed as part of Inland Rail projects, where trains idle waiting for other trains to pass on the main rail alignment, air quality impacts would likely only be significant within 25 m of an idling train. Therefore, any air quality impacts are anticipated to be restricted to within the proposal site and would not impact nearby sensitive receivers.
- ▶ Approximately 20 road vehicle movements per day are anticipated during onsite operations, split between staff travelling to and from the MDC and vehicles needed for deliveries that cannot be made via rail. It is highly unlikely that these vehicle movements would have any impact on air quality at nearby sensitive receivers, and vehicle movements and subsequent emissions are reduced from the construction phase.
- ▶ A 200 kilovolt-amperes (kVA) generator is proposed to provide power onsite, particularly for the purposes of welding. Exhaust emissions, in particular oxides of nitrogen (NO_x) and particulate matter (PM₁₀ and PM_{2.5}), will be generated when in operation. Under certain meteorological conditions, e.g. where sensitive receivers are down-wind of the generator location, there is the potential for minor and temporary air quality impacts when the generator is in use.

6.5.4 Mitigation and management measures

Mitigation and management measures are based on the current design of the proposed MDC. Refinements based on the final design of the MDC, such as the final construction and operation locations within the proposal site, may be necessary.

Table 18 lists the mitigation and management measures that would be implemented during the construction, operation and (where appropriate) decommissioning of the proposed MDC to minimise air quality impacts.

TABLE 18: AIR QUALITY CONTROL MEASURES

Control measures	Proposed MDC phase
Where sensitive receivers are located within 200 m of proposed activities, or visible dust is generated from work areas or unsealed access roads, watering would be implemented where practicable.	Construction and operation
Dust will be visually monitored every day and, when excessive, controls such as watering, changed work practices or use of polymers will be used where practicable.	Construction and operation
Vehicle and machinery movements would be restricted to existing access roads where possible.	Construction and operation
Contractor plant and machinery, including generators, will be regularly checked and maintained in a proper and efficient condition.	Construction and operation
Plant and machinery would be switched off when not in use, and not left idling.	Construction and operation

6.6 Traffic and access

6.6.1 Assessment methodology

The traffic and access impact assessment involved:

- ▶ reviewing existing technical assessments undertaken as part of the N2N EIS, including traffic surveys, database reviews and background research
- ▶ undertaking desktop reviews of the surrounding road network and intersections, public transport services, access and other relevant features
- ▶ carrying out qualitative assessments of the impacts to traffic, intersections and pavement
- ▶ recommending management and mitigation measures to minimise impacts on traffic and access during construction, operation and (where appropriate) decommissioning of the proposed MDC.

6.6.2 Existing environment

The road network within the proposal site consists mainly of local, private rural roads. Some arterial and sub-arterial roads are located surrounding the site. These roads are detailed in the below subsections and presented in Figure 10.

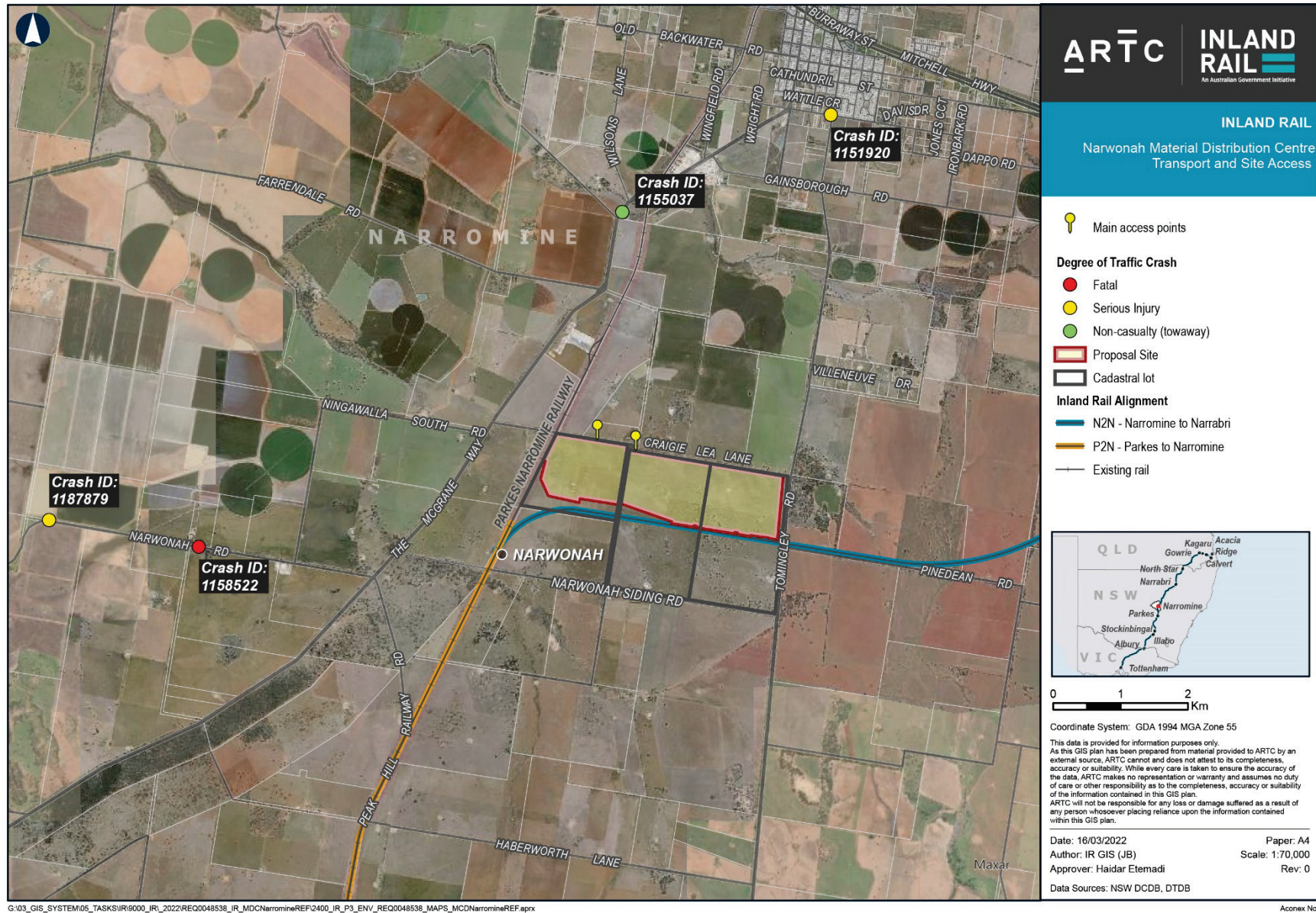


FIGURE 10: TRANSPORT AND SITE ACCESS

Main (regional) roads

The McGrane Way

The McGrane Way runs generally north to south and provides a link between Tullamore and Narromine. The proposal site connects with the P2N line to the east of The McGrane Way near Narwonah, about 10 km south of Narromine. At this location, The McGrane Way comprises a single lane in each direction on a single carriageway, with a posted speed limit of 100 km per hour.

Tomingley Road

Tomingley Road runs generally in a north–south direction, connecting the Newell and Mitchell highways and providing a direct link between Tomingley and Narromine. The proposal site crosses Tomingley Road immediately north of Pinedean Road, about 7.5 km south of Narromine. At this location, Tomingley Road comprises a single lane in each direction on a single carriageway, with a posted speed limit of 110 km per hour.

Local roads

The proposal site is adjacent to a local road on its northern boundary (Craigie Lea Lane) and nearby to another local road that is located beyond the southern boundary (Narwonah Siding Road).

Craigie Lea Lane

The Craigie Lea Lane is an unsealed single-lane (in both directions) local road connecting The McGrane Way and Tomingley Road on the northern side of the proposal site. It is about 4.5 km in total length and provides direct access to the proposal site.

Narwonah Siding Road

Narwonah Siding Road is an unsealed local road with a single lane of travel in each direction that lays to the south of the proposal site. It is approximately 5.5 km long connecting The McGrane Way and Tomingley Road and providing local access to eight lots, including two of which are subject to the proposal site.

Railway line

The P2N line is an operational single-track railway line that runs north–south, travelling north from the Broken Hill Line near Parkes. The line forms part of a larger route between Cootamundra on the Main South line and Werris Creek on the Main North line. The Narwonah Station is located south west of the proposal site, which is the immediate train stop after the Narromine Station.

Public transport

Passenger services on the P2N line were discontinued in the early 1970s. The existing rail line is operating for rail freight transport in both directions. No other public transport services are available to or from the proposal site.

Existing traffic volumes

Traffic surveys were undertaken between Tuesday 10th November 2020 to Monday 23rd November 2020, as part of the N2N EIS. Data for traffic volumes is available at the survey locations shown in Figure 11.

No turning volume data was available to undertake detailed intersection analysis.

There are no existing surveys undertaken for The McGrane Way near Craigie Lea Lane. The data at Tullamore Road is used to assess the traffic at The McGrane Way/Craigie Lea Lane intersection.

The peak volume for each road, each direction, in both the AM and PM, has been adopted for this traffic assessment. The approach was adopted so that a worst-case scenario could be studied. A summary of the AM and PM peak traffic volumes is discussed in section 6.6.3.

Crash history assessment

The available crash data was obtained from the TfNSW crash and casualty website (Crash and causality statistics - LGA view', 2021) (see Figure 10). The data incorporated was from the period 2016 to 2020.

The data shows that there were four crashes near the proposal site during this period. The crashes are summarised in Table 19 below.

TABLE 19: CRASHES NEAR THE PROPOSAL SITE

Location	Year	Degree of crash	Road user movement	No. killed	No. injured	Crash ID
Narwonah Road	2017	Fatal	Off road left—Object	1	1	1158522
Narwonah Road	2018	Serious Injury	Off road right—Object	0	1	1187879

Location	Year	Degree of crash	Road user movement	No. killed	No. injured	Crash ID
The McGrane Way	2017	Non-casualty (towaway)	Struck animal	0	0	1155037
Tomingley Rd	2017	Serious Injury	Cross traffic (x-intersection)	0	3	1151920

6.6.3 Potential impact

The potential traffic and access impacts discussed in this subsection account for the impacts likely to be caused throughout construction, operation and (where appropriate) decommissioning of the proposed MDC.

Any impacts to and from traffic and access during construction and operation would be insignificant based on the assessments outlined in the below section. This is because most of the deliveries will be via rail. Any amendments to delivery transportation methods and number of vehicles assumed should be reassessed.

Traffic impacts

Construction

It is anticipated that 10 daily light vehicle and 22 heavy vehicle (including two minibuses) movements will be generated during the peak phase of construction.

Based on the traffic surveys undertaken in November 2020 along Tullamore Road and Tomingley Road, 65 per cent of the total traffic access the location of the proposal site through the McGrane Way and 35 per cent of the total traffic use Tomingley Road. Using this data, the additional number of vehicles expected to be generated by the proposed MDC via Craigie Lea Lane and the two major roads during the AM peak, is calculated as follows:

- ▶ The McGrane Way—additional 21 vehicles (7 light vehicles and 14 heavy vehicles) daily
- ▶ Tomingley Road—additional 11 vehicles (3 light vehicles and 8 heavy vehicles) daily.

Operation

It is anticipated that up to 10 light vehicles and up to 8 heavy vehicles (including minibuses) will be generated daily during the peak phase of operation.

Using the same vehicle distribution ratio as for the construction period, i.e. traffic to the proposal site will be 65 per cent via The McGrane Way and 35 per cent through Tomingley Road, the additional number of vehicles expected to be generated by the proposed MDC during operation, turning in and out of Craigie Lea Lane during the AM peak to the two major roads, is outlined below:

- ▶ The McGrane Way—additional 14 vehicles (7 light vehicles and 7 heavy vehicles) daily
- ▶ Tomingley Road—additional 6 vehicles (3 light vehicles and 3 heavy vehicles) daily.

The increase in vehicle numbers calculated to be generated throughout construction and operation is not expected to have a significant impact on traffic operation; however, a revised traffic impact assessment must be undertaken if the number of vehicles accessing the site increases and or the origin/destination of the vehicles change.

Intersection impacts

A conservative growth rate for rural roads of 3 per cent (compound) has been adopted and applied to the base 2020 traffic volumes to estimate the traffic volumes along the McGrane Way and Tomingley Road during the construction, operation and decommissioning phases of the MDC. Figure 11 and Figure 12 illustrate the volumes based on this growth rate.

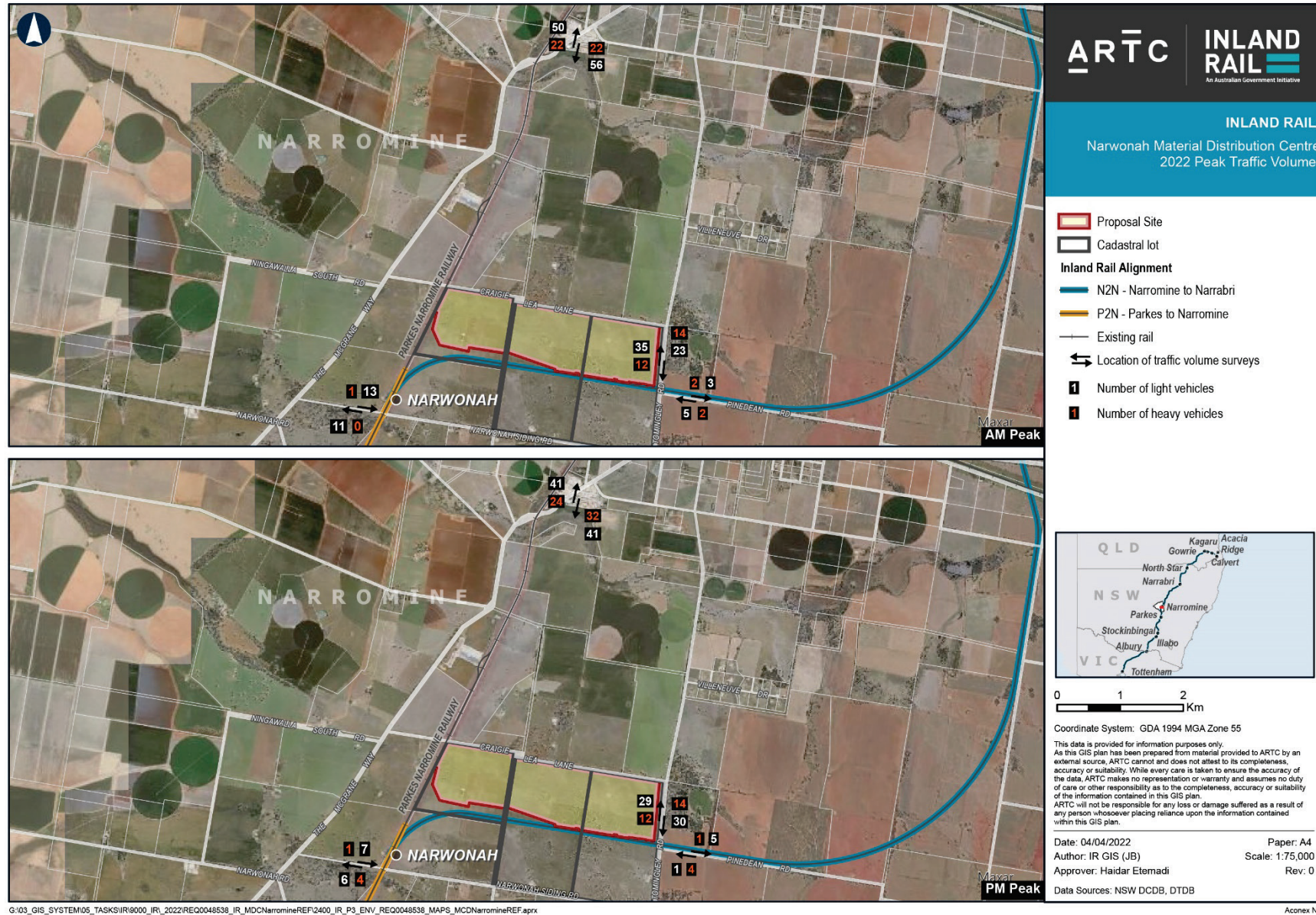


FIGURE 11: 2022 PEAK TRAFFIC VOLUME

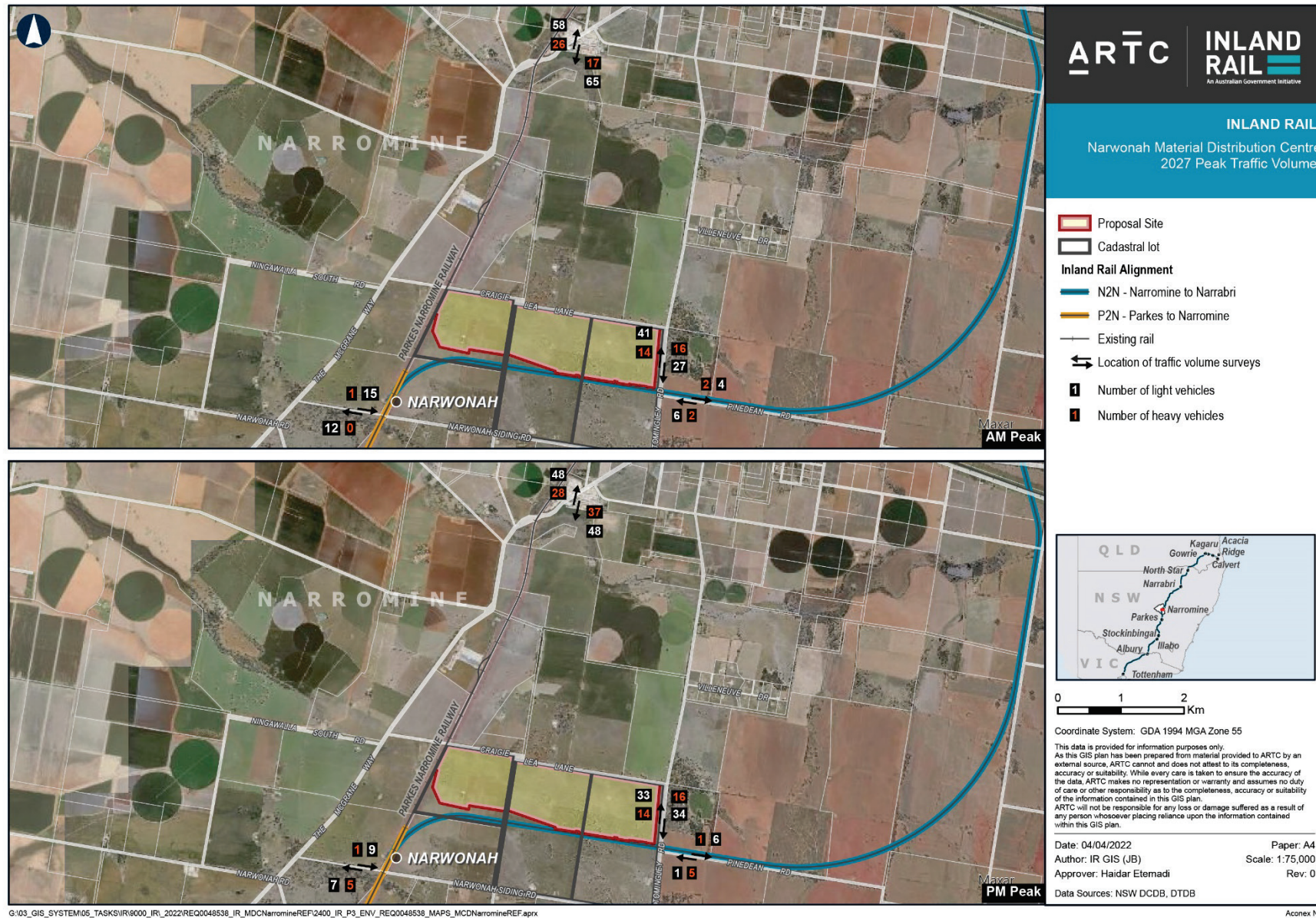


FIGURE 12: 2027 PEAK TRAFFIC VOLUME

Based on the traffic growth rates and the expected number of vehicles accessing the site during construction and operation, the following intersections would require rural basic right-turn (BAR) and basic left-turn (BAL) as per Part 6 of the *Austrroads Guide to Traffic Management* (Austrroads, 2020a) (see Figure 13 and Figure 14):

- ▶ McGrane Way/Craigie Lea Lane intersection
- ▶ Tomingley Road/Craigie Lea Lane intersection

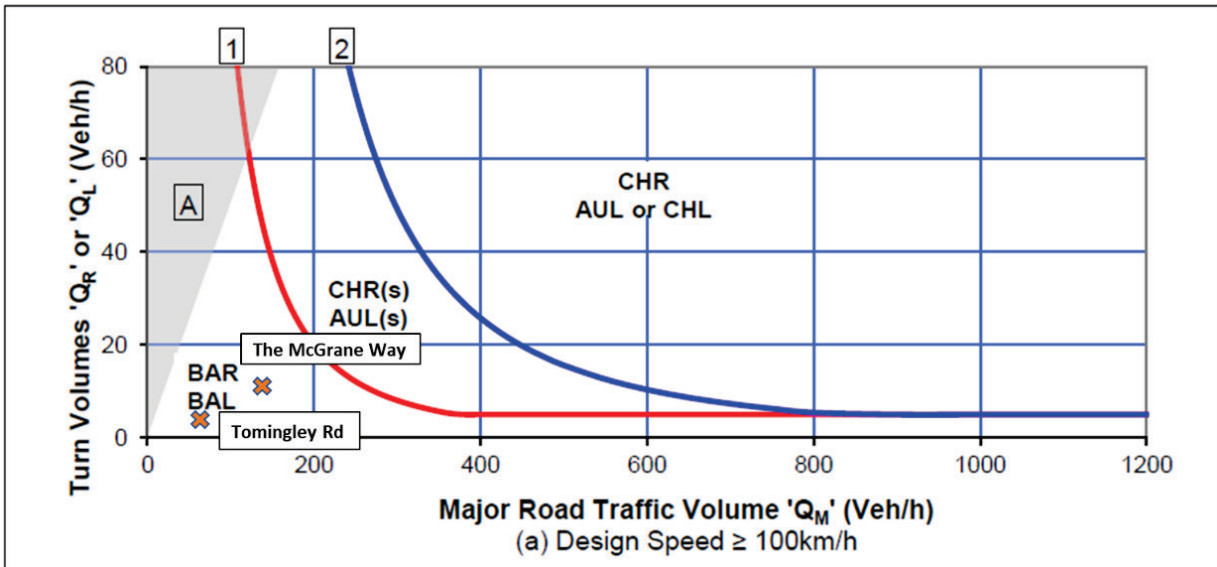


FIGURE 13: TURN TREATMENTS FOR THE CRAIGIE LEA LANE INTERSECTIONS DURING CONSTRUCTION (SOURCE: FIGURE 3.25, AUSTRROADS GUIDE TO TRAFFIC MANAGEMENT)

If, during construction, the number of turning volumes is increased to 40 vehicles per hour, and/or peak traffic volume along The McGrane Way is increased to approximately 225 vehicles per hour, The McGrane Way/Craigie Lea Lane intersection would require upgrades to a channelised right turn lane (CHR) and an auxiliary left turn lane (AUL).

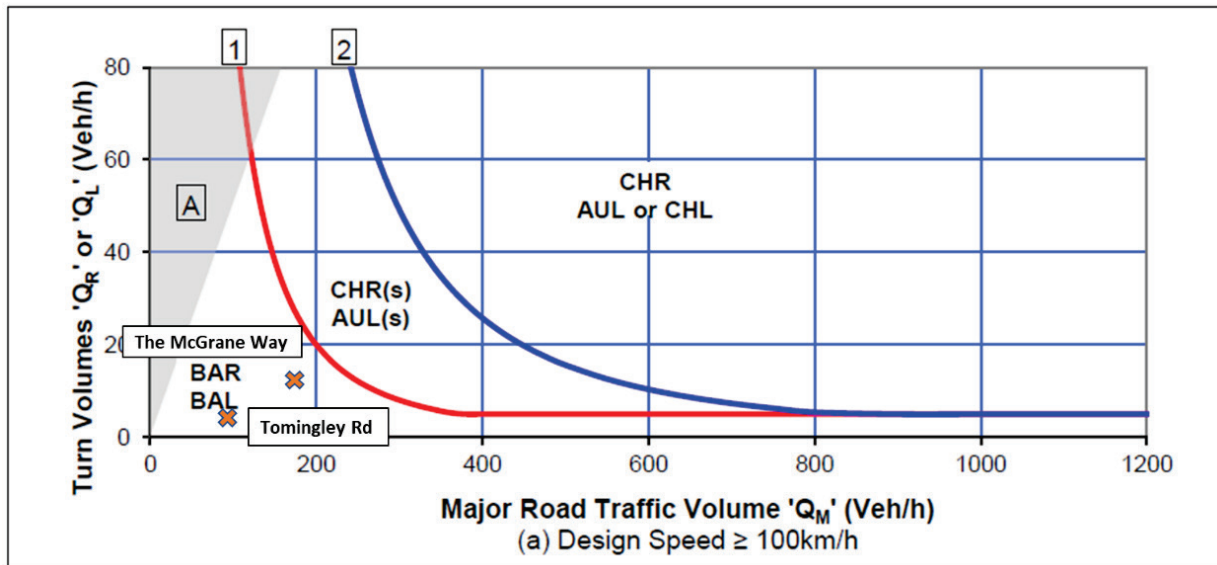


FIGURE 14: TREATMENTS FOR THE CRAIGIE LEA LANE INTERSECTIONS DURING OPERATION (SOURCE: FIGURE 3.25, AUSTRROADS GUIDE TO TRAFFIC MANAGEMENT)

The McGrane Way/Craigie Lea Lane intersection would require upgrades to a CHR and an AUL once the MDC is operational if the number of turning volumes is increased to approximately 25 vehicles per hour and/or peak traffic volume along The McGrane Way is increased to approximately 210 per hour.

Similarly, the Tomingley Road/Craigie Lea Lane intersection would require an upgrade if there were an increase in the number of vehicles turning in and out of Craigie Lea Lane and/or the number of vehicles along Tomingley Way.

An updated intersection analysis is recommended where there is a change to the number of vehicles generated during construction, the origin/destination of vehicles, and construction duration when compared with the numbers provided in this REF.

Pavement impacts

Minimal pavement impacts are expected during construction and operation based on the number of additional heavy vehicles that will be travelling along both roads and other major roads. Particularly for Craigie Lea Lane, which is currently an unsealed single-lane road and likely to be used as an access point to the proposal site.

6.6.4 Mitigation and management measures

Mitigation and management measures are based on the current design of the proposed MDC. Refinements based on the final design of the MDC, such as the final construction and operation locations within the proposal site, may be necessary.

Table 20 lists the mitigation and management measures that will be implemented during the construction, operation and (where appropriate) decommissioning of the proposed MDC to minimise impacts to and from traffic and access.

TABLE 20: TRAFFIC AND ACCESS CONTROL MEASURES

Control measures	Proposed MDC phase
<p>A Traffic Impacts Assessment (TIA) will be undertaken during detailed design, which should address the following issues and all relevant matters in accordance with the Austroads <i>Guide to Traffic Management Part 12</i> (Austroads, 2020b) and <i>Guide to Traffic Generating Developments 2002</i> (Roads and Traffic Authority (RTA), 2002):</p> <ul style="list-style-type: none"> ▶ traffic generation assessment with reference to <i>RTA Guide to Traffic Generating Developments</i> in order to determine traffic generation associated with the MDC ▶ reference <i>Guide to Traffic Management Part 6</i> (Austroads, 2020c) warrants for turning treatments. Swept path diagrams are to be provided to demonstrate the following: <ul style="list-style-type: none"> ▶ the proposed direction or directions of access and egress to and from the proposal site ▶ all vehicles can enter and exit the proposal site in a forward direction ▶ the design vehicle can access the proposal site and will not result in adverse impacts to The McGrane Way or Tomingley Road ▶ the width of the driveways are adequate to accommodate the swept path of the largest vehicle required to access the proposal site ▶ the software, AutoTurn Pro 10.2 is to be used to depict the vehicle swept paths. The parameters used to generate the swept path diagrams are to be noted on the plans ▶ an assessment of the type of intersection design required for access and egress points to and from classified roads, either directly or preferably via local roads. Safe Intersection Sight Distance (SISD) in accordance with the Austroads <i>Guide to Road Design</i> is to be provided at these access/egress points ▶ confirmation that the proposed design vehicle is legally able to access Craigie Lea Lane and Narwonah Siding Road ▶ any proposed signage may be subject to <i>State Environmental Planning Policy (Industry and Employment) 2021</i> and the <i>Transport Corridor Outdoor Advertising and Signage Guidelines</i> (Department of Planning and Environment (DPE), 2017). Referral to TfNSW may be required subject to clause 3.15 and 3.16 of the SEPP. 	Design and Pre-construction
The McGrane Way /Craigie Lea Lane and Tomingley Road/Craigie Lean Lane intersection treatment will be determined based on final detailed design.	Design and Pre-construction
Detailed design would consider the pavement impact assessment by carrying out a SIDRA Analysis of intersections subject to potential impacts.	Design and Pre-construction
A dilapidation survey should be undertaken of the made public roads within the proposed haulage routes, prior to and following completion of construction, and provided to the relevant road authority.	Design and Pre-construction
Detailed design would aim to minimise the potential for impacts to the surrounding road and transport network, and property access.	Design and Pre-construction
A Traffic Management Plan (TMP) will be prepared for the proposal as part of the CEMP, in consultation with council.	Design and Pre-construction
Temporary diversions and closures of existing rail and road traffic would be undertaken in consultation with relevant stakeholders, and alternative arrangements would be provided as required.	Construction and Operation

6.7 Land use and property

6.7.1 Assessment methodology

The assessment of land use and property impacts involved:

- ▶ reviewing existing technical assessments undertaken as part of the N2N EIS, including database reviews and background research
- ▶ reviewing relevant desktop information on land use within and surrounding the proposal site, including aerial imagery, zoning and land use maps, native title claims, Crown lands, mineral and petroleum exploration licences, travelling stock routes, road, etc.
- ▶ identifying properties surrounding the proposal site
- ▶ observing the proposal site and surrounding land during site visits
- ▶ recommending management and mitigation measures to minimise impacts on land use and property during construction, operation and (where appropriate) decommissioning of the proposed MDC.

6.7.2 Existing environment

The proposal site is located on four properties, including Lot 16 DP755131, Lot 1 DP1198931, Lot 232 DP755131 and Lot 233 DP755131, all of which is wholly owned by ARTC and is currently unencumbered by any lease or licence to any third party. The proposed subdivision as part of this proposal is planned to combine and reconfigure these lots with the inclusion of Lot 17 DP755131 (i.e. five individual lots) to create two lots, as illustrated in Figure 2: Lot A (476.15 ha) and Lot B (558.05 ha).

The proposal site and the surrounding land the has been used for primary production purposes, predominately grazing and cropping, for an extended period of time (Figure 15). The proposal site is zoned RU1 (Primary production) and is adjacent to a railway line that is zoned SP2 (Infrastructure) in the Narromine LEP 2011. The road network within the proposal site consists mainly of local roads, and informal and unsealed roads.

The proposal site is surrounded by a total of 44 residential properties in addition to several non-residential properties within a 5 km radius. The nearest residential property that is a sensitive receiver is located approximately 170 m to the north of the proposal site.

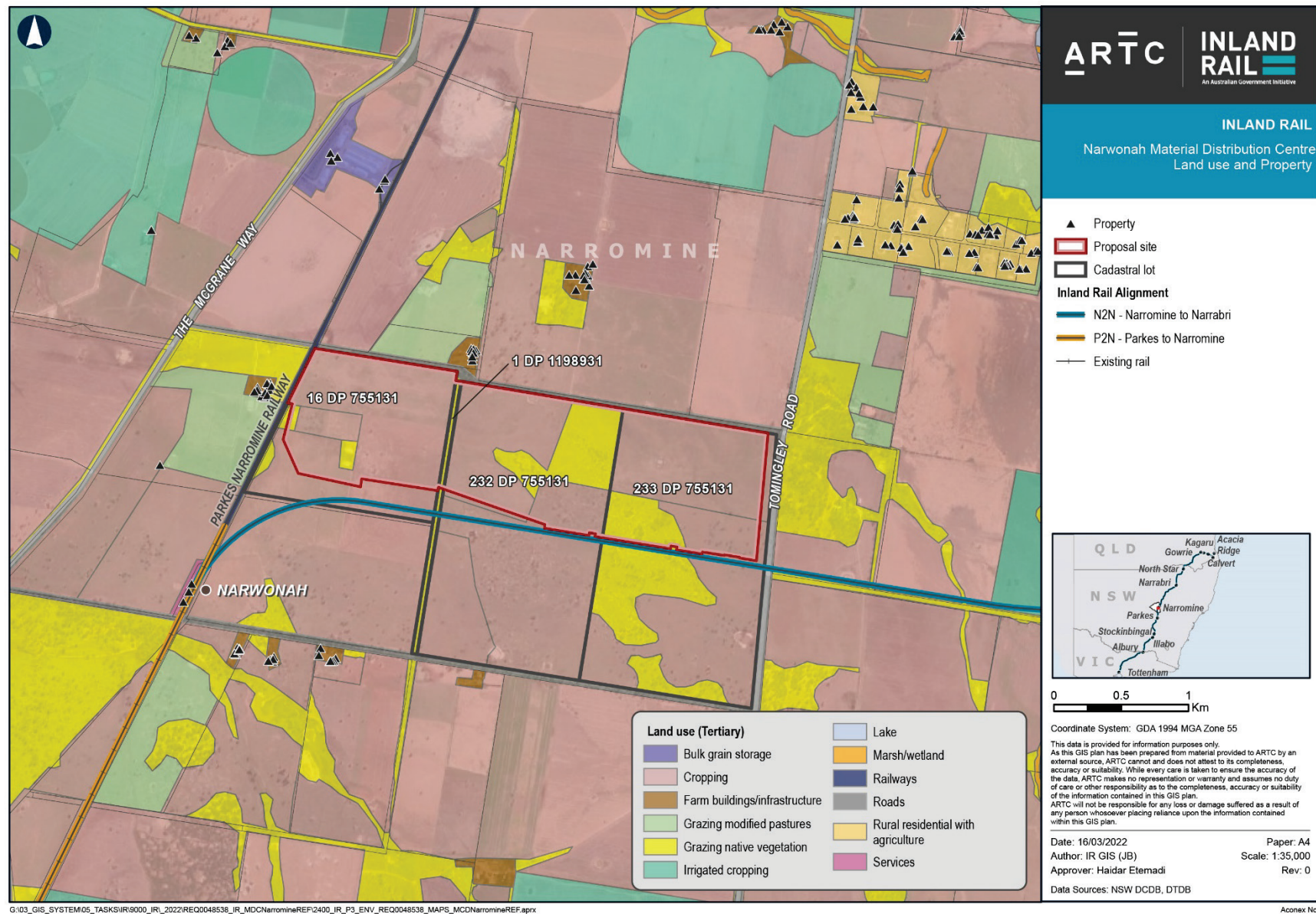


FIGURE 15: LAND USE AND PROPERTY

6.7.3 Potential impact

The potential land use and property impacts discussed in this subsection account for the impacts likely to be caused throughout construction, operation and (where appropriate) decommissioning of the proposed MDC.

Impacts to land use within the proposal site during the construction and operation of the MDC would be associated with a temporary change in land use from rural to rail operations, construction work site, material storage and laydown. Changes in land use would be managed with the mitigation measures outlined in this REF.

The subdivision does not alter the current land use; however, it supports the current use by allowing the MDC to be located primarily on a single lot. The subdivision may also facilitate the ongoing use of the proposal site post the decommissioning of the MDC or once its purpose for Inland Rail has been fulfilled, through providing flexibility in the future and ongoing use of the proposal site. The effects of the future land use of the proposed two lots has not been assessed as part of this REF and must be assessed by the future user.

As the proposed subdivision does not alter the current land use of the existing area during the lifespan of the MDC, impacts to the environment or the various environmental aspects are not expected and, therefore, have not been considered further as part of this REF or within supporting technical reports, except insofar as the subdivision facilitates the use of the proposal site for the MDC and allows unspecified future uses.

In accordance with the Narramine LEP, the proposed two lots will remain with the current minimum lot size for the land within the existing zone, which is 400 ha.

There are no private properties located within the proposal site. Potential impacts are expected to nearby residential properties throughout the construction and operation of the proposed MDC as result of increased noise (section 6.2), minor changes to air quality (section 6.5) and visual amenity (section 6.9). Potential impacts to nearby properties will be mitigated and managed as outlined in the relevant sections of this REF.

6.7.4 Mitigation and management measures

Mitigation and management measures are based on the current design of the proposed MDC. Refinements based on the final design of the MDC, such as the final construction and operation locations within the proposal site, may be necessary.

Table 21 lists the mitigation and management measure that will be implemented during the construction, operation and (where appropriate) decommissioning of the proposed MDC to minimise impacts to land use and property.

TABLE 21: LAND USE AND PROPERTY CONTROL MEASURES

Control measures	Proposed MDC phase
Access to the construction area for stock, as well as non-construction related vehicles and people would be restricted via fencing and other measures.	Design and Pre-Construction
Fencing will be provided in accordance with the Inland Rail fencing standards applicable to the adjacent land use and be constructed prior to the removal of existing fencing or any works being carried out on the subject land, unless otherwise agreed with the landowner.	Design and Pre-Construction
If required, land for the construction of the works would be acquired in accordance with the requirements of the relevant state land acquisition legislation, including the <i>Land Acquisition (Just Terms Compensation) Act 1991</i> (NSW).	Design and Pre-Construction
Property owners, tenants and occupants would be consulted to ensure they are informed about the timing and scope of activities in their area and any potential property impacts/changes, particularly in relation to potential impacts to access, services, or farm operational arrangements.	Design and Pre-Construction

6.8 Socio-economic

6.8.1 Assessment methodology

The community and socio-economic assessment methodology involved:

- ▶ undertaking a desktop review of the Australian Bureau of Statistics' (ABS) Census Quick Stats (ABS, 2016) and publicly available information on local community structure and patterns
- ▶ reviewing the overarching stakeholder engagement tasks undertaken by ARTC to help identify key community concerns
- ▶ considering the potential socio-economic impacts and opportunities, including workforce, community, local supply and business during the operation and construction of the proposed MDC
- ▶ recommending management and mitigation measures to minimise impacts on the local community during construction, operation and (where appropriate) decommissioning of the proposed MDC.

6.8.2 Existing environment

The proposal site is located within the Narromine LGA, located in the Central West and Orana region, and spans an area of about 5,200 km².

At the 2016 census, the LGA had a population of 6,444 people. Narromine is the main town in the LGA, with a population of 3,528 people (about 55 per cent of the LGA's residents). The town is located on the Mitchell Highway adjacent to the Macquarie River and about 10 km north of the proposal site. Other villages in the LGA include Trangie and Tomingley.

The median age of people in the LGA was 42 years. Children aged 0–14 years made up 21.4% of the population and people aged 65 years and over made up 21.1% of the population. Aboriginal and/or Torres Strait Islander people made up 19.9% of the population.

Of the employed people in the LGA, 7.5% worked in Other Grain Growing. Other major industries of employment included Grain-Sheep or Grain-Beef Cattle Farming 3.6%, Primary Education 3.6%, Hospitals (except Psychiatric Hospitals) 3.5% and Sheep Farming (Specialised) 3.3%.

Residents in the LGA value the strong sense of community, rural lifestyle, peaceful amenity, access to services and proximity to work and Dubbo. Aviation and sport play major roles in the culture of the Narromine community.

Community facilities within the LGA are mainly located in Narromine and include emergency services, a hospital and medical centre, several schools, and cultural facilities. Sport and recreation facilities include the Narromine Golf Club, Trangie and Narromine showgrounds, Narromine Aerodrome, Goobang National Park, the Bogan and Macquarie rivers, and state forests.

6.8.3 Potential impact

The potential socio-economic impacts or opportunities discussed in this subsection account for the impacts likely to be caused throughout construction, operation and (where appropriate) decommissioning of the proposed MDC.

Workforce

Approximately 100 personnel are anticipated onsite at any one time during the operation of the MDC and will be a mix of people working the yard (welding and material handling) and office-based logistics staff managing, coordinating and administering various operational aspects.

The MDC would require a variety of roles and skills during construction, including labourers, tradespeople, machinery operators, engineers, surveyors and site supervisors. Assuming there is no material change in labour market conditions.

It is expected that the local labour market would have the capacity to supply some of the workforce requirements for the MDC, which may have temporary and short-term impacts associated with labour draw from the local area. As a result of this tight labour supply market, and the need for specialist or expert skills for various tasks, the MDC may need to source some workers from outside the region.

The requirement for the temporary relocation of some workers may result in an increase in pressure on the availability of short-term or temporary accommodation (which may be exacerbated during harvest seasons).

It is not expected that the temporary relocation of workers to the local region would put significant pressure on existing community facilities, given the workforce requirements, the short-term nature of the proposed MDC, and capacity in community facilities in Narromine being a regional centre in the LGA.

Local supply and business

The proposed MDC will be sited on ARTC-owned land and would not require the acquisition or severance of land for its construction and operation. As a result, there are unlikely to be any impacts on local business or industry due to changes in land use or the viability of surrounding rural land.

ARTC has developed the Inland Rail Sustainable Procurement Policy which would ensure that local, regional and Indigenous businesses would have opportunities to supply the proposed MDC.

A portion of the materials may be supplied by local businesses subject to availability, which may include the supply of a range of construction materials. Additionally, there are several services that would potentially be sourced from within local or regional communities, including plant hire (wet and dry hire), truck/tipper hire, electrical installations (excluding rail systems) and instrumentation, landscaping, waste disposal services, trade services, professional services (e.g. human resources and labour provision) and community adaption to the rail corridor (e.g. community and economic development services).

The MDC's local supply arrangements would be tailored to support local business and industry where practicable.

Community

Health and wellbeing

The construction and operation of the proposed MDC is not predicted to have a significant impact on the health and wellbeing of the community. There may be some temporary disruption and nuisance as a result of noise, dust and traffic impacts at the nearest receivers or for road users of the McGrane Way, Tomingley Road and Craigie Lea Lane; however, these impacts would be short-term and temporary in nature and would be managed to mitigate their impacts (see sections 6.2: Noise and vibration, 6.5: Air quality and 6.6: Traffic and access).

Amenity (noise, air quality and visual amenity)

The proposed MDC would result in nearby residents experiencing an increase in noise due to its construction and operation. The main sources of noise at the proposal site would be generated from general construction work, and operational activities, including grinding and sandblasting, as part of rail preparation. Residents surrounding the proposal site are likely to be impacted by construction and operation noise (see section 6.2).

The proposed MDC would generate dust and exhaust emissions through construction and operation. Given the distance of the nearest residential properties (nearest being approximately 170 m from the site), the unsealed road conditions, train and road vehicle movements, and the nature of the proposed activities, the risk of amenity and nuisance impacting human health is low and not significant (see section 6.5).

Visual amenity impacts are expected, particularly to the nearby properties surrounding the proposal site who would have visibility of the MDC. Landscape impacts are measured to be low to moderate as the character of the landscape would temporarily change from an agricultural open plain to a temporary construction facility (see section 6.9)

Accessibility

The construction and operation of the proposed MDC would not result in any impacts to the accessibility of nearby properties or to local public transport. Road users and local residents would experience an increase in traffic during construction and potentially during operation (see section 6.6).

6.8.4 Mitigation and management measures

Mitigation and management measures are based on the current design of the proposed MDC. Refinements based on the final design of the MDC, such as the final construction and operation locations within the proposal site, may be necessary.

Table 22 lists the measures that would be implemented during the construction, operation and (where appropriate) decommissioning of the proposed MDC to minimise impacts on the local community. Control measures listed under sections 6.2: Noise and vibration, 6.5: Air quality and 6.6: Traffic and access would also act as socio-economic control measures.

TABLE 22: SOCIO-ECONOMIC CONTROL MEASURES

Control measures	Proposed MDC phase
ARTC would continue to manage and deliver Program-wide community and stakeholder engagement for Inland Rail in accordance with the Inland Rail Communications and Engagement Strategy.	Design/Pre-construction
The CEMP would define the requirements for the complaints management system to be implemented during construction.	Design/Pre-construction
The project will include measures to ensure ongoing consultation with local emergency services providers to inform them about the locations of level crossings, and changes to access routes and road conditions.	Design/Pre-construction
To manage the implementation of the proposed socio-economic mitigation measures, contractual mechanisms will be put in place, and specific management action and targets will be developed, in response to these measures.	Design/Pre-construction
ARTC would continue to support local employment in accordance with the <i>Australian Jobs Act 2013</i> (Cth) and Australian Industry Participation National Framework, and through the Inland Rail Academy, to leverage training programs, upskill residents and young people, and connect businesses with Inland Rail opportunities and key regional industries.	Design/Pre-construction
Key stakeholders (including local councils, emergency service providers, public transport providers, the general community, and surrounding landowners/occupants) would continue to be consulted in accordance with the Engagement Implementation Plan.	Design and Pre-Construction/Construction

Control measures	Proposed MDC phase
A temporary workforce accommodation plan would be prepared to guide the design and provision of temporary accommodation. The plan would be developed in accordance with ARTC's Inland Rail Program Accommodation Principles, relevant council development codes and guidelines.	Design/Pre-construction
Residents, landholders, landowners, businesses, affected social and recreation facilities and other relevant stakeholders would be notified before work starts, in accordance with the communication management plan, and be regularly informed of construction activities.	Construction/operation
Complaints during construction would be managed in accordance with the complaints management system defined by the communication management plan.	Construction/operation

6.9 Landscape character and visual amenity

6.9.1 Assessment methodology

The landscape and visual amenity assessment methodology involved:

- ▶ undertaking a desktop review of the existing environment
- ▶ undertaking assessment as per the following guidance documents:
 - ▶ *Guidance Note for Landscape and Visual Assessment* (Australian Institute of Landscape Architects (AILA), 2018)
 - ▶ *Guideline for landscape character and visual impact assessment: Environmental impact assessment practice note EIA-N04* (TfNSW, 2020)
- ▶ identifying sensitive receivers and or sensitive locations surrounding the proposal site
- ▶ desktop landscape character and visual appraisal based on the themes of magnitude and sensitivity (see Table 23), to determine the level of impacts for landscape character and the representative viewpoints
- ▶ recommending management and mitigation measures to minimise impacts on the local community during construction, operation and (where appropriate) decommissioning of the proposed MDC.

TABLE 23: IMPACT LEVELS

		MAGNITUDE			
		High	Moderate	Low	Negligible
SENSITIVITY	High	High Impact	High–Moderate	Moderate	Negligible
	Moderate	High–Moderate	Moderate	Moderate–Low	Negligible
	Low	Moderate	Moderate–Low	Low Impact	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

Landscape character appraisal

Landscape character is defined as a distinct, recognisable or consistent pattern of elements in the landscape. It is the pattern of elements that can give an area a distinct sense of place, making one area unique or different from another.

Sensitivity

The sensitivity of a landscape refers to the inherent and intrinsic characteristics and values, and the degree to which it can accommodate change. See Table 24 for an indication on the attributes that inform the appraisal of landscape sensitivity.

TABLE 24: SENSITIVITY LEVELS FOR LANDSCAPE

Sensitivity	Description
High	<p>Examples may include:</p> <ul style="list-style-type: none"> ▶ likely to be protected by national designation (such as a national park) and/or widely acknowledged for its quality and value ▶ likely to contain features and elements that are rare and could not be replaced ▶ a landscape with low capacity to accommodate the type of change envisaged.
Moderate	<p>Examples may include:</p> <ul style="list-style-type: none"> ▶ perhaps a regionally or locally important landscape and/or protected by a regional designation ▶ likely to contain some features and elements that could not be replaced ▶ where its character, land use, pattern and scale may have some capacity to accommodate a degree of the type of change envisaged.
Low	<p>Examples may include:</p> <ul style="list-style-type: none"> ▶ likely to contain few, if any, features and elements that could not be replaced ▶ a landscape valued to a limited extent, perhaps at a local level ▶ where its character, land use, pattern and scale is likely to have the capacity to accommodate the type of change envisaged.
Negligible	<p>Examples may include:</p> <ul style="list-style-type: none"> ▶ a landscape that is not valued for its scenic quality ▶ comprised of some features and elements that are discordant, derelict or in decline, resulting in indistinct character with little or no sense of place where its character, existing land use, pattern and scale are tolerant of the type of change envisaged, and the landscape has capacity to accommodate change.

Magnitude

Magnitude of change refers to the scale, nature and duration of change that is anticipated. Refer to Table 25 for typical examples that inform the appraisal of landscape magnitude of change.

TABLE 25: MAGNITUDE OF CHANGE FOR LANDSCAPE

Sensitivity	Description
High	Dominant, large-scale change to existing character or distinctive features and elements, and/or the addition of new features or elements, which is likely to fundamentally change the character of the landscape.
Moderate	Considerable or noticeable change to existing character or distinctive features or elements, and/or the addition of new features or elements that are uncharacteristic.
Low	Perceptible change that would not alter the overall balance of features and elements within the landscape.
Negligible	Barely perceptible change with no noticeable loss or improvement to the existing character.

Visual appraisal

The visual amenity of an area broadly refers to how potential viewers respond to or value a particular landscape.

Sensitivity

The sensitivity of a representative viewpoint is influenced by location, context and the importance of the viewer, together with the value placed on the locations by the community, or by legislation or policy. See Table 26 for typical examples that inform the appraisal of visual sensitivity.

TABLE 26: VISUAL SENSITIVITY LEVELS

Sensitivity	Description
High	<p>Examples may include:</p> <ul style="list-style-type: none"> ▶ large numbers of residential properties or viewers ▶ users of public footpaths or other recreational trails (e.g. national trails) ▶ users of recreational facilities where the purpose of that recreation is the enjoyment of the landscape (e.g. national parks and designated scenic lookouts).
Moderate	<p>Examples may include:</p> <ul style="list-style-type: none"> ▶ outdoor works ▶ users of scenic roads, railway corridors or waterways ▶ schools and other institutional buildings and their outdoor areas.
Low	<p>Examples may include:</p> <ul style="list-style-type: none"> ▶ indoor workers ▶ users of main roads or arterial roads ▶ users of recreational facilities where the purpose of that recreation is not related to the views ▶ low number of residential properties.
Negligible	<p>Examples may include:</p> <ul style="list-style-type: none"> ▶ limited numbers of viewers or infrequently accessed viewpoints ▶ limited interest in their surroundings ▶ users of minor roads and views from the air.

Magnitude

The magnitude of change considers the degree of change that the representative viewpoint will experience. It considers the nature, scale and duration of the change. See Table 27 for an indication on the attributes that inform the appraisal of visual magnitude of change.

TABLE 27: VISUAL MAGNITUDE OF CHANGE

Sensitivity	Description
High	The proposed MDC, or part of it, would become the dominant feature or focal point of the view.
Moderate	The proposed MDC, or part of it, would form a noticeable feature or element of the view that is readily apparent.
Low	The proposed MDC, or part of it, would be perceptible but not alter the overall balance of features and elements that comprise the existing view.
Negligible	Only a very small part of the proposed MDC would be discernible, or it is at such a distance that it would form a barely noticeable feature or element of the view.

6.9.2 Existing environment

Landscape character

The landscape is characteristic of the flat expanse of undefined markers or points of interest. There are occasional trees that offer limited distinction, with occasional tree lines providing some demarcation of roads and other boundaries. The expanse of the area dominates to provide a strong sense of continuity over a large distance that is only interrupted by low hills in the distance. There is a regularity and uniformity in the landscape at scale, which is only punctuated by occasional trees and strands. Overall, the landscape offers limited character locally but, rather, it creates one uniform character zone representative of its agricultural use, with occasional isolated farm buildings offering another form of relief.

This means the landscape character is of *low* sensitivity.

Visual

Visual receptors broadly consist of users of local roads and farmsteads that intermittently line Craigie Lea Lane to the north and Narwonah Siding Road to the south. Views from the farmsteads are consistent of open, agricultural plains and scattered trees, with rising terrain marking the horizon in the distance. These views are occasionally filtered by property boundary vegetation.

The landscape and landform create a large zone of visual influence (e.g. the theoretical extent from where the MDC would be visible). Despite this, there are only a limited number of viewpoints in the area that would be potentially impacted by the proposal, which are represented below in the four viewpoints. All four of *low* sensitivity.

TABLE 28: VIEWPOINT IMAGE, DESCRIPTION AND PLAN LOCATION NUMBER

Plan location number (see Figure 16)	Viewpoint and image description
1	 <p><i>View east from Craigie Lea Lane access gate</i></p>
1	 <p><i>View south along existing tree line</i></p>
2	 <p><i>View looking north-west of paddock to east of rail corridor</i></p>
3	 <p><i>View south from Craigie Lea Lane centre of property</i></p>

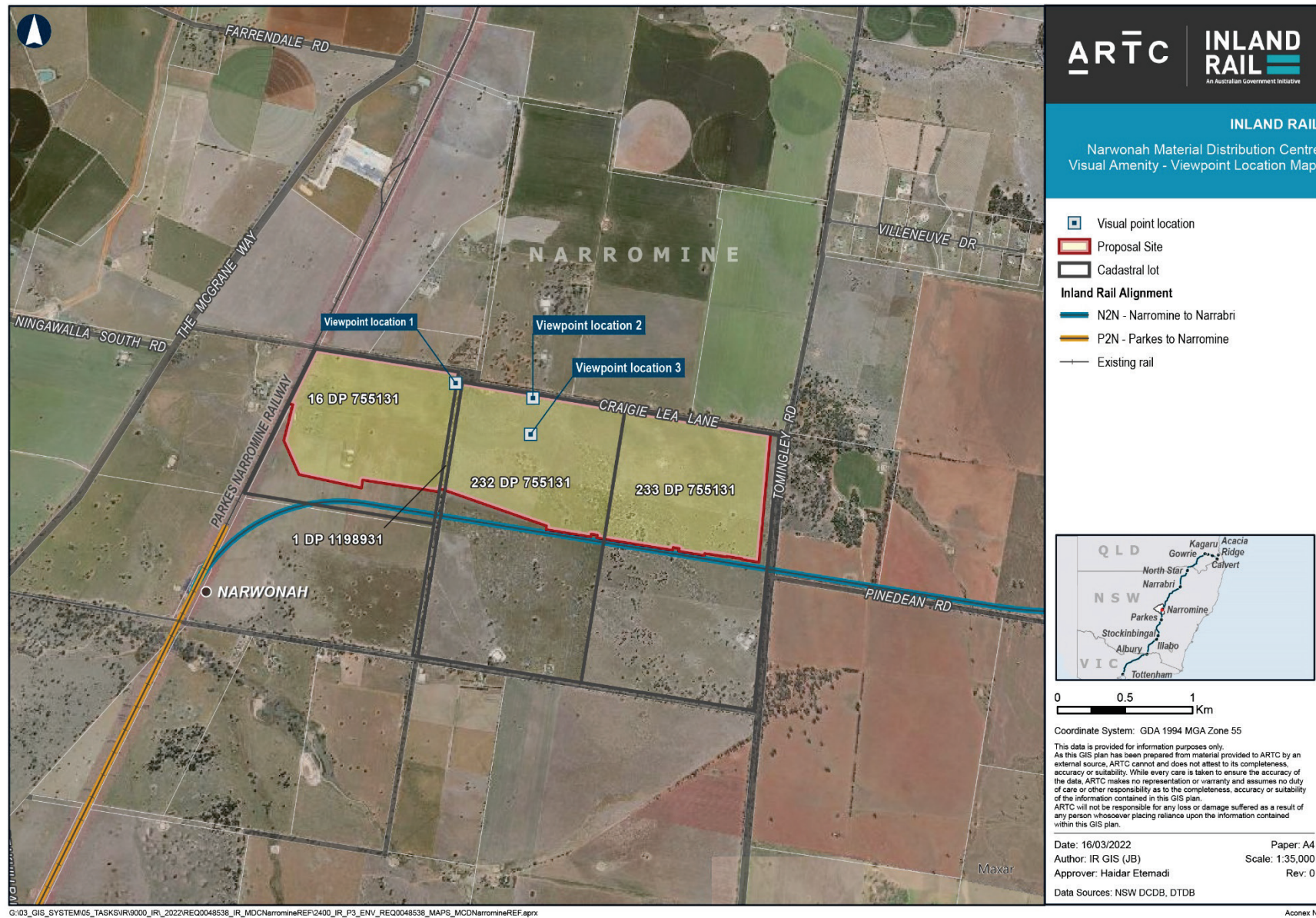


FIGURE 16: VIEWPOINT LOCATIONS

6.9.3 Potential impact

The potential impacts to landscape character and visually amenity discussed in this subsection account for the impacts likely to be caused throughout construction, operation and (where appropriate) decommissioning of the proposed MDC.

Landscape character

The proposed layout seeks to minimise impacts on existing landscape features; however, to facilitate the current concept layout, removal of vegetation would be required to facilitate the construction of the access road widening, and the laydown and storage areas.

Despite this, the MDC would be introduced into an area that is characterised by its scale and openness. This means the MDC would be a component of the landscape but it would not come to dominate or distance it from its features. Therefore, the area would come to retain its agricultural character overall but, close to the MDC, this may be disrupted depending on the final design and form of the proposal. Therefore, there would be a perceptible change in the landscape from introducing the MDC but it would not affect the overall character of the landscape. For this reason, the change is assessed to result in a **low to moderate** adverse impact on landscape character.

Visual

Properties situated to the north of Craigie Lea Lane would experience south elevation views to large ballast laydown. Based on the current conceptual plan, topsoil bunds have been positioned to the north of the ballast laydown to reduce noise impacts and screen views towards machinery and construction movements during operation. Properties situated to the south of Craigie Lea Lane and to the west of the Parkes Narromine Railway would experience east elevation views towards the proposed office and amenities, with the laydown area evident in views further to the east.

Properties situated to the south of Narwonah Siding Road would experience views towards storage facilities backed by ballast laydown. Equipment machinery and movement are anticipated to be evident in these views for the duration of the works.

The visual impacts will vary throughout the operational phase of the MDC depending on the staging of the construction works; however, the presence of equipment machinery and material storage are likely to be evident through the duration. Aspects of the MDC will form a noticeable to dominant part of views from visual receptors with the potential to result in a moderate to high magnitude of change and a low to moderate visual impact.

6.9.4 Mitigation and management measures

Mitigation and management measures are based on the current design of the proposed MDC. Refinements based on the final design of the MDC, such as the final construction and operation locations within the proposal site, may be necessary.

Table 29 lists the measures that would be implemented during the construction, operation and (where appropriate) decommissioning of the proposed MDC to minimise impacts on the landscape character and visual amenity.

TABLE 29: LANDSCAPE CHARACTER AND VISUAL AMENITY CONTROL MEASURES

Control measures	Proposed MDC phase
A Landscape and Rehabilitation Strategy should be developed during the detailed design stage in line with the ARTC Landscape Strategy, Landscape Framework and the Landscape Specification.	Design/Pre-construction
Vegetation will be retained, where feasible, and supplemented with further planting to strengthen the existing screening value. This would be considered along Craigie Lea Lane, Narwonah Siding Road and to the east of Parkes Narromine Railway.	Design/Pre-construction
The detailed MDC layout would be refined so that, while not in use, construction machinery is stored in suitable locations to minimise views and disturbance.	Design/Pre-construction

6.10 Soil and contamination

6.10.1 Assessment methodology

The soil and contamination assessment methodology involved:

- ▶ reviewing existing technical assessments undertaken as part of the N2N EIS, including database reviews and background research
- ▶ reviewing the findings of existing geotechnical investigations carried out to support the MDC's engineering design (D&N Geotechnical Pty Ltd, 2022)

- ▶ reviewing relevant desktop information on land use within and surrounding the proposal site, including aerial imagery, zoning and land use maps, soils, geology and site investigations results such as geotechnical investigations
- ▶ undertaking searches of relevant databases, including:
 - ▶ NSW EPA's contaminated land record and record of notices
 - ▶ ARTC's contaminated site register
 - ▶ DPE's Acid Sulphate Soils (ASS) Risk Mapping
 - ▶ NSW DPI cattle dip site locators
 - ▶ Department of Defence's UXO Mapping Application
 - ▶ Per- and Polyfluoroalkyl substances (PFAS) investigation database
 - ▶ NSW governments' Naturally Occurring asbestos in NSW mapping
 - ▶ EPLs held under the POEO Act
- ▶ recommending management and mitigation measures to minimise impacts during construction, operation and (where appropriate) decommissioning of the proposed MDC.

6.10.2 Existing environment

Landform, geology and soils

The site surface is typically flat, with a gentle reduction in surface elevation of approximately 15 m towards the west, over a distance of about 3 km between the eastern and western site extents. The site surface currently is occupied by long grasses and occasional mature trees, most recently used for livestock grazing. Several minor surface dams are evident at the site. Review of the aerial imagery and initial site observations indicate that gilgai features are evident at the site.

Site soils are identified to be generally stable and are broadly characterised as moist silts with clays at depth (see Figure 17).

A desktop review was undertaken in 2022, which indicated that geological conditions across the site locality are variable, comprising colluvium and alluvium soils, underlain by sedimentary bedrock, at variable depths. The solid geology is expected to comprise of predominantly siltstone bedrock, of the Early Silurian Aged Cotton Formation. The below soils above the geology comprise units that are expected to occur at the site, formed through more recent transportation/deposition activities:

- ▶ Quaternary aged (Holocene epoch), unconsolidated Colluvium (associated with weathering and transportation/disposition of the regional parent geology)
- ▶ Tertiary aged (Pliocene epoch), unconsolidated Alluvium (sandy clayey SILT, containing minor white carbonate nodules associated with floodplain deposition as a back plain).

The geotechnical assessment carried out to support the MDC's engineering design identified a high-dispersion hazard for the site soils. The soil material is medium-to-high plasticity and the pH of soils range between 6.8 and 8.6 units.

Acid sulphate soils

A search of the Australian Soil Resource Information System and ASS risk map (CSIRO, 2016) indicated that the probability of occurrence of ASS is extremely low. No deep earthwork cuttings are proposed; on this basis, the potential for encountering acid sulfate rock during the construction of the MDC is low and has not been considered further.

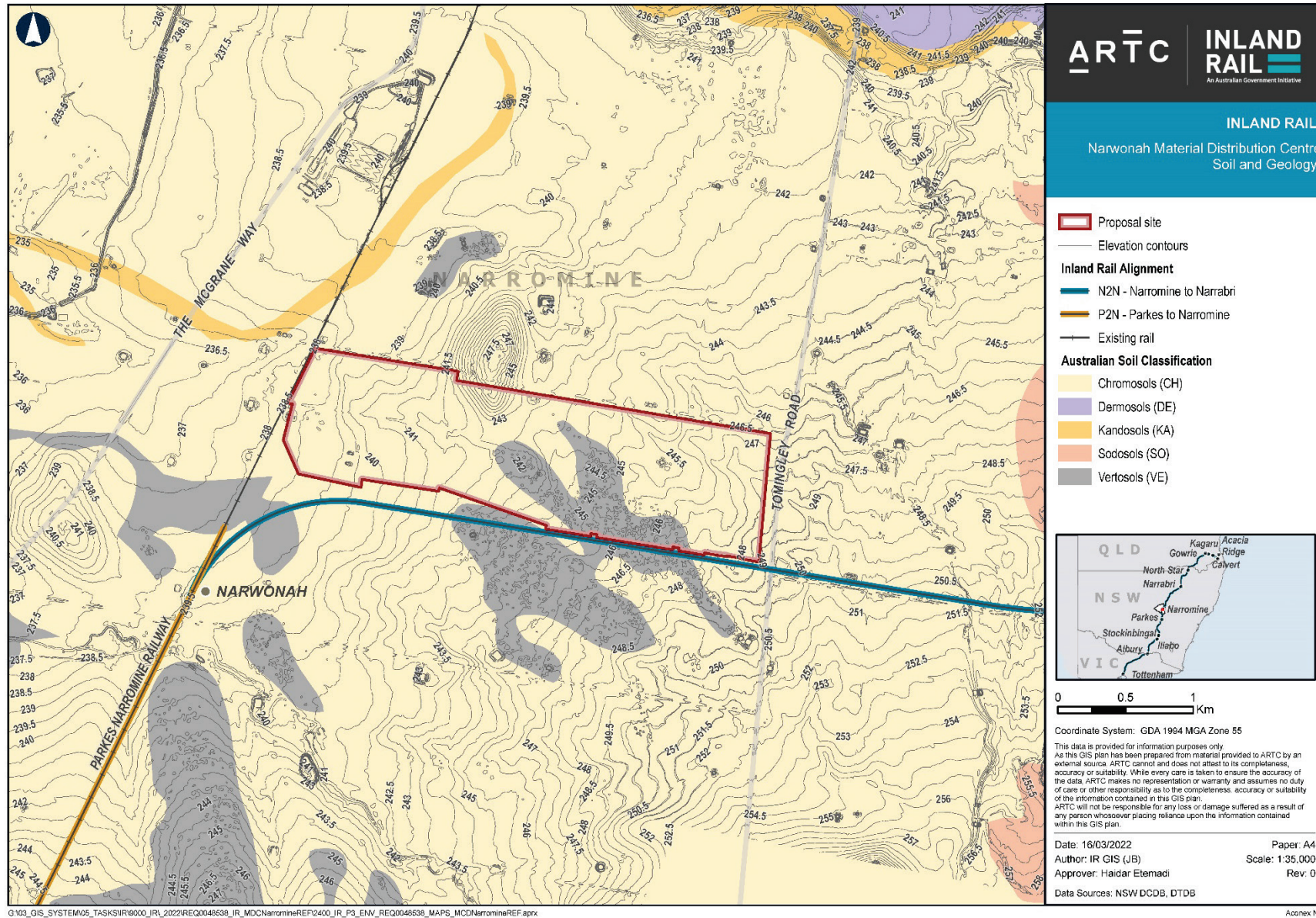


FIGURE 17: SOIL AND GEOLOGY

Contamination

The proposal site is not identified on the NSW EPA contaminated land records or listed in the following data bases:

- ▶ NSW EPA's contaminated land record (accessed 13 December 2021)
- ▶ NSW EPA's record of notices (accessed 13 December 2021)
- ▶ ARTC's contaminated site register (accessed 13 December 2021)
- ▶ DPE's Acid Sulphate Soils Risk mapping (accessed 13 December 2021)

The geotechnical assessment found on the proposal site that no areas of environmental concern have been identified and there has been no significant change to the livestock grazing land use from 1974 to 2022. Preliminary site investigation as part of this assessment found no evidence of soil contamination and assessed that there is a low potential risk from soil contamination to human health or environment on this site.

As part of the N2N EIS preliminary soil and contamination assessment, a total of three test pits and boreholes (TP2002, BH2001, BH-2-070) were identified near the proposal site. The analysis of soil samples found no visual or olfactory evidence of contamination in any of the test pits or boreholes.

Additionally, the proposal site does not contain the following:

- ▶ Sites that may be contaminated with PFAS based on the NSW Government PFAS Investigation Program (accessed 25 February 2022)
- ▶ Cattle dip structures are located based on site visits and a search of the NSW Department of Primary Industries cattle dip site locators (accessed 25 February 2022)
- ▶ Unexploded ordinance based on the Department of Defence's UXO Mapping Application (accessed 25 February 2022)
- ▶ Areas of naturally occurring asbestos based on NSW governments' *Naturally Occurring asbestos in NSW mapping* (accessed 25 February 2022)
- ▶ Current or previously held EPL.

Several existing land uses or areas within or near the proposal site have been identified as having a risk of contamination. These areas are listed in Table 30.

TABLE 30: PROPOSAL SITE AREAS WITH CONTAMINATION RISK

Land use and potential location	Potential contamination sources	Potential contaminations present
Degraded road surfaces potentially along the eastern side of the proposal site that is adjacent to Tomingley Road	Bitumen, asphalt or tar-based materials in degraded road surfaces that could impact adjacent surface soils and runoff. Contamination associated with degraded road surfaces is likely to be relatively isolated to surface soils and flow paths immediately underlying and surrounding existing roads.	Hydrocarbons (TRH, BTEX, PAH).
Agricultural activities throughout the proposal site	Contaminated soils and groundwater due to the use of agricultural chemicals, chemical storage (e.g. pesticides, fuels), disposal of farm wastes, livestock burial areas and livestock grazing; however, contamination is likely to be diffuse in nature (e.g. low-level pesticide use over large areas) or sporadic and localised.	Contaminants of concern could include heavy metals, hydrocarbons (TRH, BTEX), herbicides, pesticides and micro-biological organisms.
Existing railways and rail infrastructure traversing the western boundary of the proposal site	Contaminated surface soils and drainage paths adjacent to interchanges, intersections with existing roads and other stoppage points, due to leaks, brake pad use, etc. Contamination associated with existing railways and rail infrastructure is likely to be relatively isolated to the fill materials, ballast and surface soils immediately adjacent to existing infrastructure; however, the likelihood of encountering contamination at these locations is considered to be high.	Heavy metals, hydrocarbons (TRH, BTEX, PAH), herbicides, pesticides and asbestos.
Small farm dams throughout the proposal site	Contaminated sediments and water in dams due to use of agricultural chemicals and livestock grazing within the dam catchments. Contamination is likely to be isolated and it is unlikely that soils surrounding dams would be affected.	Heavy metals, hydrocarbons (TRH, BTEX), herbicides, pesticides and micro-biological organisms.

6.10.3 Potential impact

The potential soil and contamination impacts discussed in this subsection account for the impacts likely to be caused throughout construction, operation and (where appropriate) decommissioning of the proposed MDC.

Impact on soil

The proposed activities of the MDC may result in increased risk from erosion and sedimentation due to vehicle movement over existing unsealed access roads and in the vicinity of the proposed activities. Suitable erosion and sediment controls are to be implemented, as per Table 31 and section 7.

Contamination impact

Construction

The proposal site is not located within known contaminated sites based on available information. Therefore, the construction works are unlikely to encounter any significant pre-existing contamination, including throughout site establishment activities where there will be ground disturbance; however, the risk on contamination migration exists throughout the construction phase.

Additionally, the geotechnical assessment found that proposal site is assessed to be suitable for its proposed future industrial use, subject to the implementation of the control measures outlined in the below subsection (see section 6.10.4).

Operation

Some of the proposed activities, such as fuel storage, refuelling activities, potential storage of excavated spoil, plant and machinery maintenance have the potential to cause contamination onsite as a result of spills or leaks, equipment breakdown and the rupture of hydraulic lines. The delivery and stockpiling processes do not involve further land-disturbing activities.

6.10.4 Mitigation and management measures

Mitigation and management measures are based on the current design of the proposed MDC. Refinements based on the final design of the MDC, such as the final construction and operation locations within the proposal site, may be necessary.

Table 31 lists the mitigation and management measures that will be implemented during the construction, operation and (where appropriate) decommissioning of the proposed MDC to minimise impacts to soils and from existing or potential contamination.

TABLE 31: CONTAMINATION AND SOIL CONTROL MEASURES

Control measures	Proposed MDC phase
A Contaminated Land and Hazardous Materials Management Plan would be prepared and implemented as part of the CEMP.	Design and Pre-Construction
An unexpected finds protocol should be included as part of the CEMP or as a stand-alone document if potentially contaminated fill material or buried unexpected finds are encountered during construction earthworks.	Design and Pre-Construction
Personnel involved in ground-disturbing works must be familiar with the unexpected finds protocol/procedure and be trained in the identification of potential contaminated soil/material and relevant controls.	Design and Pre-Construction
The reuse or retention of contaminated or potentially contaminated material onsite (i.e. soil, ballast and timbers) will be subject to a risk assessment and/or occur as per the relevant components of the CEMP.	Design and Pre-Construction
Hazardous materials surveys would be undertaken during detailed design for all proposed demolition activities.	Design and Pre-Construction
A hazardous substances and dangerous goods risk management strategy will be developed to manage the potential for risks.	Design and Pre-Construction
The proposed activities will adhere to the <i>Safe Work Australia Model Code of Practice—How to Manage and Control Asbestos in the Workplace 2016</i> (Safe Work Australia, 2020) and <i>Safe Work Australia Model Code of Practice – How to Safely Remove Asbestos 2018</i> (Safe Work Australia, 2018).	Design and Pre-Construction
If ASS are encountered, they would be managed in accordance with the <i>Acid Sulfate Soils Assessment Guidelines</i> (ASSMAC, 1998), and the <i>Waste Classification Guidelines - Part 4: Acid Sulfate Soils</i> (NSW EPA, 2014).	Design and Pre-Construction

Control measures	Proposed MDC phase
During construction works, surplus soil waste requiring offsite disposal must be assessed and classified prior to being transported to an appropriately licenced landfill, in accordance with the NSW EPA <i>Waste Classification Guidelines 2014</i> .	Construction
Topsoil would be stripped progressively in areas designated for construction and stockpiled separately onsite for use in rehabilitation/stabilisation works.	Construction
Drilling and excavation activities during construction will make use of drilling fluids and chemicals that are environmentally neutral and biodegradable, where practical.	Construction
Vehicle and plant maintenance activities will be undertaken in suitable areas, with hardstand to minimise risk of contaminants from incidental spills or leaks from entering aquifers via infiltration or surface runoff.	Construction and Operation
The freight transportation of dangerous goods of the proposed MDC will be in accordance with the <i>Australian Code for the Transport of Dangerous Goods by Road and Rail</i> (National Transport Commission, 2020). Freight carts will be required to display appropriate Hazchem signage, including placards, and carry appropriate spill-containment equipment to be used by emergency services personnel in the event of an emergency.	Construction and Operation
A contamination assessment report (with sampling and analysis conducted) should be undertaken post the MDC and demobilisation to demonstrate the proposal site was not contaminated as a result of the MDC and the land is suitable for use or development.	Post decommissioning

6.11 Waste

6.11.1 Assessment methodology

The assessment of waste management and minimisation from the proposed MDC involved:

- ▶ identifying potential waste-generating activities and types of wastes from the proposed MDC
- ▶ classifying potential waste types identified and estimating quantities of each
- ▶ identifying risks associated with waste arising from the proposed MDC
- ▶ recommending management and waste-handling procedures to minimise impacts during construction, operation and (where appropriate) decommissioning of the proposed MDC.

6.11.2 Potential impacts

The potential impacts from waste discussed in this subsection account for the impacts likely to be caused throughout construction, operation and (where appropriate) decommissioning of the proposed MDC.

Construction

The key waste-generating activity would be earthworks associated with construction of the MDC, which will generate spoil and would require appropriate measures to gauge potential impacts associated with handling and reuse/disposal. Other activities likely to generate waste during construction include:

- ▶ vegetation clearing and grubbing
- ▶ topsoil stripping
- ▶ fencing (temporary and or permanent)
- ▶ construction of roads, drainage structures, culverts, bridges and other ancillary infrastructure
- ▶ construction of rail infrastructure—rail formation, welding, ballasting and tamping
- ▶ general construction work
- ▶ washdown facilities

Key waste streams predicted to be generated during construction are outlined in Table 32, with the likely classifications based on Part 1 (Classifying waste) of the Waste Classification Guidelines. Waste volumes and classifications would be confirmed during detailed design and construction planning, and incorporated into the construction waste management plan.

TABLE 32: POTENTIAL WASTE GENERATION DURING CONSTRUCTION

Activity	Potential waste stream	Likely classification of waste streams
Clearing and grubbing of vegetation	Green waste including timber and leaves/grasses	General solid waste (non-putrescible)
Topsoil stripping	Topsoil	General solid waste (non-putrescible)
Cut and fill earthworks	Spoil—comprising virgin excavated natural material or excavated natural material and contaminated soils	General solid waste (non-putrescible)
Roads, drainage structures and culvert/bridge construction	Concrete, asphalt, aggregate, timber formwork, scrap metals, cable and packaging materials	General solid waste (non-putrescible)
Rail formation	Sleepers rail	General solid waste (non-putrescible)
Welding	Waste metal	General solid waste (non-putrescible)
Ballasting and tamping	Waster ballast	General solid waste (non-putrescible)
Fencing	Waste metal/timber posts	General solid waste (non-putrescible)
General construction wastes	Packaging waste, such as pallets, plastic film wrap, cable reels and metal straps/bands Oily rags and filters from use of plant and equipment	General solid waste (non-putrescible)
Construction workers	Typical domestic waste, including food waste, paper, cardboard and container	General solid waste (putrescible and non-putrescible)
Site amenities and washdown facilities	Wastewater, greywater, hydrocarbon and water mixtures or emulsions	Liquid waste

Operation

The main waste-generating activity during the operation of the MDC would be associated with maintaining the infrastructure onsite, including rail and road infrastructure. Small quantities of green waste may be generated because of vegetation control. Waste may also be generated by onsite staff, site amenities and washdown facilities, and maintenance of plants and vehicles (see Table 32 for potential waste streams of these activities and their likely classification). Other general debris and litter would also be collected.

Decommissioning

Waste-generating activities throughout decommissioning activities would generate waste such as general waste, concrete, bricks, wood, glass, metallic waste, cement, general construction waste and liquid waste.

6.11.3 Mitigation and management measures

Generally, all waste generated during construction and operation would be managed using the waste hierarchy approach of avoidance and reuse before consideration is given to disposal. If reuse or recycling are not viable options, waste would be disposed of at an appropriately licensed landfill in accordance with NSW Waste Classification Guidelines.

Mitigation and management measures are based on the current design of the proposed MDC. Refinements based on the final design of the MDC, such as the final construction and operation locations within the proposal site, may be necessary.

Table 33 lists the measures that would be implemented during the construction, operation and (where appropriate) decommissioning of the proposed MDC to minimise impacts of waste.

TABLE 33: WASTE MANAGEMENT CONTROL MEASURES

Control measures	Proposed MDC phase
<p>A waste management plan would be prepared for the proposed MDC, including:</p> <ul style="list-style-type: none"> ▶ waste targets for the MDC ▶ estimated waste generation (volumes and types of waste arisings) ▶ waste mitigation and management measures for the waste types and quantities, and contingencies for any unexpected waste volumes ▶ general protocols and performance objectives for keeping the worksite clean and tidy ▶ processes for monitoring, documenting and reporting waste types, volumes and how these arisings compare to waste targets (e.g. describe waste streams and estimated volumes, temporary waste storage areas and disposal locations on and offsite (including stockpiles and landfilling), as well as waste disposal NEPM criteria for disposal sites ▶ requirements for waste segregation (e.g. inert—including virgin excavated material, vegetation, building and demolition waste, concrete and asphalt; solid—such as food waste and litter, industrial/regulated—such as asbestos; hazardous—such as flammable liquids; liquid—such as sewage ▶ requirements for secure temporary storage, collection frequency and disposal/recycling requirements ▶ effluent management for construction staff amenities ▶ procedures and reporting/documentation requirements for ensuring waste transporters and receivers are appropriately licensed according to the type of waste ▶ requirements for training, inspections, audits, corrective actions, notification and classification of environmental incidents, record keeping, monitoring and performance objectives for handover on completion of construction ▶ any other requirements necessary to comply with conditions of approval, subsequent approvals or regulatory requirements. 	Design/Pre-construction
<p>During detailed design, a waste reduction review would be undertaken to identify opportunities to meaningfully achieve the waste reduction through design, construction and operation, including the consideration of the following:</p> <ul style="list-style-type: none"> ▶ decommissioning of redundant track ▶ opportunities for designing out waste ▶ alternative approaches to materials used during construction, operation and maintenance to ensure resource efficiencies, in accordance with relevant design standards. 	Design/Pre-construction
Detailed design would include measures to minimise excess spoil generation. This would include a focus on optimising the design to minimise spoil volumes, and the reuse of material onsite.	Design/Pre-construction
Consideration of alternative approaches to materials used, construction and operational techniques, and maintenance of a process to achieve a less resource-intensive and more efficient process, in accordance with relevant design standards.	Design/Pre-construction
All waste generated would be classified in accordance with the Waste Classification Guidelines and disposed of in accordance with the relevant requirements of the Protection of the Environment Operations (Waste) Regulation 2014.	Construction / Decommissioning
Arrangements would be made with landfill operators prior to the delivery of waste and recyclables to any rural facility to ensure that the waste types and quantities can be accepted.	Construction / Decommissioning
Any hazardous or dangerous waste (e.g. asbestos, chemicals, oils) would be correctly stored and managed onsite and, if necessary, disposed of by a licensed contractor or facility and in accordance with the relevant state occupational health and safety legislative and regulatory obligations. This includes wastes generated because of demolition.	Construction / Operation / Decommissioning
Waste management plans/procedures would be included in the Operators EMP.	Operation

6.12 Hazard and risk

6.12.1 Assessment methodology

The hazard and risk assessment involved:

- ▶ reviewing bushfire-prone maps within the proposed location
- ▶ reviewing the construction and operation activities, and identifying associated hazard and risks
- ▶ undertaking a qualitative assessment of the potential impacts to the public and staff during construction and operation
- ▶ recommending management and mitigation measures to minimise the potential for hazards and risks during the construction, operation and (where appropriate) decommissioning of the proposed MDC.

6.12.2 Potential impact

Hazards and risks associated with the construction, operation and (where appropriate) decommissioning of the MDC are briefly discussed in this subsection.

The proposed MDC would contribute to additional movements of vehicles and plants per day during both the site preparation and operation phases, which may result in potential impacts to air quality, noise and vibration. Increased movements of vehicles to and from the proposal sites may also contribute to increased risk on road safety for road users and pedestrians during construction; however, the proposal site is located within a rural setting with very limited surrounding development and there are no major impacts to roads or community facilities.

According to NSW Rural Fire Service's Bush Fire Prone Land mapping tool (accessed 25 January 2022), bushfire-prone areas are sparsely mapped within the proposal site; particularly, within areas of dense vegetation that are located along the eastern boundary of the proposal site. The construction and operation of the MDC have the potential to cause ignition through littering (cigarettes, glass bottles, etc.), generation of sparks through hot works (welding or excavator bucket contacting rock or the rail track), mechanical failure of infrastructure components, fuel leaks and spills.

6.12.3 Mitigation and management measures

Mitigation and management measures are based on the current design of the proposed MDC. Refinements based on the final design of the MDC, such as the final construction and operation locations within the proposal site, may be necessary.

Potential risks to onsite workers are regulated by workplace health and safety legislation (including the *Work Health and Safety Act 2011* (Cth)). The construction contractor would be responsible for managing the site in accordance with regulatory requirements.

Table 34 lists the measures that would be implemented during the construction, operation and (where appropriate) decommissioning of the proposed MDC to minimise hazards and risks.

TABLE 34: HAZARD AND RISK CONTROL MEASURES

Control measures	Proposed MDC phase
Local emergency services would be engaged with to discuss and coordinate emergency response procedures, including (but not limited to) temperature, high wind and container topple.	Design and Pre-Construction
A workforce safety plan that references the ARTC Safety Management System would be prepared and would outline any specific actions to ensure the safety of workers across the proposal site.	Construction
Maintenance program/operational policy would be developed to monitor bushfire risk.	Operation

6.13 Cumulative impacts

6.13.1 Assessment methodology

The cumulative impacts assessment determines the potential environmental effects of the proposed MDC with the consideration of other existing or likely future activities.

This assessment accounts for the spatial area of influence of the MDC determined by the proposal site and/or environmental values identified in impact assessments (see section 6).

The assessment of cumulative impacts for the proposed MDC has been based on identifying and considering the following:

- publicly listed major projects timed to occur during the construction, operation or decommissioning of the proposed MDC, including the project type, location, duration and intensity of impacts.
- significance of potential cumulative impacts
- management and mitigation measures to minimise the potential cumulative impacts during the construction, operation and (where appropriate) decommissioning of the proposed MDC.

6.13.2 Major projects nearing the proposal site

Projects with the potential for cumulative impacts with the proposed MDC are listed in Table 35 below.

The project that is most likely to contribute to cumulative impacts is the N2N Project, which is proposed by ARTC and expected to commence construction in 2023 to 2027, before being fully operational.

TABLE 35: PROJECT WITH THE POTENTIAL FOR CUMULATIVE IMPACTS

Project	Details	Status	Construction / Operation period	Likelihood of having cumulative impacts
Inland Rail—Narromine to Narrabri	<p>ARTC seeks to construct and operate the N2N section of Inland Rail. The project consists of about 306 km of new single-track standard-gauge railway with crossing loops.</p> <p>The project also includes changes to some roads, to facilitate construction and operation of the new section of railway, and ancillary infrastructure to support the project.</p> <p>N2N would be located between the towns of Narromine and Narrabri in NSW. The proposal is located directly adjacent to the north of the proposed N2N track (see Figure 3).</p> <p>The construction of the N2N rail track is expected to progress during the operation period of the proposal. A turnout located to the south of the proposal site (see Figure 4) is planned for installation as the N2N track progresses construction.</p> <p>Early operation of the MDC will generally consist of the receipt, handling, rail welding and stockpiling of rail track materials (sleepers, rail, ballast). There may potentially be some deliveries of materials to the southern Inland Rail projects either by rail or road. Once the N2N track construction commences, early operation activities will continue; however, there will also be the load out of materials via the progressively constructed Inland Rail N2N main line heading north.</p>	Response to submissions Prepare Amendment Report	Expected in early 2023 and to take about four years	Highly likely
Tomingley Gold Extension Project	<p>Tomingley Gold Operations Pty Ltd propose to extend the existing Tomingley Gold Operations (TGO) gold mine, located immediately to the south of the Tomingley village in central western NSW, to incorporate mining of the San Antonio and Roswell deposits.</p> <p>The proposal is approximately 30 km north of the TGO extension project.</p> <p>An approved water pipeline, required for the TGO operations, travels from a licensed bore located approximately 7 km to the east of Narromine, along Pinedean Road and Tomingley Road, located at the south eastern corner of the proposal site.</p>	Post public exhibition (Response to submissions)	Expected to be operation up to 2032	Unlikely
Inland Rail—Parkes to Narromine	<p>The P2N section in NSW was commissioned in late September 2020 and is now operational.</p> <p>The project involved the upgrade of 98.4 km of existing rail track, including a full rebuild of the rail tracks, rail formation and supporting structures along the rail corridor.</p> <p>The 5.3-km stretch of new rail track near Parkes, known as the North West Connection, is also complete and has been transferred to ARTC Operations, with trains now using the line.</p> <p>The P2N project ends where the N2N Project begins. This point is located south west of the proposal site (see Figure 3).</p>	Operational	-	Unlikely

6.13.3 Potential impacts

Construction

Cumulative impacts are unlikely during the construction phase of the MDC. The N2N Project is expected to commence construction once the MDC is operational.

Operation

Cumulative impacts may occur because of operational activities occurring simultaneously with the construction phase of the N2N Project. The N2N Project traverses along the southern boundary of the proposal site and is expected to commence construction in 2023. As the proposed MDC and the N2N Project will, in time, be concurrently active, potential cumulative impacts are expected; particularly, for the surrounding sensitive receivers that would be impacted by both the MDC and the N2N Project, as well as flooding implications and vegetation clearing impacts. Table 36 details the expected cumulative impacts during the operation of the proposed MDC and the construction phase of the N2N Project.

TABLE 36: POTENTIAL CUMULATIVE IMPACTS DURING THE CONSTRUCTION OF THE N2N PROJECT

Aspect	Potential cumulative impacts
Noise and vibration	Cumulative noise impacts would occur during the construction phase of the N2N rail track and MDC operations, which may affect the surrounding sensitive receivers. For receivers in proximity to the future N2N rail track, noise levels are predicted to be dominated by the N2N track construction. For the receivers that are more than approximately 300 m away from the future N2N track and the proposed MDC, the cumulative noise levels may increase by up to 2–3 dB, which is generally regarded as not significant. As such, no major cumulative noise impacts are predicted.
Biodiversity	The proposal would result in the clearing of up to 146.30 ha of native vegetation across the proposal site. The removal of 15.85 ha of woodland would remove potential habitat for a variety of threatened species, such as small woodland birds and microbats, as well as the Koala. As the proposal is located adjacent to the proposed N2N rail corridor and construction compound, it would contribute to additional clearing of native vegetation and threatened species habitat; however, it is unlikely to result in a cumulative impact that is significant.
Surface water	Offsite flood impacts that result from the MDC may change when assessed cumulatively with the N2N Project. This is expected to be largely due to flood regime changes resulting from the N2N Project works. The section of the proposed N2N rail alignment immediately south of the proposal site is currently designed to a 1% AEP formation flood immunity and includes new cross-drainage infrastructure (i.e. culverts). While the N2N Project aims to avoid adverse flood impacts/changes to the existing flow regime offsite, the N2N Project is expected to result in some changes to flow distribution across the various overland flow paths within the proposal site.
Air quality	Overlapping impacts of dust and exhaust emissions from the N2N Project construction activities and the operation of the MDC are likely to occur at some point. This would increase the risk of air quality impacts to nearby sensitive receivers. Given the low number of sensitive receivers near the proposal site, the risk of cumulative impacts during this period is considered to be low.
Traffic and access	The N2N Project would generate additional traffic during its construction phase; however, this will be throughout a temporary period during where the track segment located to the south of the proposal site would be under construction. The minimal road traffic expected for the proposed MDC and the temporary spike of additional traffic from the N2N Project during its construction phase of the rail track to the south of the proposal site would be temporary and, therefore, considered to impose minimal impacts.
Socio-economic	Cumulative socio-economic impacts would temporarily affect community amenity (noise, air quality and visual), particularly for the sensitive receivers in proximity of the proposal site. Impacts on these environmental factors, as assessed in this REF, may increase in intensity through the N2N track construction phase and cause further disturbance to the surrounding community.
Cultural heritage	Cultural heritage impacts for the proposed MDC are low, therefore it is anticipated that the cumulative impacts would also be low; however, the likelihood of potential impacts to cultural heritage would increase with ground disturbance to be undertaken to the south of the proposal site, which is expected to occur during the construction phase of the N2N Project.

6.13.4 Mitigation and management measures

Mitigation and management measures are based on the current design of the proposed MDC. Refinements based on the final design of the MDC, such as the final construction and operation locations within the proposal site, may be necessary.

Given the short and temporary duration of most of the cumulative impacts, mitigation and management measures summarised in section 7 are considered sufficient to manage the impacts.

7. Summary of environmental management measures

Table 37 lists the control measures that have either been identified through the assessment undertaken in this REF or are standard best-practice environmental management controls.

These measures may be subject to refinement, as this REF report is based on the current design of the proposed MDC. Refinements based on the final design of the MDC, such as the final construction and operation locations within the proposal site, may be necessary.

TABLE 37: SUMMARY OF CONTROL MEASURES

Aspect	Control measures	Proposed MDC phase
Biodiversity	<p>A flora and fauna management sub-plan will be prepared prior to construction, and implemented as part of the construction environmental management plan (CEMP).</p> <p>The plan will be prepared in accordance with the relevant guidelines, legislation and standards, and will include but not be limited to:</p> <ul style="list-style-type: none"> ▶ establishing protocols for the staged clearing of vegetation and safe tree felling and log removal to reduce the risk of fauna mortality ▶ an unexpected finds protocol. ▶ processes for notification of a wildlife rescue organisation (e.g. WIRES) in case any injured fauna are found. All animals encountered will be treated humanely, ethically, and in accordance with relevant codes under the Prevention of Cruelty to Animals Act 1979 (NSW). 	Design and Pre-construction
Biodiversity	Measures to suppress dust, prevent erosion and sedimentation will be implemented during clearing and site work.	Construction / Operation
Biodiversity	Temporary and permanent stockpiles are to be located within cleared areas (and not within areas of adjoining native vegetation) or within the dripline of trees.	Construction / Operation
Biodiversity	All workers will be provided with an environmental induction prior to starting work onsite. This will include information on the ecological values of the site, protection measures to be implemented to protect biodiversity, and penalties for breaches.	Pre-clearing
Biodiversity	<p>A suitably qualified ecologist is to be present during clearing activities for habitat identified during pre-clearing surveys, in order to identify areas to be avoided, and manage the rescue or relocation of fauna as necessary.</p> <p>If a Koala is observed in the area during vegetation clearing, works are to cease and not recommence until the Koala has moved on of its own accord or with the assistance of an ecologist.</p>	Pre-clearing
Biodiversity	<p>A weed and pest species management protocol will be prepared as part of the CEMP to manage weeds and pathogens during site activities. It will include, but not be limited to, the following:</p> <ul style="list-style-type: none"> ▶ process to identify, control and remove all priority weeds in accordance with the requirements of the Biosecurity Act 2015 ▶ process to minimise the introduction and spread of weeds, such as exclusion areas for native vegetation, driving instructions, etc. ▶ communication of responsibilities of all site personnel regarding the management of weeds and pathogens, through site inductions and toolbox talk meetings ▶ measures to ensure all trucks transporting weed waste from the site are covered to avoid the spread of weed-contaminated material. Disposal must be documented and evidence of appropriate disposal must be kept. 	Pre-clearing
Biodiversity	So far as is practicable, suitable bush rock habitat, hollow-bearing logs or limbs, and woody debris will be relocated to nearby adjacent areas outside of the proposal site footprint by the supervising ecologist or contractor.	Pre and during clearing

Aspect	Control measures	Proposed MDC phase
Biodiversity	Disturbance of vegetation will be limited to the minimum necessary to undertake the proposal. Clearing boundaries and any features to be retained, e.g. hollow bearing trees, need to be clearly marked on-ground before clearing commences.	During clearing
Biodiversity	All machinery entering the site must be appropriately washed down and disinfected, as far as practicable, prior to mobilisation onsite to prevent the potential spread of weeds, Cinnamon Fungus (<i>Phytophthora cinnamomi</i>) and Myrtle Rust (<i>Pucciniales</i> fungi), in accordance with the national best practice guidelines for <i>Phytophthora</i> (O'Gara et al., 2005) and the <i>Myrtle Rust factsheet</i> (DPI, 2015b) for hygiene control. Weed inspections of vehicles should also be undertaken and documented as part of the CEMP.	Prior to any plant or machinery being brought onsite, where practicable
Biodiversity	Protocols to prevent introduction or spread of chytrid fungus will be implemented following hygiene guidelines for wildlife, protocols to protect priority biodiversity areas in NSW from <i>Phytophthora cinnamomi</i> , myrtle rust, amphibian chytrid fungus and invasive plants (DPIE, 2020b).	Pre-clearing, during construction and operation
Biodiversity	Sediment controls are to be established around the proposal site perimeter as a minimum, in accordance with the Blue Book and the contractor's environmental management plan. Measures will be implemented to minimise the risk of movement of materials in the event of a significant rainfall, such as covering stockpiles with impervious covers (tarps) or temporary trenching upslope of stockpiles to divert surface runoff around stockpiles. In the event of forecast heavy rainfall, additional measures will be implemented, or works will be postponed, to prevent the potential for sediment laden run-off into adjacent properties or waterways.	Pre-clearing, during construction and operation
Noise and Vibration	Develop and implement a Construction Noise and Vibration Management Plan (CNVMP).	Design and Pre-construction Construction/ Operation
Noise and Vibration	The construction noise impact assessment in this report should be refined following any changes in design refinement, to reflect the final locations of construction activities and scheduling to inform the development of the CNVMP.	Design and Pre-construction
Noise and Vibration	Building condition surveys will be undertaken for sensitive receivers within 200 m of the proposed MDC to ensure there is sufficient information to respond to any potential complaints. Surveys are to take place prior to commencement and on completion of vibration-generating works.	Design and Pre-construction
Noise and Vibration	Review construction staging method to identify opportunities to schedule noisy works during the day or, where relevant, evening time period.	Design and Pre-construction
Noise and Vibration	Review construction staging method to identify opportunities where simultaneous operation of noisy equipment can be separated out to operate individually.	Design and Pre-construction
Noise and Vibration	Selection of quieter construction equipment should be investigated where feasible and practicable. This is especially important for any out-of-hours works where predicted noise levels indicate high levels of noise impacts to nearby sensitive receivers.	Design and Pre-construction
Noise and Vibration	Staff training is to be undertaken so that unnecessary sources of noise and vibration are avoided. Training must include the understanding and adoption of the CNVMP and best-practice behaviours onsite to minimise noise and vibration. The behaviours and implementation of CNVMP should be enforced through regular checks and reminders.	Construction/ Operation
Noise and Vibration	Where feasible and practicable, plant and equipment used intermittently, or no longer in use, will be throttled or shut down.	Construction/ Operation
Noise and Vibration	Equipment will be operated and maintained in a manner as detailed by the manufacturer. This includes the replacement of engine covers, repair of defective silencing equipment, tightening of rattling components and repair of leakages in compressed air lines.	Construction/ Operation

Aspect	Control measures	Proposed MDC phase
Noise and Vibration	<p>All mechanical plant near sensitive receivers should be modified to reduce noise, where feasible and practicable, such as:</p> <ul style="list-style-type: none"> ▶ internal combustion engines are fitted with a suitable muffler in good repair, operating as per the manufacturer's specifications ▶ pneumatic tools are fitted with an effective silencer on their air exhaust port ▶ aggregate bins, loaders and chutes are lined with a rubber material to dampen the vibration of the structure <p>suitable rubber pads on wagons, loaders and ground are installed prior to unloading of rails, ballast and sleepers to minimise short-term noise impacts.</p>	Construction/ Operation
Noise and Vibration	<p>Localised acoustic shielding in the form of acoustic semi-enclosures and blankets will be installed to shield noisy construction equipment from the nearest residences, where practicable:</p> <ul style="list-style-type: none"> ▶ acoustic enclosures should be installed as close to the works area as possible ▶ acoustic blankets should be arranged to overlap such that no air gaps are present between blankets. <p>Acoustic shielding is particularly effective for stationary plant that is scheduled to work for lengthy periods. Guidance for acoustic enclosures should be taken from AS 2436-2010 -Guide to noise and vibration control on construction, demolition, and maintenance sites.</p>	Construction/ Operation
Noise and Vibration	Non-tonal reversing beepers (or an equivalent mechanism) will be fitted and used on all construction vehicles and mobile plant regularly used on the site and for any out-of-hours works, where practicable.	Construction/ Operation
Noise and Vibration	Site access points and roads should be sited as far as practicable from sensitive receivers.	Construction/ Operation
Noise and Vibration	Delivery vehicles shall be fitted with straps rather than chains where feasible.	Construction/ Operation
Noise and Vibration	Sites are to be designed so that reversing of delivery vehicles is minimised so that they can drive through the site where possible.	Construction/ Operation
Noise and Vibration	<p>Where feasible and practicable:</p> <ul style="list-style-type: none"> ▶ unsealed haul roads should be regularly graded. Sealed access roads and hardstand areas should have potholes filled in a timely fashion ▶ night-time construction traffic should be limited. If unavoidable, they should be redirected away from noise-sensitive receivers, in accordance with the Construction Traffic Management Plan ▶ appropriate construction traffic speed limits should be established and enforced near noise-sensitive receivers. 	Construction/ Operation
Noise and Vibration	Regular communications on the activities and progress of the proposal should be provided to the community (e.g. via newsletter, email and/or website).	Construction/Operation
Noise and Vibration	The operational works staging method will be reviewed to identify opportunities to schedule noisy works during the day or, where relevant, evening.	Operation
Noise and Vibration	<p>The provision of at-property treatment could be considered for any noise impacts, given the 24-hour operational duration of the MDC. This may include:</p> <ul style="list-style-type: none"> ▶ investigating potential for local at-property solid fencing ▶ offering alternative ventilation where the windows are to remain closed ▶ upgrading the acoustic performance of specific elements of the building envelope (e.g. windows and doors). <p>Note that these at-property treatments would require prior detailed investigations and assessments of the existing conditions to assess the most effective acoustic treatment. If these treatments are considered effective, works would be executed only if specific agreements between the property owners and the proponent are reached.</p>	Operation

Aspect	Control measures	Proposed MDC phase
Indigenous and non-indigenous heritage	<p>The MDC design should be formulated to avoid impacts to Site MDC-AS01, in which case, the location of MDC-AS01:</p> <ul style="list-style-type: none"> ▶ is protected with a 10-m fenced no-go zone through the period of ground-disturbing construction works ▶ is marked on site mapping ▶ restrictions regarding it must be discussed at site inductions and toolbox meetings for works in the site vicinity. <p>If impacts to Site MDC-AS01 cannot be avoided:</p> <ul style="list-style-type: none"> ▶ surface salvage of artefacts in Site MDC-AS01 must be carried out ▶ salvage of artefacts in Site MDC-AS01 must be carried out in consultation with RAPs ▶ artefacts collected from Site MDC-AS01 must be subject to repatriation in accordance with consultation with RAPs ▶ an AHIP will be required to permit any impacts, including surface collection salvage, to Site MDC-AS01 ▶ an ACHAR will be required in support of the AHIP application. 	Design/ Pre-Construction
Indigenous and non-indigenous heritage	Mature trees in Lot 1 DP 1198931 are to be inspected for evidence of cultural modification.	Design/ Pre-Construction
Indigenous and non-indigenous heritage	A program of archaeological sub-surface testing must be completed for areas where gilgais are evident in the proposal site, in accordance with the <i>Code of Practice for archaeological investigation of Aboriginal objects in NSW</i> .	Design/ Pre-Construction
Indigenous and non-indigenous heritage	<p>The following steps should be carried out to manage potential minor indirect (visual) impacts to Craigie Lea homestead:</p> <ul style="list-style-type: none"> ▶ The homestead should be inspected by a heritage specialist to determine whether the homestead retains heritage significance, or whether it has been substantially altered. ▶ If the homestead is confirmed to be of local heritage significance, or a significance assessment is not completed, design of the MDC should minimise visual impacts through reduction of height adjacent to the item, or consideration of additional screening. 	Design/ Pre-Construction
Indigenous and non-indigenous heritage	An Unexpected Heritage Finds procedure must be prepared and implemented for any ground-disturbance works.	Pre-Construction
Indigenous and non-indigenous heritage	Staff engaged in onsite works should receive a heritage induction that will make them aware of the nature of potential heritage finds and their obligations under the <i>National Parks & Wildlife Act 1974</i> and the <i>Heritage Act 1977</i> .	Pre-Construction
Surface water	<p>Flood assessment will be undertaken based on design calculations using existing hydraulic modelling for the MDC and surrounding area, to confirm requirements for design provisions and mitigation measures under the following scenarios:</p> <ul style="list-style-type: none"> ▶ proposed MDC without N2N rail infrastructure in place ▶ proposed MDC with N2N rail infrastructure in place (i.e., cumulative impact assessment) if deemed required. 	Design and Pre-construction
Surface water	A risk assessment will be undertaken to identify opportunities for relaxation of flood immunity/protection requirements of various site elements on a case-by-case basis (in consideration of the impacts to adjacent landholdings and receptors, and extents of infrastructure required in achieving such requirements) and in consultation with relevant parties.	Design and Pre-construction
Surface water	Site elements will be strategically placed to minimise impacts to overland flow conveyance and storage, in so far as is possible.	Design and Pre-construction
Surface water	Appropriate cross- and open-drain features will be provided to maintain designated flow regime, and avoid flow redirection and/or flood impacts on external properties. If required, adequate design allowance should be included to accommodate changes in flow distribution resulting from the N2N Project. This would also include appropriate scour protection measures.	Design and Pre-construction
Surface water	Appropriate flood protection will be provided to protect hazardous material storage facilities.	Design and Pre-construction

Aspect	Control measures	Proposed MDC phase
Surface water	Erosion and sediment control plans and SWMP will be developed and be signed off by a Suitably Qualified Person (e.g. CPESC) in accordance with regulatory requirements.	Construction
Surface water	Requirements for construction water (volumes, quality, demand curves, approvals requirements and lead times) would be defined during detailed design.	Construction
Surface water	Any discharge of construction water (e.g. from sediment basins and excavation dewatering etc.) to the drainage systems or receiving waters would comply with the trigger values so that the proposed MDC does not have an adverse impact on water quality.	Construction
Surface water	Inspection and maintenance of any erosion and sediment controls would be carried out throughout the works to ensure they are operating effectively.	Construction and Operation
Surface water	The proposed MDC would be managed in accordance with the water quality management requirements specified in state policy, procedures and guidelines.	Operation
Air quality	Where sensitive receivers are located within 200 m of proposed activities, or visible dust is generated from work areas or unsealed access roads, watering would be implemented where practicable.	Construction and operation
Air quality	Dust will be visually monitored every day and, when excessive, controls such as watering, changed work practices or use of polymers will be used where practicable.	Construction and operation
Air quality	Vehicle and machinery movements would be restricted to existing access roads where possible.	Construction and operation
Air quality	Contractor plant and machinery, including generators, will be regularly checked and maintained in a proper and efficient condition.	Construction and operation
Air quality	Plant and machinery would be switched off when not in use, and not left idling.	Construction and operation

Aspect	Control measures	Proposed MDC phase
Traffic and access	<p>A Traffic Impacts Assessment (TIA) will be undertaken during detailed design, which should address the following issues and all relevant matters in accordance with the <i>Austrroads Guide to Traffic Management Part 12</i> (Austrroads, 2020b) and <i>Guide to Traffic Generating Developments 2002</i> (Roads and Traffic Authority (RTA), 2002):</p> <ul style="list-style-type: none"> ▶ traffic generation assessment with reference to RTA Guide to Traffic Generating Developments in order to determine traffic generation associated with the MDC ▶ reference <i>Guide to Traffic Management Part 6</i> (Austrroads, 2020c) warrants for turning treatments. Swept path diagrams are to be provided to demonstrate the following: <ul style="list-style-type: none"> ▶ the proposed direction or directions of access and egress to and from the proposal site ▶ all vehicles can enter and exit the proposal site in a forward direction ▶ the design vehicle can access the proposal site and will not result in adverse impacts to The McGrane Way or Tomingley Road ▶ the width of the driveways are adequate to accommodate the swept path of the largest vehicle required to access the proposal site ▶ the software, AutoTurn Pro 10.2 is to be used to depict the vehicle swept paths. The parameters used to generate the swept path diagrams are to be noted on the plans ▶ an assessment of the type of intersection design required for access and egress points to and from classified roads, either directly or preferably via local roads. Safe Intersection Sight Distance (SISD) in accordance with the <i>Austrroads Guide to Road Design</i> is to be provided at these access/egress points ▶ confirmation that the proposed design vehicle is legally able to access Craigie Lea Lane and Narwonah Siding Road ▶ any proposed signage may be subject to State Environmental Planning Policy (Industry and Employment) 2021 and the Transport Corridor Outdoor Advertising and Signage Guidelines. Referral to TfNSW may be required subject to clause 3.15 and 3.16 of the SEPP. 	Design and Pre-construction
Traffic and access	The McGrane Way/Craigie Lea Lane and Tomingley Road/Craigie Lean Lane intersection treatment will be determined based on final detailed design.	Design and Pre-construction
Traffic and access	Detailed design would consider the pavement impact assessment by carrying out a SIDRA Analysis of intersections subject to potential impacts.	Design and Pre-construction
Traffic and access	A dilapidation survey should be undertaken of the made public roads within the proposed haulage routes, prior to and following completion of construction, and provided to the relevant road authority.	Design and Pre-construction
Traffic and access	Detailed design would aim to minimise the potential for impacts to the surrounding road and transport network, and property access.	Design and Pre-construction
Traffic and access	A Traffic Management Plan (TMP) will be prepared for the proposal as part of the CEMP, in consultation with council.	Design and Pre-construction
Traffic and access	Temporary diversions and closures of existing rail and road traffic would be undertaken in consultation with relevant stakeholders, and alternative arrangements would be provided as required.	Construction and Operation
Land use and property	Access to the construction area for stock, as well as non-construction related vehicles and people would be restricted via fencing and other measures.	Design and Pre-Construction
Land use and property	Fencing will be provided in accordance with the Inland Rail fencing standards applicable to the adjacent land use and be constructed prior to the removal of existing fencing or any works being carried out on the subject land, unless otherwise agreed with the landowner.	Design and Pre-Construction

Aspect	Control measures	Proposed MDC phase
Land use and property	If required, land for the construction of the works would be acquired in accordance with the requirements of the relevant state land acquisition legislation, including the <i>Land Acquisition (Just Terms Compensation) Act 1991</i> (NSW).	Design and Pre-Construction
Land use and property	Property owners, tenants and occupants would be consulted to ensure they are informed about the timing and scope of activities in their area and any potential property impacts/changes, particularly in relation to potential impacts to access, services, or farm operational arrangements.	Design and Pre-Construction
Socio-economics	ARTC would continue to manage and deliver Program-wide community and stakeholder engagement for Inland Rail in accordance with the Inland Rail Communications and Engagement Strategy.	Design/Pre-construction
Socio-economics	The CEMP would define the requirements for the complaints management system to be implemented during construction.	Design/Pre-construction
Socio-economics	The project will include measures to ensure ongoing consultation with local emergency services providers to inform them about the locations of level crossings, and changes to access routes and road conditions.	Design/Pre-construction
Socio-economics	To manage the implementation of the proposed socio-economic mitigation measures, contractual mechanisms will be put in place and specific management action and targets will be developed in response to these measures.	Design/Pre-construction
Socio-economics	ARTC would continue to support local employment in accordance with the <i>Australian Jobs Act 2013</i> (Cth) and Australian Industry Participation National Framework, and through the Inland Rail Academy, to leverage training programs, upskill residents and young people, and connect businesses with Inland Rail opportunities and key regional industries.	Design/Pre-construction
Socio-economics	Key stakeholders (including local councils, emergency service providers, public transport providers, the general community, and surrounding landowners/occupants) would continue to be consulted in accordance with the Engagement Implementation Plan.	Design and Pre-Construction/Construction
Socio-economics	A temporary workforce accommodation plan would be prepared to guide the design and provision of temporary accommodation. The plan would be developed in accordance with ARTC's Inland Rail Program Accommodation Principles, relevant council development codes and guidelines.	Design/Pre-construction
Socio-economics	Residents, landholders, landowners, businesses, affected social and recreation facilities and other relevant stakeholders would be notified before work starts, in accordance with the communication management plan, and be regularly informed of construction activities.	Construction/operation
Socio-economics	Complaints during construction would be managed in accordance with the complaints management system defined by the communication management plan.	Construction/operation
Landscape character and visual amenity	A Landscape and Rehabilitation Strategy should be developed during the detailed design stage in line with the ARTC Landscape Strategy, Landscape Framework and the Landscape Specification.	Design/Pre-construction
Landscape character and visual amenity	Vegetation will be retained, where feasible, and supplemented with further planting to strengthen the existing screening value. This would be considered along Craigie Lea Lane, Narwonah Siding Road and to the east of Parkes Narromine Railway.	Design/Pre-construction
Landscape character and visual amenity	The detailed MDC layout would be refined so that, while not in use, construction machinery is stored in suitable locations to minimise views and disturbance.	Design/Pre-construction
Contamination and soil	A Contaminated Land and Hazardous Materials Management Plan would be prepared and implemented as part of the CEMP.	Design and Pre-Construction
Contamination and soil	An unexpected finds protocol should be included as part of the CEMP or as a stand-alone document if potentially contaminated fill material or buried unexpected finds are encountered during construction earthworks.	Design and Pre-Construction

Aspect	Control measures	Proposed MDC phase
Contamination and soil	Personnel involved in ground-disturbing works must be familiar with the unexpected finds protocol/procedure and be trained in the identification of potential contaminated soil/material and relevant controls.	Design and Pre-Construction
Contamination and soil	The reuse or retention of contaminated or potentially contaminated material onsite (i.e. soil, ballast and timbers) will be subject to a risk assessment and/or occur as per the relevant components of the CEMP.	Design and Pre-Construction
Contamination and soil	Hazardous materials surveys would be undertaken during detailed design for all proposed demolition activities.	Design and Pre-Construction
Contamination and soil	A hazardous substances and dangerous goods risk management strategy will be developed to manage the potential for risks.	Design and Pre-Construction
Contamination and soil	The proposed activities will adhere to the <i>Safe Work Australia Model Code of Practice—How to Manage and Control Asbestos in the Workplace 2016</i> (Safe Work Australia, 2020) and <i>Safe Work Australia Model Code of Practice – How to Safely Remove Asbestos 2018</i> (Safe Work Australia, 2018).	Design and Pre-Construction
Contamination and soil	If ASS are encountered, they would be managed in accordance with the <i>Acid Sulfate Soils Assessment Guidelines</i> (ASSMAC, 1998), and the <i>Waste Classification Guidelines - Part 4: Acid Sulfate Soils</i> (NSW EPA, 2014).	Design and Pre-Construction
Contamination and soil	During construction works, surplus soil waste requiring offsite disposal must be assessed and classified prior to being transported to an appropriately licenced landfill, in accordance with the NSW EPA <i>Waste Classification Guidelines 2014</i> .	Construction
Contamination and soil	Topsoil would be stripped progressively in areas designated for construction and stockpiled separately onsite for use in rehabilitation/stabilisation works.	Construction
Contamination and soil	Drilling and excavation activities during construction will make use of drilling fluids and chemicals that are environmentally neutral and biodegradable, where practical.	Construction
Contamination and soil	Vehicle and plant maintenance activities will be undertaken in suitable areas, with hardstand to minimise risk of contaminants from incidental spills or leaks from entering aquifers via infiltration or surface runoff.	Construction and Operation
Contamination and soil	The freight transportation of dangerous goods of the proposed MDC will be in accordance with the <i>Australian Code for the Transport of Dangerous Goods by Road and Rail</i> (National Transport Commission, 2020). Freight carts will be required to display appropriate Hazchem signage, including placards, and carry appropriate spill-containment equipment to be used by emergency services personnel in the event of an emergency.	Construction and Operation
Contamination and soil	A contamination assessment report (with sampling and analysis conducted) should be undertaken post the MDC and demobilisation to demonstrate the proposal site was not contaminated as a result of the MDC and the land is suitable for use or development.	Post decommissioning

Aspect	Control measures	Proposed MDC phase
Waste	<p>A waste management plan would be prepared for the proposed MDC, including:</p> <ul style="list-style-type: none"> ▶ waste targets for the MDC ▶ estimated waste generation (volumes and types of waste arisings) ▶ waste mitigation and management measures for the waste types and quantities, and contingencies for any unexpected waste volumes ▶ general protocols and performance objectives for keeping the worksite clean and tidy ▶ processes for monitoring, documenting and reporting waste types, volumes and how these arisings compare to waste targets (e.g. describe waste streams and estimated volumes, temporary waste storage areas and disposal locations on and offsite (including stockpiles and landfilling), as well as waste disposal NEPM criteria for disposal sites ▶ requirements for waste segregation (e.g. inert—including virgin excavated material, vegetation, building and demolition waste, concrete and asphalt; solid—such as food waste and litter, industrial/regulated—such as asbestos; hazardous—such as flammable liquids; liquid—such as sewage ▶ requirements for secure temporary storage, collection frequency and disposal/recycling requirements ▶ effluent management for construction staff amenities ▶ procedures and reporting/documentation requirements for ensuring waste transporters and receivers are appropriately licensed according to the type of waste ▶ requirements for training, inspections, audits, corrective actions, notification and classification of environmental incidents, record keeping, monitoring and performance objectives for handover on completion of construction ▶ any other requirements necessary to comply with conditions of approval, subsequent approvals or regulatory requirements. 	Design/Pre-construction
Waste	<p>During detailed design, a waste reduction review would be undertaken to identify opportunities to meaningfully achieve the waste reduction through design, construction and operation, including the consideration of the following:</p> <ul style="list-style-type: none"> ▶ decommissioning of redundant track ▶ opportunities for designing out waste ▶ alternative approaches to materials used during construction, operation and maintenance to ensure resource efficiencies, in accordance with relevant design standards. 	Design/Pre-construction
Waste	Detailed design would include measures to minimise excess spoil generation. This would include a focus on optimising the design to minimise spoil volumes, and the reuse of material onsite.	Design/Pre-construction
Waste	Consideration of alternative approaches to materials used, construction and operational techniques, and maintenance of a process to achieve a less resource-intensive and more efficient process, in accordance with relevant design standards.	Construction / Decommissioning
Waste	All waste generated would be classified in accordance with the Waste Classification Guidelines and disposed of in accordance with the relevant requirements of the Protection of the Environment Operations (Waste) Regulation 2014.	Construction / Decommissioning
Waste	Arrangements would be made with landfill operators prior to the delivery of waste and recyclables to any rural facility to ensure that the waste types and quantities can be accepted.	Construction / Operation / Decommissioning
Waste	Any hazardous or dangerous waste (e.g. asbestos, chemicals, oils) would be correctly stored and managed onsite and, if necessary, disposed of by a licensed contractor or facility and in accordance with the relevant state occupational health and safety legislative and regulatory obligations. This includes wastes generated because of demolition.	Construction and Operation
Waste	Waste management plans/procedures would be included in the Operators EMP.	Operation

Aspect	Control measures	Proposed MDC phase
Hazard and risk	Local emergency services would be engaged with to discuss and coordinate emergency response procedures, including (but not limited to) temperature, high wind and container topple.	Design and Pre-Construction
Hazard and risk	A workforce safety plan that references the ARTC Safety Management System would be prepared and would outline any specific actions to ensure the safety of workers across the proposal site.	Construction
Hazard and risk	Maintenance program/operational policy would be developed to monitor bushfire risk.	Operation

8. Environmental matters and checklists

8.1 Ecologically sustainable development

As per Clause 6(2) of the *Protection of the Environment Administration Act 1991*, ecologically sustainable development (ESD) requires the effective integration of social, economic and environmental considerations in decision-making processes. ARTC is committed to the principles of ESD and understands that the social, economic and environmental matters are interdependent.

It is anticipated that the proposal site will receive delivery of bulk track construction materials and will be used for track material storage for multiple Inland Rail projects and sections. The proposed MDC allows for track construction via a progressive rail head from the proposal site; subsequently, significantly reducing the need for road transportation and waste production. Overall, the proposed MDC is a significant positive contribution to the Inland Rail projects' and sections' expected sustainability outcomes.

The Inland Rail program of works is seeking an Infrastructure Sustainability Council (ISC) sustainability rating, which provides independent verification of the sustainability performance of the works. The proposed MDC will form part of the Rail Corridor Program (RCP) ISC As Built rating.

The ESD principles set out in section 6(2) of the *Protection of the Environment Administration Act 1991* have been applied to the proposed MDC as follows:

a) *Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations (the 'integration principle').*

The selection of rail-based deliveries with the storage onsite has considered the complexity of the supply chain and determined that rail offered the best outcome, considering the cost of delivery options and the preference for limiting road transport to minimise environmental and social (traffic safety) effects.

b) *If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation (the 'precautionary principle').*

The approach to site construction methodology would minimise environmental damage. The construction contractor will develop and implement appropriate measures and management plans to limit degradation.

c) *The principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations (the 'intergenerational principle').*

The approach to site construction methodology has minimised environmental damage through limitation of clearing and retention of waterway setbacks.

d) *The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making (the 'biodiversity principle').*

The approach to site construction methodology has minimised clearing of vulnerable ecological communities, with these sites protected from clearing.

e) *Improved valuation, pricing and incentive mechanisms should be promoted and, more specifically, environmental factors should be included in the valuation of assets and services (the 'valuation principle').*

The proposal site and MDC's operation strategy allow efficiency in storage and delivery methods, representing the most cost-effective approach.

8.2 Clause 171(2) Checklist

The environmental factors listed in clause 171(2) of the EP&A Regulation have been considered in Table 38, below, to assess the likely impacts of the proposed MDC.

TABLE 38: CLAUSE 171(2) CHECKLIST

Factor	Impact
a) the environmental impact on a community	The proposal may result in some amenity-related impacts (visual, noise and dust) to nearby sensitive receivers during construction and operation. Potential impacts would be managed through the implementation of the safeguards and mitigation measures provided in section 7.

Factor	Impact
b) the transformation of a locality	The proposal would result in the clearance and grading of former agricultural land and native grasslands. In the context of the surrounding land uses, this is expected to be acceptable.
c) the environmental impact on the ecosystems of the locality	The proposal would result in the clearance and grading of former agricultural land and native grasslands. It is unlikely to have a significant impact on any ecosystems.
d) reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality	The proposal would result in the clearance and grading of former agricultural land and native grasslands. In the context of the surrounding land uses this is expected to be acceptable.
e) the effect on a locality, place or building that has— i) aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance, or ii) other special value for present or future generations	An Aboriginal site was identified within the proposal site and areas where gilgais are evident have been assessed as of moderate archaeological potential; however, excavation testing is required to establish the archaeological potential of the proposal site area.
f) the impact on the habitat of protected animals, within the meaning of the <i>Biodiversity Conservation Act 2016</i>	The proposal would result in the clearance of habitat for protected animals; however, the impact is not expected to be significant.
g) the endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air	The proposal would not endanger any species of animal, plant or other form of life, whether living on land, in water or in the air, providing the implementation of the safeguards detailed in section 7 are undertaken.
h) long-term effects on the environment	The proposal would clear and regrade a large area of former agricultural land and native grasslands.
i) degradation of the quality of the environment	There is the potential for negative noise, visual and dust impacts from the construction and operation of the proposal, as well as vegetation clearing. These impacts will be managed through the implementation of the control measures detailed in section 7.
j) risk to the safety of the environment	Contamination risks are present during the construction and operation of the MDC; however, any risks or potential impacts would be appropriately managed as necessary.
k) reduction in the range of beneficial uses of the environment	The proposal would not reduce the beneficial uses of the environment.
l) pollution of the environment	The proposal could potentially cause pollution of the environment; however, the potential impacts would be minimised through the implementation of the safeguards detailed in section 7.
m) environmental problems associated with the disposal of waste	All waste generated by the proposed MDC would be managed using the waste hierarchy approach of avoidance and reuse before consideration is given to disposal. If reuse or recycling are not viable options, waste would be disposed of at an appropriately licensed landfill in accordance with <i>NSW Waste Classification Guidelines</i> . Appropriate waste-management measures would also be adhered to.
n) increased demands on natural or otherwise resources that are, or are likely to become, in short supply	Materials required for the construction and operation of the MDC are readily available and would be sourced from local contractors where possible.
o) the cumulative environmental effect with other existing or likely future activities	The proposal would result in an increase in cumulative clearing of native vegetation when considered in conjunction with the N2N Project; however, additional clearing, and its impact on threatened fauna habitat, is not expected to be significant. Offsite flood impacts that result from the MDC may change when assessed cumulatively with the N2N Project.
p) the impact on coastal processes and coastal hazards, including those under projected climate change conditions?	The proposed MDC is not likely to have any impacts to coastal processes or coastal hazards.
q) applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1	The proposal is aligned with the relevant aims and objectives of the Narromine LEP 2011 and the Draft Central West and Orana Regional Plan 2041.
r) other relevant environmental factors.	Impacts of relevant environmental factors have been considered in this REF (see section 6).

8.3 Matters of national environmental significance

Under the environmental assessment provisions of the EPBC Act, MNES and impacts on Commonwealth land are required to be considered to assist in determining whether the proposal should be referred to DAWE. Table 39, below, summarises the expected impacts on each MNES.

TABLE 39: MNES CHECKLIST

Will the proposal	If yes, describe the impacts (i.e., short term, long term, positive, negative, nil.)
Impact on listed threatened species and ecological communities?	No threatened ecological communities or flora species listed under the EPBC Act were identified as being present onsite. While there is the potential for Corben's Long-eared Bat and Koala, which are listed as vulnerable under the EPBC Act, to occur on the proposal site, none were recorded during surveys and are unlikely to be present. The assessments of significance found that the proposal is unlikely to significantly reduce the availability of foraging habitat for these species, given the wide availability of alternate foraging habitat in the study area, and is unlikely to have a significant impact on EPBC Act-listed threatened species and ecological communities.
Impact on listed migratory species?	No important habitat for any migratory species would be impacted by the proposal. Any migratory species that may occur would be transient individuals and would not rely on the limited wetland or woodland habitat present in the proposal site.
Impact on Wetlands of international importance?	The site is not proximate to any protected wetlands.
Impact on the Commonwealth marine environment?	The site is not proximate to the Commonwealth marine environment.
Impact on World Heritage properties?	The site is not proximate to World Heritage properties.
Impact on National Heritage places?	There are no National Heritage Register listed properties in the vicinity of the proposal site.
Involve nuclear actions?	No nuclear actions are proposed; no existing nuclear actions are proximate to the site.
Impact on the Great Barrier Reef Marine Park?	The site is not proximate to the Great Barrier Reef Marine Park.

9. Conclusion

The proposal is a key component of Inland Rail and is required to enable the construction of multiple Inland Rail projects.

The proposed MDC is required to allow for the timely delivery, stockpiling, handling and distribution of track construction materials. The MDC would achieve the following key objectives:

- ▶ continual production of materials to meet consumption demand of Inland Rail projects and sections
- ▶ avoidance of road freight to enhance safety, reduce environmental impacts and network constraints
- ▶ safer and better controlled material handling and storage process
- ▶ flexibility for the Inland Rail Program
- ▶ sustainability and efficiency in construction methods.

The current design of the proposed MDC will be developed in detailed design before construction commencement. ARTC is aiming to commence construction of the proposal from June 2022, be operational by September 2022 and decommission in 2027.

The proposal also includes a subdivision of five lots into two new lots, which will facilitate the use of the proposal site for the MDC and will also enable flexibility in the future and ongoing use of the proposal site.

This REF has been prepared by ARTC in accordance with Part 5, Division 5.1 of the EP&A Act and considers all matters affecting or likely to affect the environment as a result of the proposal. The potential impacts of the proposal have been assessed in accordance with clause 171(2) of the EP&A Regulation and the requirements of the EPBC Act.

The following key impacts have been identified should the proposal proceed:

- ▶ loss of 146.30 ha of native vegetation (including 15.85 ha of woodland, which would remove potential habitat for a variety of threatened species)
- ▶ minimal increase of impacts to amenity (visual, noise and air quality)
- ▶ minimal increase in flood impacts within the ARTC boundary
- ▶ low risk of potential impacts to cultural heritage.

Mitigation and management measures have been recommended to address the above impacts and other potential impacts. They are based on the impacts of the current design of the MDC and, through the application of these recommended mitigations, the proposal can appropriately manage its impacts.

Based on the assessment, it is considered that the proposal will not result in a significant impact on the environment or any MNES under the EPBC Act. As such, an EIS or SIS is not required. This assessment concludes that it would be appropriate for the proposal to proceed.

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APPENDIX G

Site Contamination Investigation



Site Contamination Investigation

Client: Narromine Shire Council

Site Address: 397 Craigie Lea Lane, Narromine, NSW 2821

16 June 2023

Our Reference: 40038-ER01_A

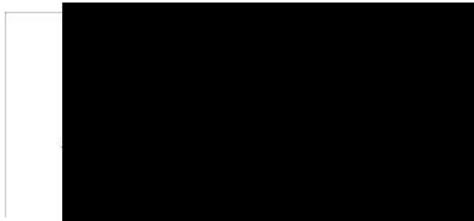
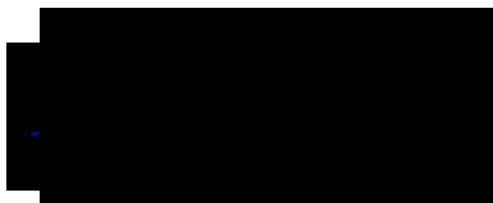
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Project Name:	Preliminary Site Contamination Assessment – 397 Craigie Lea Lane, Narromine, NSW 2821
Client:	Narromine Shire Council
Project Number:	40038
Report Reference:	40038 ER01_A
Date:	16/06/2023

Prepared by:	Reviewed by:
	
Nardus Potgieter MSc(Chem) BSc(Hons)(Env.Tech.) Senior Environmental Scientist	Jim Sarantzouklis MAIBS (Assoc) MEHA MAICD RPIA BA, Grad Dip URP, Dip Env H & B Director

Executive Summary

Barnson Pty Ltd was engaged by Narromine Shire Council (Rep. Phil Johnston) to undertake a preliminary contaminated site investigation over Part of 397 Craigie Lea Lane, Narromine, NSW 2821, hereafter referred to as the Subject Site.

The Preliminary Site Investigation (PSI) is in support of the potential future industrial development of the investigation area. The primary future land use proposed for the property is to be of a commercial/industrial nature and the focus of the preliminary site contamination assessment is to determine the suitability of the site for use as industrial land.

The investigation was based on a desktop review of information available for the property, as well as the findings of a site inspection and confirmatory sampling and analysis of surface soils collected at the site. A review of the available historical information indicated that agriculture (pastoral) pursuits were carried out on the site for many years.

Activities associated with the historical and current use of the Subject Site were identified as having a potential to contaminate surface soil at the site. The following potential sources of contamination were identified:

- Historical and current livestock farming and grazing activities;
- Historical and current feed-crop cultivation;
- Use, maintenance and storage of motorised vehicles and equipment, and
- Localised waste disposal

A site inspection, supplemented with confirmatory sampling and analysis, was undertaken to determine the presence and significance of potential contamination associated with the identified sources. This investigation did not find any evidence of contamination and concluded that the Investigation Area is suitable for the proposed development and use.

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1. INTRODUCTION

1.1. Background and Objectives

Barnson was engaged by Narromine Shire Council to undertake investigations in support of a feasibility study for future industrial related development of a site located at 397 Craigie Lea Lane, south-west of Narromine, NSW (the Subject Site).

The Subject Site is located approximately 7kms south of Narromine. Figure 1.1 presents a map indicating the location of the Subject Site. The site identified for the future development is an area of approximately 95ha located in the north-eastern half of Lot 21 DP 592824, hereafter referred to as the Investigation Area.

1.2. Objectives

The objectives of the Investigation are:

- Identify contamination that may affect the site's suitability for development, and
- Assess the need for possible further investigations, remediation or management of any contamination identified.

1.3. Scope of Work

To meet the stated objectives, Barnson completed the following scope of work:

- Site identification including a review of site history, site condition, surrounding environment, geology and, where information was available, hydrogeology.
- Desktop review of site history and assessment of potential sources of contamination.
- Development of a Conceptual Site Model (CSM) with information gathered from the data review and site inspection.
- Site inspection to assess site conditions.
- Collection of confirmatory soil samples and analysis to determine nature of possible contamination.
- Provide conclusions as to the suitability of the site for the intended future land use.
- Preparation of a report.

1.4. Purpose of this report

The purpose of this report is to document, with cognisance of the Guidelines for Consultants Reporting on Contaminated sites (NSW EPA, 2020), works undertaken, in accordance with the scope of works as described in Section 1.3, results of the desktop review and site inspection, and recommendations for further actions required to determine fitness of the site for the intended use.

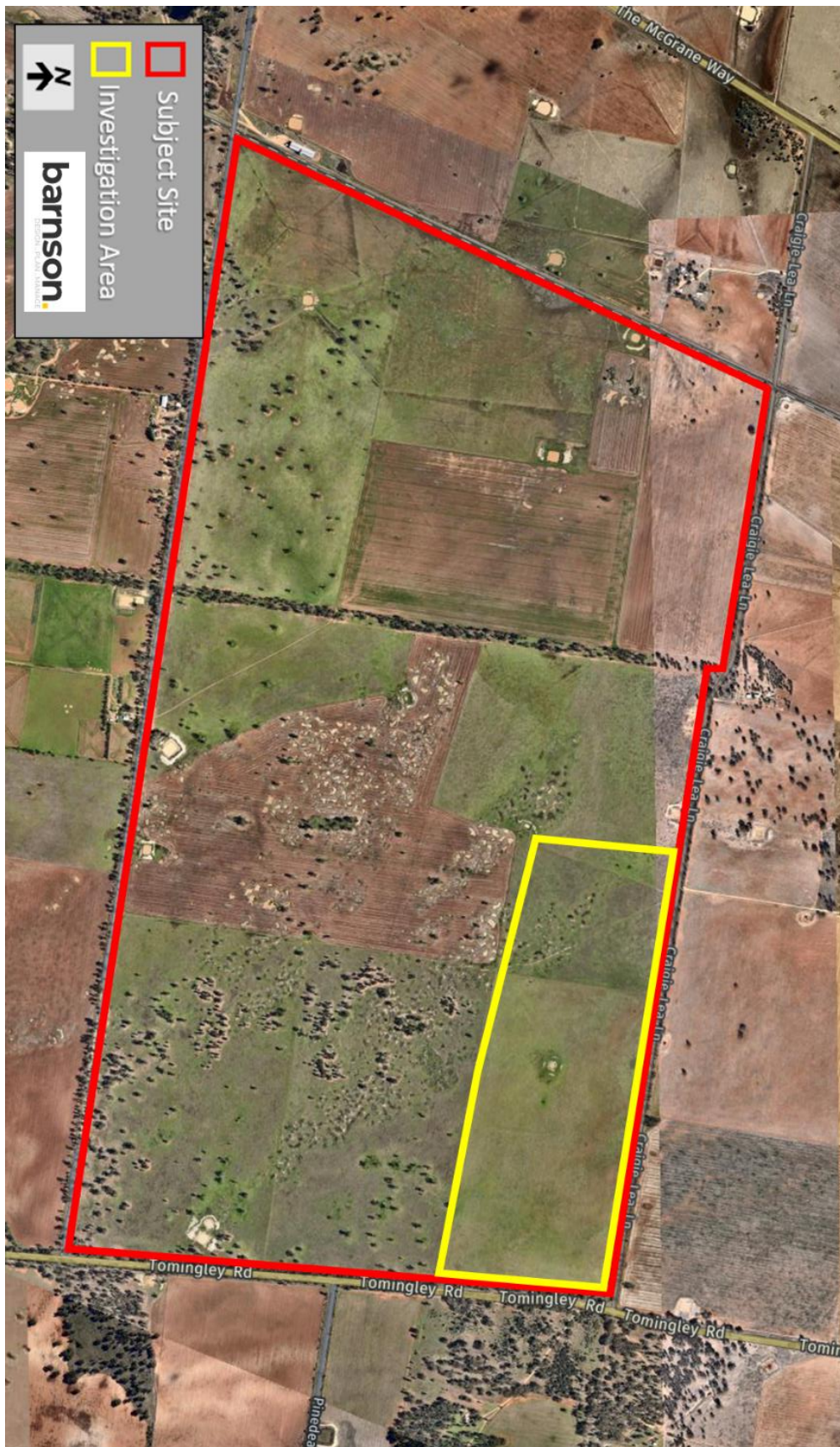


Figure 1.1: Location of the Subject Site and Investigation Area

1.5. Assumptions and Limitations

The following assumptions have been made in preparing this report:

- The future use of the site will be for commercial/industrial purposes. This assumption forms the basis for the conceptual site model (Section 4).
- All information pertaining to the contamination status of the site has been obtained through public record searches, a preliminary site inspection and analysis of confirmatory samples collected at the site. All documents and information in relation to the site, which were obtained from public records, are accepted to be correct and has not been independently verified or checked.

It should be recognised that even the most comprehensive site assessments may fail to detect all contamination on a site. This is because contaminants may be present in areas that were not previously surveyed or sampled or may migrate to areas that showed no signs of contamination when sampled. Investigative works undertaken at the Subject Site by Barnson identified actual conditions only at those locations in which sampling and analysis were performed. Opinions regarding the conditions of the site have been expressed based on historical information and analytical data obtained and interpreted from previous assessments of the site. Barnson does not take responsibility for any consequences as a result of variations in site conditions.

2. SITE DESCRIPTION

2.1. Site Identification

Table 2.1 presents a summary of the available information pertaining to the identification of the Subject Site.

Table 2.1: Summary of Subject Site

Information	Details
Site address	397 Craigie Lea Lane, Narromine, NSW 2821
Lot/Section and Deposited Plan No.	Lot 1 DP 1198931 Part Lot 16 DP 755131 Part Lot 17 DP 755131 Lot 232 DP 755131 Lot 233 DP 755131
Zoning	RU1 – Primary Production
County	Narromine
Parish	Wentworth
Local Government Area	Narromine Shire Council
Subject Site Area	Approx. 830ha
Investigation Area	Approx. 95ha

The entirety of the Subject Site is zoned RU1 – Primary Production and has an area of approximately 830ha. The site is surrounded by similar land zoning with Large Lot Residential (R5) approximately 1.5kms to the north-east.

2.2. Investigation Area

The Investigation Area is bounded to the north by Craigie Lea Lane and Tomingley Road to the east. To the south and west the Investigation Area adjoins the remainder of Lots 232 and 233 of DP 755131.

The Subject Site has historically been used for agricultural (pastoral) purposes and the Investigation Area is currently unoccupied and covered in vegetation (mainly tall pasture grass, see Figure 2.1). The Subject Site is sectioned into several paddocks with steel wire fencing and gates and include several earthen farm dams constructed to collect rain for stock water supply purposes (Figure 2.2).



Figure 2.1: Vegetation covering Investigation Area.



Figure 2.2: View of dam in centre of the Investigation Area.

A portion of the Investigation Area is covered in a series of small mounds and depressions known as gilgai. The depressions seasonally fill with water and retains this water as a result of underlying expanding clay soils. The area of the Investigation Area where the gilgai is most well observed is outlined in Figure 2.3.

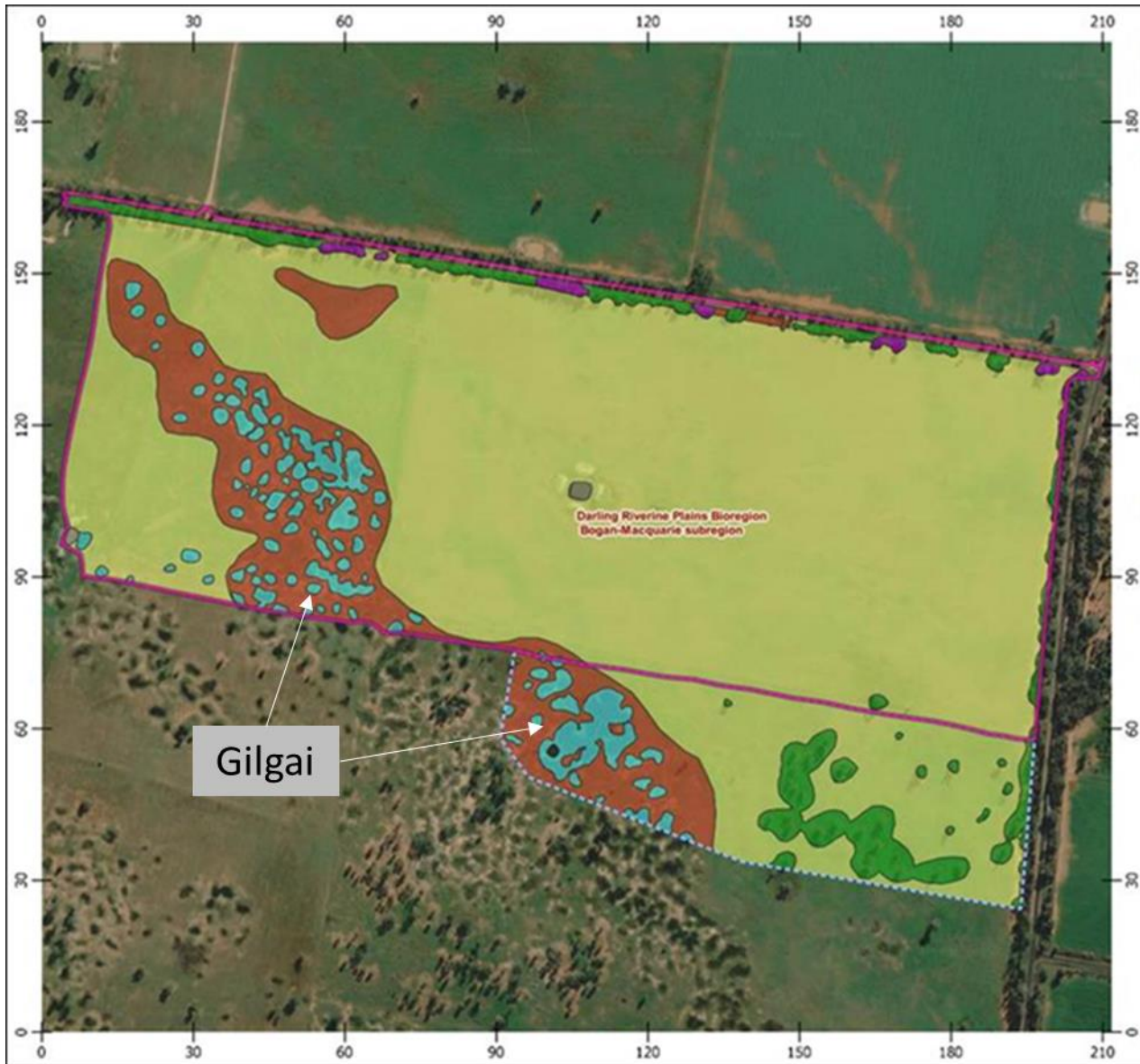


Figure 2.3: Aerial view of Investigation Area indicating location of gilgai.

The Investigation Area is proposed to be utilised for future industrial land uses. At this stage, the Preliminary Site Investigation is to be a part of a due diligence study to determine the potential opportunities and constraints of the Investigation Area for the proposed use/s.

2.3. Historical Record of Site Contamination

Datasets maintained by the Office of Environment and Heritage (OEH) including notices under CLM Act, POEO Environment Protection License Register, and environmental incidents were reviewed.

- List of NSW contaminated sites notified to EPA – The sites appearing on the OEH “List of NSW contaminated sites notified to the EPA” indicate that the notifiers consider that the sites are contaminated and warrant reporting to EPA. However, the contamination may or may not be significant enough to warrant regulation by the EPA. The EPA needs to review information before it can make a determination as to whether the site warrants regulation. A search of the listing returned no record for the subject site.
- Contaminated Land Record of Notices – A site will be on the Contaminated Land Record of Notices only if the EPA has issued a regulatory notice in relation to the site under the *Contaminated Land Management Act 1997*. A search of the register in May 2023 returned no record for the subject site.

There is further no record of the Subject Site in any of the following databases:

- Former Gasworks Database
- EPA PFAS Investigation Program
- Defence PFAS Investigation & Management Program
- Air Services Australia National PFAS Management Program
- Defence 3 Year Regional Contamination Investigation Program.

2.4. Previous Site Investigations

Barnson previously conducted an assessment of potential contamination at the Subject Site. The preliminary site investigation report (Barnson, 2021) identified the following as potential sources of contamination:

- Historical livestock farming activities.
- Historical cropping activities
- Storage of demolition waste
- Vehicles and equipment

The report (Barnson, 2021) concluded that the site investigation conducted to determine the presence and significance of potential contamination associated with the identified sources, revealed that none of the potential sources identified are likely to have contributed significant quantities of contamination to the surface soils of the Subject Site..

3. SITE SETTING

3.1. Geology

Geologically, the main units underlying the area south of Narromine include limestone quartzose greywacke, siltstone, chert, slate, quartzite, sandstone, phyllite, mica, paragneiss, shale, and schist. The area is shown with volcanic intrusions of the Cotton Formation, which are described as basalt intrusions separated by layers of clay and slate.

A review of the Narromine 1:250,000 Geology map (refer to Figure 3.1) shows the geology of the area where the Subject Site is situated as alluvium.

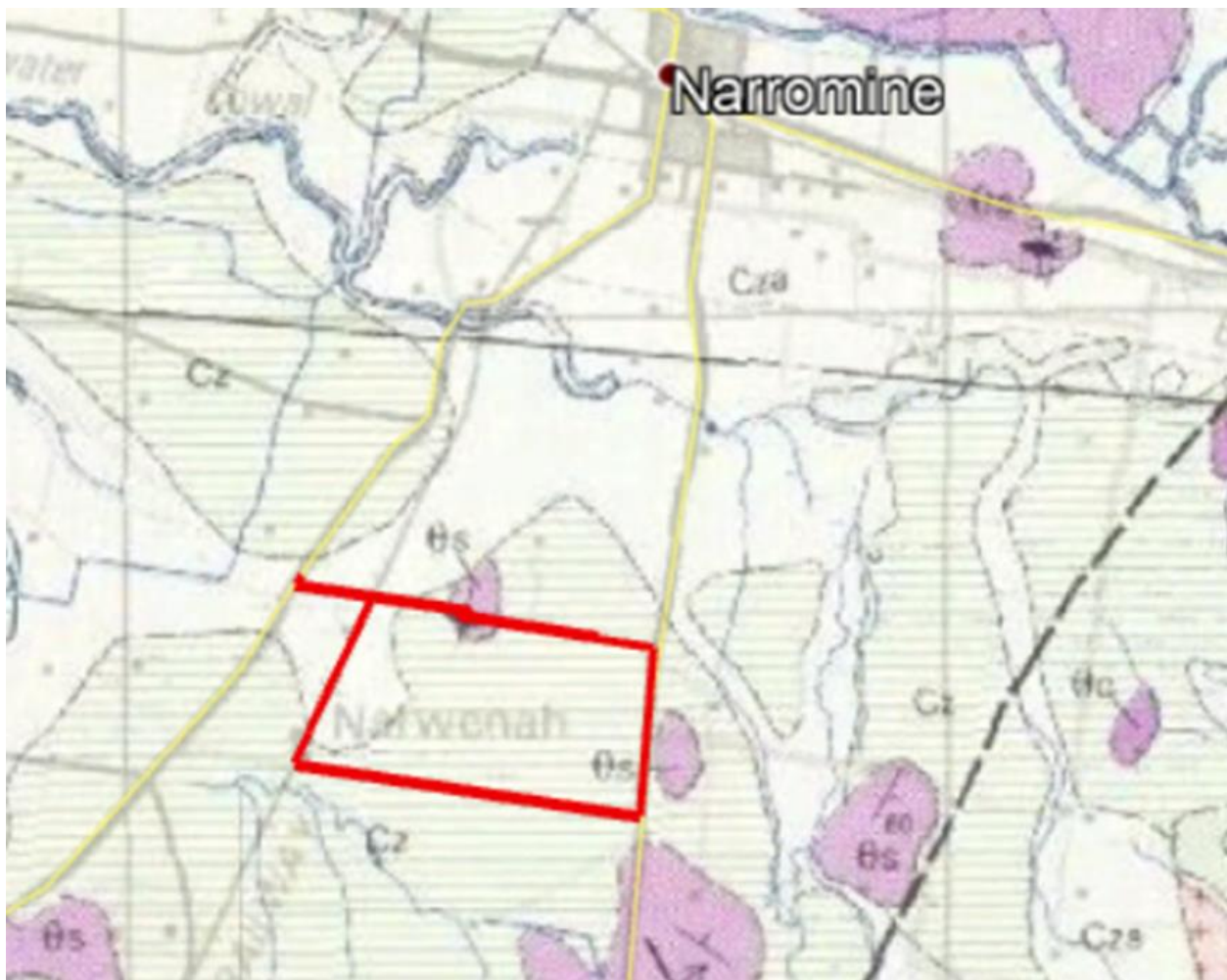


Figure 3.1: Narromine 1:25000 geology map showing the location of the Subject Site

Source: Google Earth, accessed 22/05/2023

Surface geology of the Subject Site is described as recent alluvium deposits derived from the underlying geology, consisting mainly of red silt with pebbles and quartz grit.

The geological units underlying the Subject Site area has low asbestos potential.

3.2. Soils

The subject site is mapped within three hydrogeological landscapes namely the 'Trangie, Terowie and Wyangal'. In these landscapes, soils are described as sandy silt (Eutrophic Red Sodosol and Solodic Soil) underlain with Endocalcareous Epipedal Brown Vertosol and Grey Clay, all of alluvial origin.

The soils are described as of moderate to low chemical fertility with known use for improved pastures and some dryland animal feed cropping. In general, top-soils are considered slightly erodible but sub-soil erodibility is low.

Surface soils are not saline but are susceptible to structure degradation leading to decreased permeability, water holding and drainage. Soils are not indicated as acid sulphate soils.

The Atlas of Australian Acid Sulfate Soil has the subject site in an area of 'very low' probability of occurrence. According to the National Assessment dataset for dryland salinity, the subject site does not fall in an area with current risk of soil salinity.

3.3. Topography and Drainage

Figure 3.2 presents topographical information overlain on a map of the Subject Site. The presented data shows that the site slopes gently from an elevated area near the south-eastern corner toward the west and north-west at less than 1°

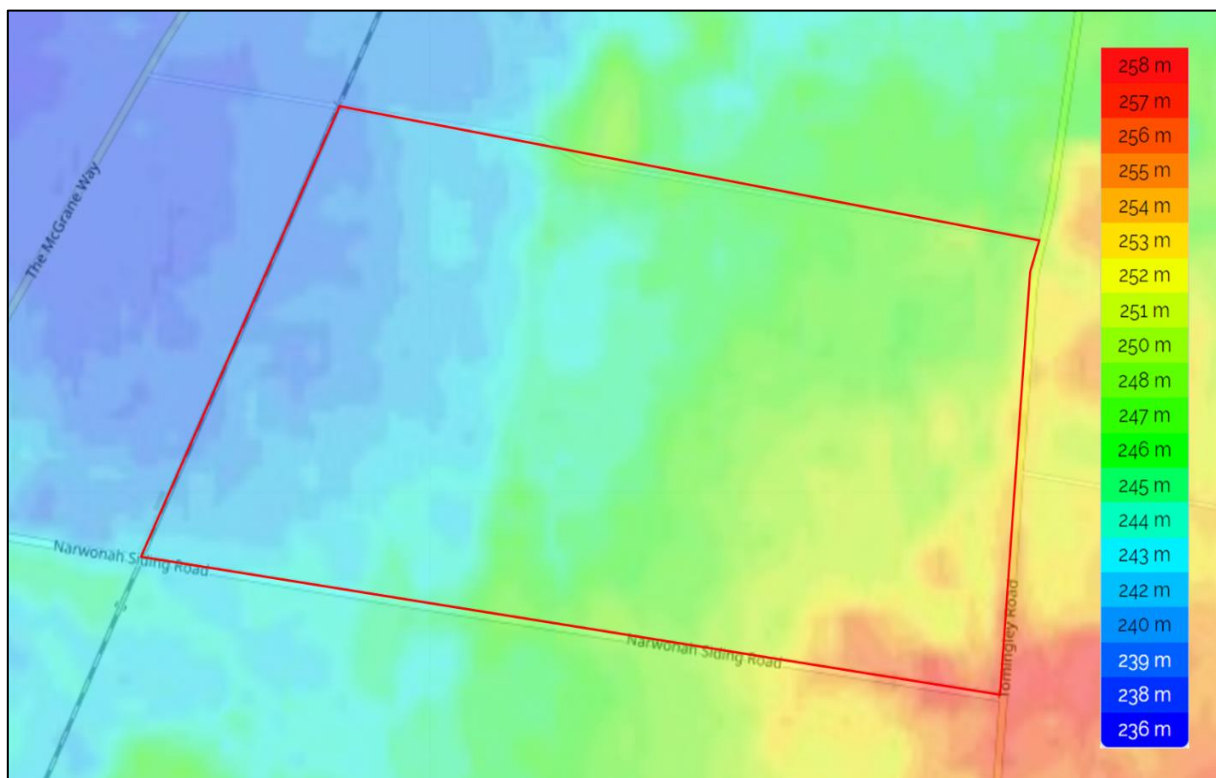


Figure 3.2: Subject Site topography.

Precipitation runoff at the site will most likely remain on site and either pool and evaporate or seep into surface soils.

The closest natural water body is the Yellow Creek, which represents the main drainage for the area, at its closest point it is located approximately 200m to the south from the south-western corner of the Subject Site.

3.4. Groundwater Resources

A review of existing groundwater bore records (WaterNSW, 2023) indicate 1 registered groundwater bore within the boundaries of the Subject Site (see Figure 3.3: Groundwater bores near the Subject Site.). The information recorded in the database for this bore (GW001565) and two more closest to the Subject Site (GW002441 and GW000306) indicate an average depth of between 89m and 112m deep. Only the on-site bore has data reported for depth of water bearing zones, indicating 50.3m, with standing water level of 42m and average yields 0.38L/s. According to the database all bores are used for stock.

The Subject Site falls outside the area mapped as groundwater vulnerable in the Narromine Local Environmental Plan (Narromine LEP, 2011). Based on the lithology of the area, aquifers are deep and unconfined with groundwater flow occurring vertically and laterally through fractures in bedrock. Most aquifers are isolated from surface by thick layers of clay with low hydraulic conductivity and transmissivity. High runoff rates occur on steeper slopes.

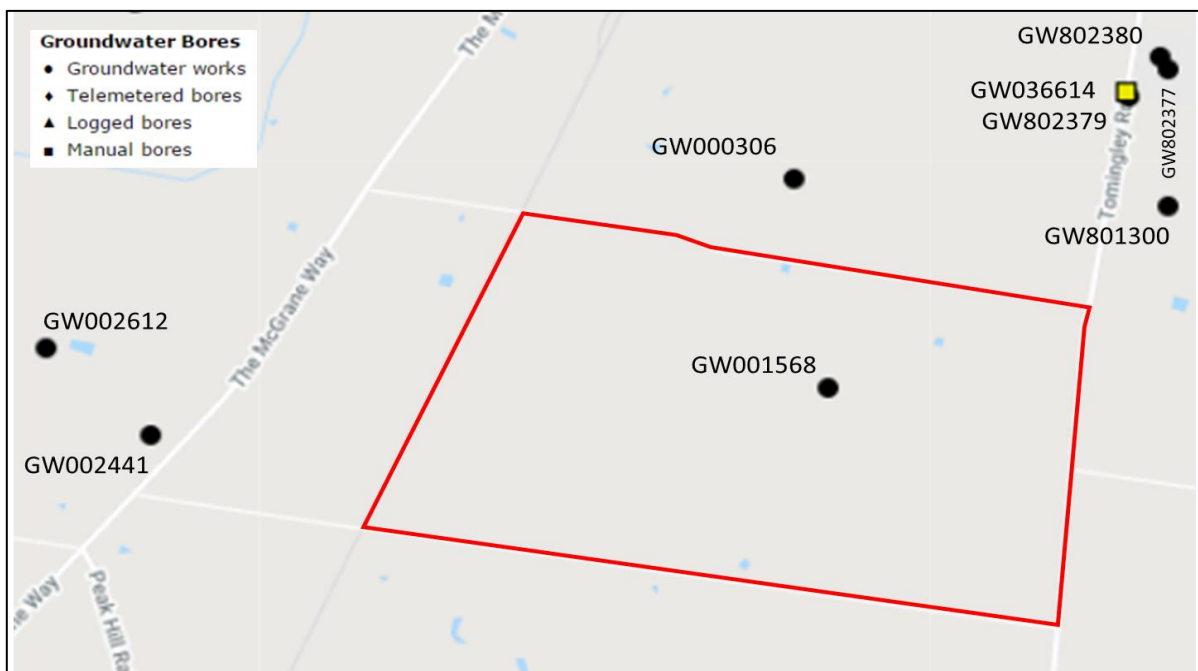


Figure 3.3: Groundwater bores near the Subject Site.

Source: WaterNSW All Goundwater Map, accessed 22/05/2023

The information recorded in the database for the groundwater bores indicates the depth of the bores reach final depths ranging from 61.0m to 85.0m. With a Standing Water Level (S.W.L) of 8m recorded for GW803397 and provided a Water Bearing Zone (W.B.Z) of 22.00m thick, starting at 9m. According to the database, the bores are utilised for domestic or stock watering purposes.

4. CONCEPTUAL SITE MODEL

4.1. General

The Conceptual Site Model (CSM) is intended to provide an understanding of the potential for contamination and exposure to contaminants within the investigation areas. The CSM draws together the available historical information for the site, with site specific geological, and hydrogeological information to identify potential contaminants, contamination sources, migration and exposure pathways and sensitive receptors.

4.2. Sources

The identification of sources presented here is based on the review of available historical information and photographs, as well as an understanding of current conditions at the Subject Site. The following is a summary of the potentially contaminated areas and sources of contamination identified:

- Historical farming activities.

Both the eastern and western portions of the Subject Site have historically been used in the operation of the livestock farming activities. Potential sources of contamination associated with these activities include the animal pens and yards, as well as the disposal of animal wastes. Activities associated with the management of animal health, including sheep dip or spraying for the control of parasites could further result in localised contamination. Potential contaminants include pesticides, hydrocarbons, heavy metals, and elevated nutrients.

- Cropping and feed production.

Historical photographs of the Subject Site indicate periodic crop farming activities in the western half of the Site. Crop farming in moderate to low fertility soils likely required the use of chemicals such as fertilisers and pesticides in the maintenance of the crops. Potential contaminants associated with these chemicals include heavy metals, organochlorine and organophosphate pesticides. Intensive use of fertiliser can also lead to the build-up of heavy metals in surface soil particularly zinc and cadmium, depending on the type and source of the fertiliser.

- Vehicles and equipment.

Operation of farm often involves the use of motorised vehicles and equipment used for a variety of applications such as transport, earth moving or pumping water. The use, storage, maintenance and refuelling of the equipment and vehicles has the potential to contribute to localised contamination of surface soils.

- Use of unclassified fill or uncontrolled disposal of waste.

There is no evidence to suggest that significant quantities of fill material have ever been imported to the Site for levelling or construction purposes. The Subject Site is further fenced and it is unlikely that large quantities of domestic or demolition waste would have been disposed of at the Site. However, foreign or potentially hazardous materials or wastes sporadically disposed of at the site could contribute a variety of contaminants to localised areas of the Site. Contaminants may include hydrocarbons and heavy metals.

4.3. Contaminants of Potential Concern

Considering the potential sources relevant to the Subject Site, a wide variety of contaminants may be present. With the historical agricultural activities considered the primary potential source of contamination, the residues of agricultural chemicals such as pesticides and fertilisers are accepted as the most likely contaminants. Of interest here are chlorinated organic compounds which historically have been widely used as insecticides, fungicides, herbicides and soil fumigants in agriculture and which are stable enough in the environment (persistent) to remain in soil for extended periods of time. Inorganic compounds that contain heavy metal including arsenic, copper, lead and mercury were also historically used as pesticides, particularly in the control of external parasites on sheep. The use of fertiliser, although not commonly considered a source of soil contamination, potentially could lead to a build-up of heavy metals such as cadmium in soils in areas where it has been extensively applied.

The potential presence of fuels and lubricants are further potentially relevant to the on-site storage, maintenance or movement of vehicles and equipment in the operation of the farm.

Based on this understanding of the site history and activities, the contaminants of potential concern identified for the investigation of the Subject Site include:

- pesticides (organochlorines, organophosphates);
- hydrocarbons (mainly fuel and lubricants); and
- heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn)

4.4. Pathways

The primary pathways by which receptors could be exposed to the contaminants outlined above include:

- Inhalation of dust or vapours.
- Dermal contact with contaminated soils.
- Incidental ingestion of contaminated soils.
- Surface runoff, sediment transport and discharge to surface waters.
- Vertical and horizontal migration of contamination through the soils into the underlying groundwater.

Of the listed potential pathways, the contamination of water resources through infiltration is considered the most unlikely. The Subject Site is not indicated as a groundwater vulnerable zone (Narromine LEP, 2011) and the depth to groundwater at the site is estimated to be at least 40m. The slope of the site further would limit overland flow of water, in turn limiting the migration of any contaminants with overland flow.

4.5. Receptors

Potential receptors may include:

Human receptor populations

- Workers of the proposed manufacturing and warehousing facilities.
- Visitors to the site (e.g. workers conducting maintenance, contractors).
- Workers involved in the construction of facilities and rail infrastructure.

Environmental Receptors

- Local drainage channels and receiving surface water bodies (negligible likelihood of contamination expected).
- Groundwater resources beneath the site (negligible likelihood of contamination expected).

4.6. Potential for Contamination

The Subject Site is not listed in any of the contaminated land databases. Based on the results of the desktop assessment, the overall likelihood for *significant* chemical contamination to be present within the site is low.

Although agricultural activities at the Subject Site is reasoned to have a potential for contaminating surface soils at the site, the type and quantity of contaminants introduced through this land use is not expected to have led to significant contamination of the surface soils.



5. SITE INVESTIGATION

5.1. General

The objective of the investigation is to determine whether there are any environmental risks associated with the Investigation Area that could affect the proposed future development and would require further investigation or action to render the site suitable for its intended use.

The desktop evaluation of the site history and current use of the site did not identify any significant risks in this regard but did identify both historical and current land use activities that could contribute to contamination of the surface soils of the Subject Site.

Barnson conducted an inspection of the Investigation Area on 30 March 2023. The purpose of the site inspection was to verify the findings of the desktop assessment, as well as to collect confirmatory samples of soil from areas of the Subject Site where development is proposed, or contamination is suspected.

Based on the findings of the CSM the inspection and sampling were focussed on the surface soils (0-150mm).

During the site inspection the following observations were made:

- The Subject Site is fenced and access to the site is controlled. There are several informal vehicle paths traversing the site and there is at least two (2) access gates and paths from the Cragie Lea Lane frontage (see Figure 5.1).
- At the time Barnson conducted the site inspection, most of the Investigation Area was covered with tall pasture grass. All areas were attended by vehicle, where vehicle paths were available, and all visible open ground and prominent features were inspected. No visible discoloration or staining of open ground or soil, and no obvious discoloration or irregularities in the occurrence of vegetation was observed during the site inspection.
- Surface soils over most of the Investigation Area are soft red sands (Figure 5.2), however, in the areas where gilgai are present surface soils consist of grey sticky clay. Gilgai areas were wet at the time of the site inspection (Figure 5.3).
- The surface water observed on site were confined to a dams located on the property (See Figure 2.2).
- There was no evidence found to indicate that any part of the Investigation Area previously contained structures. No evidence of demolition waste or footings of any previous structures were observed during the site investigations.



Figure 5.1: Gate from Cragie Lea Lane.



Figure 5.2: Red surface soil encountered in majority of the Investigation Area.



Figure 5.3: Gilgai with green vegetation indicating wet area.

5.2. Confirmatory Sampling

The purpose of collecting confirmatory samples as part of the site inspection is to determine if any of the potential contaminants identified from the CSM are present. The samples are not intended for statistically valid characterisation or quantification of contamination levels.

Based on the findings of the CSM the inspection and sampling were focussed on the surface soils (0-150mm). Samples of soil were collected from the areas of the site where surface soils were accessible. The sample collection was coordinated with the geotechnical investigation of the site and while some locations coincide with that of the geotechnical bore locations, samples were also collected from high traffic areas, such as near the access gate, as well as inside gilgai focussed on areas of the site proposed for potential redevelopment.

Table 5.1 is a summary description of the collected samples submitted for analysis. Figure 5.4 presents an outline of the of the Investigation Area with the locations of the surface soil samples indicated.

Table 5.1: Summary of sample details.

Sample Number	Collected samples Reference - Figure 5.4	Description
CL-01	1	Surface soil (0-150mm) sample collected from geotechnical bore near south-eastern corner of the investigation area
CL-02	2	Surface soil (0-150mm) sample collected from geotechnical bore near north-eastern corner of the investigation area.
CL-03	3	Surface soil (0-150mm) sample collected from geotechnical bore in central part of the investigation area, near dam.
CL-04	4	Surface soil (0-150mm) sample collected from vehicle path at gate in internal paddock fencing
CL-05	5	Surface soil (0-150mm) sample collected from central portion of the Investigation Area near vehicle path.
CL-06	6	Surface soil (0-150mm) sample collected in gilgai.
CL-07	7	Surface soil (0-150mm) sample collected from high traffic area inside Investigation Area near access gate.
CL-08	8	Surface Soil (0-150mm) sample collected inside shallow channel letting overland flow into gilgai area.
CL-09	9	Surface soil (0-150mm) sample collected from south-west corner of investigation area.
CL-10	10	Surface Soil (0-150mm) sample collected from geotechnical bore near eastern boundary of the investigation area

The pattern followed for the soil sampling can be described as Judgement Sampling, where points are selected on the basis of the investigator's knowledge of the proposed land use and likely distribution of contaminants at a site. It is an efficient sampling method for confirmatory sampling that utilises knowledge of the site history and field observations to direct sample collection (NSW EPA, 1995).

All samples were submitted to the Australian Laboratory Services (ALS) laboratory in Mudgee, for determination of the following parameters:

- metallic element (cadmium, chromium, copper, lead, nickel and zinc) concentrations, including arsenic and mercury in soil;
- Extraction with organic solvent and analysis of Total Recoverable Hydrocarbons (TRH) fractions C6 to C40, benzene, toluene, ethylbenzene and total xylene (BTEX), Polycyclic Aromatic Hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and phenols; and
- Extraction with organic solvent and analysis of Organochlorine (OCP) and Organophosphorus (OPP) pesticide compounds.

The ALS laboratory is NATA accredited for all the analysis indicated above.

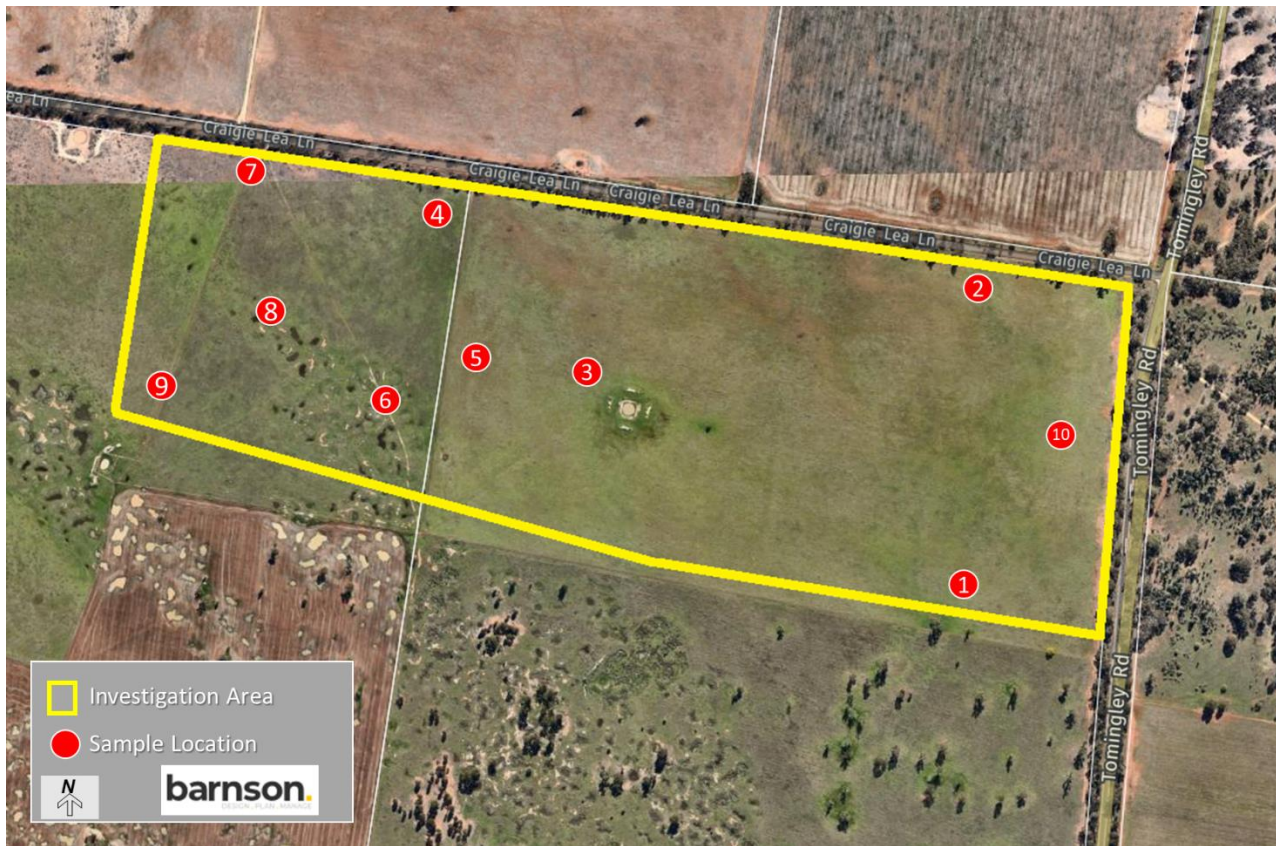


Figure 5.4: Surface soil sample locations.

5.3. Analytical Results

5.3.1. Surface Soil

The ALS report for the samples is attached as Appendix A. The laboratory report indicates that only metals were detected in the soil. The concentrations of petroleum hydrocarbons, pesticides, polycyclic organic compounds as well as total polychlorinated biphenyls are indicated as below the limits of detection in all surface soil samples.

The metals detected include chromium (Cr), copper (Cu), lead (Pb), nickel (Ni), Mercury (Hg), and zinc (Zn). Concentrations of cadmium and arsenic are reported to be below the limit of detection in all samples.

Table 5.2 presents a summary of the elements detected above the limit of detection in samples collected from the Subject Site.

Table 5.2: Summary of metal concentrations detected in soil samples collected from the Subject Site.

Analyte	CL-01	CL -02	CL -03	CL -04	CL -05	CL -06	CL-07	CL-08	CL-09	CL-10
	mg.kg ⁻¹									
Arsenic (As)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Cadmium (Cd)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium (Cr)	14	11	17	14	15	17	15	16	12	15
Copper (Cu)	6	<5	6	7	7	15	5	6	8	6
Lead (Pb)	6	5	6	7	7	12	6	6	7	7
Mercury (Hg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel (Ni)	5	3	5	7	7	10	5	4	7	5
Zinc (Zn)	8	5	7	9	9	25	7	9	11	9

5.4. Analytical Data Quality

Samples were collected in new, clean containers using cleaned equipment and soils were placed in glass jars provided by the laboratory that were refrigerated after filling and transported in an insulated container to the laboratory. Chain of custody was recorded for all samples. A copy of the signed sheet is attached as Appendix A.

The analyses were undertaken at a NATA accredited laboratory. The laboratory quality control procedures in the form of duplicates as well as analyte and surrogate spikes were applied to all contaminant classes analysed. The results reported for the duplicate is within the Relative Percent Difference range of the acceptance criteria for a duplicate sample. The analyte spike recoveries reported for the different sets of organic analytes are indicated as within the acceptance criteria (see Appendix A).

All media appropriate to the objectives of this investigation have been adequately analysed and no area of significant uncertainty exist. It is concluded the data is suitable for the purposes of the contaminated site investigation.

6. ASSESSMENT

6.1. Assessment Criteria – Human Health and Environmental Risk

Screening for human health and ecological risk, utilises published human health investigation levels (HILs) and ecological screening and investigation levels (ESLs & EILs) from the National Environment Protection (Assessment of Site Contamination) Measure (NEPC, 1999) to identify contaminant concentrations in soil that may pose a risk to future residents, people visiting the site, or to ecological receptors.

HILs are scientifically based, generic assessment criteria designed to be used in the screening of potential risks to human health from chronic exposure to contaminants. HIL's are conservatively derived and are designed to be protective of human health under the majority of circumstances, soil types and human susceptibilities and thus represent a reasonable 'worst-case' scenario for specific land-use settings. The HILs selected for evaluation of the Subject Site, and its continued use for industrial purposes, are those derived for commercial/industrial land use (HIL-D) and assumes a commercial land use such as shops, offices, factories or industrial sites with associated levels of access to potentially contaminated soil.

Although the primary concern in most site assessments is protection of human health, the assessment should also include consideration of ecological risks and protection of groundwater resources that may result from site contamination. EILs provide screening criteria to assess the effect of contaminants on a soil ecosystem and afford species level protection for organisms that frequent or inhabit soil and protect essential soil processes.

Ecological investigation levels (EILs) have been derived for common metallic contaminants in soil. The values selected for the evaluation of the heavy metals detected in the soil samples from the Subject Site considers the physicochemical properties of soil and contaminants and the capacity of the soil to accommodate increases in contaminant levels above natural background while maintaining ecosystem protection for identified land uses.

Table 6.1 presents a summary of the health-risk based criteria and ecological investigation levels selected for assessment of the detected metal concentrations.

6.2. Findings

Direct comparison of the analytical results presented in Table 5.2 with the assessment criteria (refer Table 6.1) show that the detected metal concentrations in samples collected from the Investigation Area are well below the health and ecological risk-based criteria values. The general low concentrations of heavy metals detected suggest naturally occurring element abundance and is most likely not related to any of the potential sources of contamination identified for the Investigation Area.

The samples of soil collected in the high traffic areas contained no elevated concentrations of hydrocarbons or heavy metals, while the samples collected from the gilgai contained no detectable concentrations of either pesticides or hydrocarbons. These results verify the assertion that the activities previously undertaken at the site did not contribute significant or widespread contamination to the surface soils.

Table 6.1: Human health and ecological risk screening levels for metals.

Element	Health-based Investigation Levels Commercial/Industrial D mg.kg ⁻¹	Ecological Investigation Levels (EIL) Commercial/Industrial mg.kg ⁻¹
Arsenic (As)	3,000	160
Cadmium (Cd)	900	NA
Chromium (Cr) (Total)	NR	660
Copper (Cu)	240,000	830
Lead (Pb)	1,500	1,800
Mercury (Hg)	730	NA
Nickel (Ni)	6,000	55
Zinc (Zn)	400,000	360

Note: NR=not relevant due to low human toxicity of Cr(III). NA=No applicable screening level. EILs selected are most conservative values relevant to commercial land use scenarios.

7. CONCLUSIONS AND RECOMMENDATIONS

In accordance with the objectives stated in Section 1.2, and based on the information contained within this assessment, the following conclusions are presented (subject to the limitations noted in Section 1.5):

- Activities associated with the historical and current use of the Subject Site were identified as having a potential to contaminate surface soil at the site.
 - The following potential sources of contamination were identified:
 - Historical and current livestock farming and grazing activities;
 - Historical and current feed-crop cultivation;
 - Use, maintenance and storage of motorised vehicles and equipment, and
 - Localised waste disposal
 - A review of the available historical information, including contaminated sites databases and aerial photographs indicated a low potential for significant environmental contamination to be present across the site.
 - A site investigation conducted to determine the presence and significance of potential contamination associated with the identified sources, revealed that none of the potential sources identified are likely to have contributed significant quantities of contamination to the surface soils of the Investigation Area.
 - Based on the findings of the desktop review, site investigation and confirmatory sampling and analysis, it is concluded that the Investigation Area is suitable for the future proposed development and use. The environmental media such as surface soils and surface water at the Investigation Area are unlikely to present a risk of impact to the health of humans or the environment and further investigation is not required.
 - It is recommended that any material excavated at the Subject Site as part of the redevelopment, be classified in accordance with the general solid waste (NSW EPA, 2014) guidelines and appropriately disposed.
-

8. REFERENCES

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- Narromine LEP. (2011). *Narromine Local Environmental Plan 2011*. Retrieved January 20, 2020, from NSW Legislation: <https://www.legislation.nsw.gov.au/#/view/EPI/2012/55>
- NEPC. (1999). *National Environment Protection (Assessment of Site Contamination) Measure (as amended, 2013)*. National Environment Protection Council.
- NSW EPA. (1995). *Contaminated Sites: Sampling Guidelines*. NSW Environmental Protection Agency.
- NSW EPA. (2014a). *Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014, The excavated natural material order 2014*. Sydney: NSW Environment Protection Authority.
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- WaterNSW. (2023). *Real Time Data*. Retrieved February 27, 2023, from Water NSW: <https://realtimedata.waternsw.com.au/water.stm>
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APPENDIX A

Chain of Custody and Laboratory Report

**CERTIFICATE OF ANALYSIS**

Work Order	: ME2300735	Page	: 1 of 13
Client	: BARNSON	Laboratory	: Environmental Division Mudgee
Contact	: Nardus Potgieter	Contact	: Mary Monds (ALS Mudgee)
Address	: Unit 4 108-110 Market Street MUDGEES NSW 2850	Address	: 1/29 Sydney Road Mudgee NSW Australia 2850
Telephone	: 0429 464 067	Telephone	: +61 2 6372 6735
Project	: Soil	Date Samples Received	: 17-Apr-2023 14:40
Order number	: ----	Date Analysis Commenced	: 18-Apr-2023
C-O-C number	: ----	Issue Date	: 27-Apr-2023 18:01
Sampler	: Nardus Potgieter (Client Sampler)		
Site	: ----		
Quote number	: SY/053/14		
No. of samples received	: 14		
No. of samples analysed	: 14		



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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
- Surrogate Control Limits

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>
Aleksandar Vujkovic	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Dian Dao	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW



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 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

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.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP068: Where reported, Total OCP is the sum of the reported concentrations of all Organochlorine Pesticides at or above LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EA058 Emerson: V. = Very, D. = Dark, L. = Light, VD. = Very Dark
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H+ + Al3+).



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 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				CL-01 Surface Soil	CL-02 Surface Soil	CL-03 Surface Soil	CL-04 Surface Soil	CL-05 Surface Soil
Sampling date / time				30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	ME2300735-001	ME2300735-002	ME2300735-003	ME2300735-004	ME2300735-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	7.6	5.8	7.4	6.9	8.1
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	14	11	17	14	15
Copper	7440-50-8	5	mg/kg	6	<5	6	7	7
Lead	7439-92-1	5	mg/kg	6	5	6	7	7
Nickel	7440-02-0	2	mg/kg	5	3	5	7	7
Zinc	7440-66-6	5	mg/kg	8	5	7	9	9
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05



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 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				CL-01 Surface Soil	CL-02 Surface Soil	CL-03 Surface Soil	CL-04 Surface Soil	CL-05 Surface Soil
Sampling date / time				30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	ME2300735-001	ME2300735-002	ME2300735-003	ME2300735-004	ME2300735-005
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5



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 Client : BARNSON
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Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				CL-01 Surface Soil	CL-02 Surface Soil	CL-03 Surface Soil	CL-04 Surface Soil	CL-05 Surface Soil
Sampling date / time				30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	ME2300735-001	ME2300735-002	ME2300735-003	ME2300735-004	ME2300735-005
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5



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 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				CL-01 Surface Soil	CL-02 Surface Soil	CL-03 Surface Soil	CL-04 Surface Soil	CL-05 Surface Soil
Sampling date / time				30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	ME2300735-001	ME2300735-002	ME2300735-003	ME2300735-004	ME2300735-005
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	96.6	122	113	111	125
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	74.1	94.5	86.5	94.0	88.6
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	61.4	53.2	50.0	61.0	64.6
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	79.9	82.1	76.9	76.2	77.0
2-Chlorophenol-D4	93951-73-6	0.5	%	81.8	86.6	79.8	78.9	79.4
2,4,6-Tribromophenol	118-79-6	0.5	%	54.2	61.8	47.6	44.0	43.8
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	82.9	82.5	81.4	80.5	81.8
Anthracene-d10	1719-06-8	0.5	%	88.9	89.0	85.0	89.0	88.2
4-Terphenyl-d14	1718-51-0	0.5	%	84.2	83.4	80.2	81.0	79.9
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.2	%	110	125	119	120	116
Toluene-D8	2037-26-5	0.2	%	85.4	82.9	88.3	86.4	88.6
4-Bromofluorobenzene	460-00-4	0.2	%	84.3	89.4	87.7	87.7	85.8



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 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				CL-06 Surface Soil	CL-07 Surface Soil	CL-08 Surface Soil	CL-09 Surface Soil	CL-10 Surface Soil
Sampling date / time				30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	ME2300735-006	ME2300735-007	ME2300735-008	ME2300735-009	ME2300735-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	22.7	7.9	6.3	11.0	5.9
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	17	15	16	12	15
Copper	7440-50-8	5	mg/kg	15	5	6	8	6
Lead	7439-92-1	5	mg/kg	12	6	6	7	7
Nickel	7440-02-0	2	mg/kg	10	5	4	7	5
Zinc	7440-66-6	5	mg/kg	25	7	9	11	9
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05



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 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	CL-06 Surface Soil	CL-07 Surface Soil	CL-08 Surface Soil	CL-09 Surface Soil	CL-10 Surface Soil
Sampling date / time					30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	ME2300735-006	ME2300735-007	ME2300735-008	ME2300735-009	ME2300735-010	
				Result	Result	Result	Result	Result	
EP068A: Organochlorine Pesticides (OC) - Continued									
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	



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 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				CL-06 Surface Soil	CL-07 Surface Soil	CL-08 Surface Soil	CL-09 Surface Soil	CL-10 Surface Soil
Sampling date / time				30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	ME2300735-006	ME2300735-007	ME2300735-008	ME2300735-009	ME2300735-010
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5



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 Project : Soil

Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				CL-06 Surface Soil	CL-07 Surface Soil	CL-08 Surface Soil	CL-09 Surface Soil	CL-10 Surface Soil
Sampling date / time				30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	ME2300735-006	ME2300735-007	ME2300735-008	ME2300735-009	ME2300735-010
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	114	110	121	110	103
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	73.7	90.8	92.6	108	133
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	70.9	67.1	53.8	98.4	70.8
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	83.7	78.3	81.9	76.5	81.1
2-Chlorophenol-D4	93951-73-6	0.5	%	86.2	81.1	84.6	76.5	82.6
2,4,6-Tribromophenol	118-79-6	0.5	%	66.7	53.0	57.2	46.8	47.1
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	81.7	79.7	81.4	78.8	81.8
Anthracene-d10	1719-06-8	0.5	%	86.6	84.2	86.0	81.9	89.2
4-Terphenyl-d14	1718-51-0	0.5	%	81.5	79.2	80.4	79.4	87.1
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.2	%	102	104	120	119	120
Toluene-D8	2037-26-5	0.2	%	76.0	75.7	96.0	87.8	92.4
4-Bromofluorobenzene	460-00-4	0.2	%	79.2	77.1	106	86.7	101



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 Client : BARNSON
 Project : Soil

Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				CL-A-S Surface Soil	CL-A-D Sub-soil	CL-B-S Surface Soil	CL-B-D Sub-soil	----
Sampling date / time				30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	----
Compound	CAS Number	LOR	Unit	ME2300735-011	ME2300735-012	ME2300735-013	ME2300735-014	-----
				Result	Result	Result	Result	---
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	6.3	----	6.5	----	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	10	----	26	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	7.4	----	8.7	----	----
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Dark Reddish Brown (5YR 3/4)	Dark Red (2.5YR 3/6)	Dark Grayish Brown (10YR 4/2)	Very Dark Grayish Brown (10YR 3/2)	----
Texture	----	-	-	Silty Loam	Silty Clay Loam	Medium Heavy Clay	Clay Loam	----
Emerson Class Number	EC/TC	-	-	2	2	1	2	----
EA150: Soil Classification - National Committee on Soil and Terrain (2009)								
Clay (<2 µm)	----	1	%	20	27	13	35	----
Silt (2-20 µm)	----	1	%	9	9	10	7	----
Fine Sand (0.02-0.2 mm)	----	1	%	37	32	35	26	----
Coarse Sand (0.2-2.0 mm)	----	1	%	31	30	34	26	----
Gravel (>2mm)	----	1	%	3	2	8	6	----
EA152: Soil Particle Density								
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.57	2.59	2.47	2.61	----
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	3.2	----	3.5	----	----
Exchangeable Magnesium	----	0.1	meq/100g	1.0	----	1.3	----	----
Exchangeable Potassium	----	0.1	meq/100g	0.8	----	1.0	----	----
Exchangeable Sodium	----	0.1	meq/100g	<0.1	----	0.1	----	----
Cation Exchange Capacity	----	0.1	meq/100g	5.0	----	5.8	----	----
Exchangeable Sodium Percent	----	0.1	%	0.4	----	1.8	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	340	----	1090	----	----
EK072: Phosphate Sorption Capacity								
Phosphate Sorption Capacity	----	250	mg P sorbed/kg	649	----	506	----	----



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 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2,4,6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	63	125
Toluene-D8	2037-26-5	67	124
4-Bromofluorobenzene	460-00-4	66	131



Page : 13 of 13
 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

Inter-Laboratory Testing

Analysis conducted by ALS Brisbane, NATA accreditation no. 825, site no. 818 (Chemistry) 18958 (Biology).

(SOIL) EA058: Emerson Aggregate Test

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(SOIL) EA150: Soil Classification - National Committee on Soil and Terrain (2009)

(SOIL) EA152: Soil Particle Density

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(SOIL) EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions

(SOIL) EP080/071: Total Petroleum Hydrocarbons

(SOIL) EP080: BTEXN

(SOIL) EP080S: TPH(V)/BTEX Surrogates

(SOIL) EP075(SIM)B: Polynuclear Aromatic Hydrocarbons

(SOIL) EP075(SIM)S: Phenolic Compound Surrogates

(SOIL) EP075(SIM)T: PAH Surrogates

(SOIL) EP068A: Organochlorine Pesticides (OC)

(SOIL) EP068B: Organophosphorus Pesticides (OP)

(SOIL) EP068T: Organophosphorus Pesticide Surrogate

(SOIL) EP068S: Organochlorine Pesticide Surrogate

(SOIL) EA055: Moisture Content (Dried @ 105-110°C)

(SOIL) EP066: Polychlorinated Biphenyls (PCB)

(SOIL) EP066S: PCB Surrogate

(SOIL) EG035T: Total Recoverable Mercury by FIMS

(SOIL) EG005(ED093)T: Total Metals by ICP-AES

(SOIL) EK062: Total Nitrogen as N (TKN + NO_x)

(SOIL) EK072: Phosphate Sorption Capacity

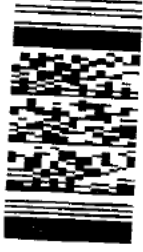
(SOIL) EA002: pH 1:5 (Soils)

(SOIL) EA010: Conductivity (1:5)

(SOIL) ED007: Exchangeable Cations



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CHAIN OF CUSTODY AND ANALYTICAL REQUEST

Job Number	40038	Date	17/04/2023
Laboratory	ALS Mudgee	Report to	Nardus Potgieter npotgieter@barnson.com.au
Sample Temperature on Receipt		Notes	
20 °C	Signature: [Redacted]		

Sample ID	Sample Description	Sample Date	Sample type	Analysis request					
				1	2	3	4	5	6
CL-01	Surface soil	30/03/2023	Soil	X					
CL-02	Surface soil	30/03/2023	Soil	X					
CL-03	Surface soil	30/03/2023	Soil	X					
CL-04	Surface soil	30/03/2023	Soil	X					
CL-05	Surface soil	30/03/2023	Soil	X					
CL-06	Surface soil	30/03/2023	Soil	X					
CL-07	Surface soil	30/03/2023	Soil	X					
CL-08	Surface soil	30/03/2023	Soil	X					
CL-09	Surface soil	30/03/2023	Soil	X					
CL-10	Surface soil	30/03/2023	Soil	X					
CL-A-S	Surface soil	30/03/2023	Soil		X	X	X	X	X
CL-A-D	Sub-soil	30/03/2023	Soil					X	X
CL-B-S	Surface soil	30/03/2023	Soil		X	X	X	X	X
CL-B-D	Sub-soil	30/03/2023	Soil					X	X

Analysis request		Method Code
1	TRH (C6-C40) / BTEXN / PAH / OC / OP / PCB / 8 Metals	S-16
2	pH plus EC (Saturated Paste) plus Exchangeable Cations and ECEC plus ESP	AG-1
3	P Sorption Capacity	EK072
4	Total Nitrogen as N*	EK062
5	Soil Classification by Particle Size Analysis (Sieve Hydrometer and SPD analysis to "Yellow Book" spec)	EA150H-Y
6	Emerson Aggregate Testing	EA058

Relinquished by / Affiliation	Accepted by / Affiliation	Date
[REDACTED] / Barnson	[REDACTED] / ALS Mudgee	17/04/2023 240



APPENDIX H

Onsite Effluent Management Report



On-Site Effluent Management Report

Client: Narromine Shire Council

Site Address: 397 Craigie Lea Lane,
Narromine, NSW 2821

14 August 2023

Our Reference : 40038-ER02_B

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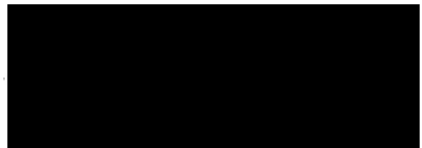
DISCLAIMER

This report has been prepared solely for Narromine Shire Council (the Client) in accordance with the scope provided and for the purpose(s) as outlined throughout this report. Barnson Pty Ltd accepts no liability or responsibility for or in respect of any use or reliance upon this report and its supporting material by anyone other than the client.

Installation must be by a licensed plumber and Barnson will not be liable for the incorrect installation and/or construction of the system. Installation and construction of the system must hold true to the design recommendations presented in this report. Installation should be in accordance with the prescriptions within AS 1547:2012.

Unless otherwise stated in this report, Barnson has not verified the accuracy or completeness of the data retrieved from online databases and guidance documents. The recommendations for the proposed system as presented in this report are based on historical data obtained for the area. Barnson will not be liable in relation to incorrect recommendations should any information provided by the client be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed.

The accuracy of the advice provided in this report may be limited by unobserved variations in ground conditions across the site in areas between and beyond test locations and by any restrictions in the sampling and testing which was able to be carried out, as well as by the amount of data that could be collected given the project and site constraints. These factors may lead to the possibility that actual ground conditions and materials behaviour observed at the test locations may differ from those which may be encountered elsewhere on the site. If the sub-surface conditions are found to differ from those described in this report, we should be informed immediately to evaluate whether recommendations should be reviewed and amended if necessary.

Project Name:	397 Craigie Lea Lane, Narromine, NSW 2821
Client:	Narromine Shire Council
Project Number:	40038
Report Reference:	40038 ER02_B
Date:	14/08/2023
Prepared by:	Reviewed by:
	
Nardus Potgieter MSc(Chem) BSc(Hons)(Env.Tech.) Senior Environmental Scientist	Jeremy Wiatkowski AdvDip Laboratory Operations Senior Laboratory Technician

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1. INTRODUCTION

1.1 Overview

This report has been prepared by Barnson Pty Ltd on behalf of Narromine Shire Council (the Client), in support of the industrial development of the property located at 397 Craigie Lea Lane, Narromine, NSW 2821 (hereafter referred to as the Subject Site).

The Subject Site is located approximately 7kms south of Narromine. Figure 1.1 presents a map indicating the location of the Subject Site. The site identified for the development is an area of approximately 95ha located in the north-eastern half of Lot 21 DP 592824, hereafter referred to as the Investigation Area. A site plan showing the proposed layout of the new development is attached as Appendix A.

As the property is not sewered, the proposed development will require on-site wastewater management.

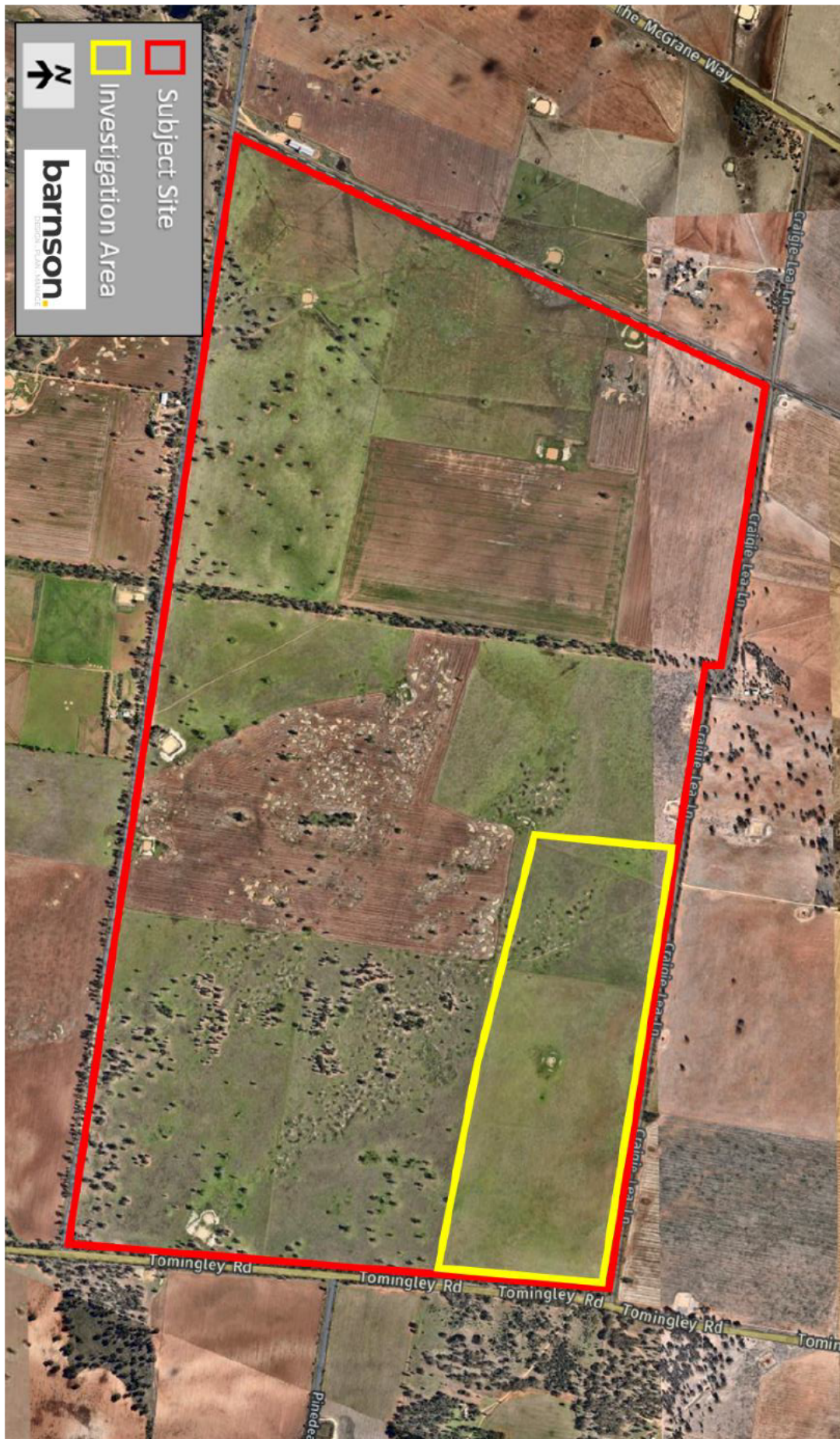
The purpose of this report is to present the findings of a site inspection and geotechnical investigation undertaken of the Investigation Area in support of design recommendations for on-site wastewater management. The assessment evaluates the constraints of the Subject Site and Investigation area in order to inform the design and siting of a system or systems capable of accommodating wastewater effluent from the proposed new development.

1.2 Key References

The following key references were utilised as part of this assessment:

- AS/NZS 1547:2012. *On-site Domestic Wastewater Management*;
- NSW Government 1998. *On site Sewerage Management for Single Households* (The Silver Book/OSMSH);
- NSW Government 2000. *The Easy Septic Tank Guide*. Developed by Social Change Media for the NSW Department of Local Government;
- NSW Health, 2001. 'Septic Tank and Collection Well Accreditation Guidelines';
- Narromine Shire Council 'Development Control Plan (2011); Narromine Local Environmental Plan 2011; Murphy B.W. & Lawrie J.W. 1998. Soil Landscapes of the Dubbo 1:250 000 Sheet Report, DLWC.
- Sydney Catchment Management Authority, 2019. *Designing and Installing On-Site Wastewater Systems*
- NSW Government 2000. *Environmental Planning and Assessment Regulation*. Schedule 3 - Part 1: 29 Sewerage systems and sewer mining systems.

Figure 1.1: Location of the Subject Site and Investigation Area



1.3 System Requirements

1.3.1 Design Allowances

The purpose of this assessment is to evaluate the capabilities of the Investigation Area to accommodate on-site wastewater management. The evaluation considers the establishment of industrial facilities at each of the proposed lots accommodating offices and workshops. It is assumed that each facility has a small kitchen and ablution amenities providing water closet (toilet), urinal, basin and shower facilities to staff. The wastewater generated from the facilities is assumed to consist of grey and blackwater sewage effluent. Industrial effluent is not considered as part of this assessment.

For the purpose of this site capability assessment, it is assumed that wastewater from each of the proposed lots is reticulated to a central point where it is treated and the treated effluent disposed off. Although separate on-site wastewater treatment systems at each individual lot is possible, this option is not evaluated at this time.

In accordance with NSW Health 'Septic Tank and Collection Well Accreditation Guidelines' (2001), the recommended design flow allowance for factories and offices is 43L/person/day. Assuming each of the proposed lots will employ an average of 7 to 8 people the total staff complement of the subdivision is assumed to be a maximum of 200 persons. The estimated daily maximum volume of wastewater generated for the development is then max 200 staff at 43L/person/day = 8,600L/day.

1.3.2 Narromine Shire Council Requirements

The Narromine Shire Council 'On-site Sewage Management Strategy' (2014) notes that Property owners are required to obtain an approval to install and operate a new system or to operate an existing system.

According to the strategy, a system of sewage management must be operated:

- in accordance with the relevant operating specifications and procedures (if any) for the sewage management facilities used for the purpose, and
- to allow the removal of any treated sewage (and any by- product of any sewage) in a safe and sanitary manner.

The strategy sets out to develop a way by which the requirements can be put into practice with minimum burden to Council and the community while achieving maximum benefits for the environment, public health and community amenity.

A risk management approach is applied, which allocate a low, medium or high risk rating to systems. Owners of low risk systems will not be required to renew their approval to operate. Owners of medium risk systems will consist of those systems with minor problems and be required to receive an inspection every three years, and owners of high risk systems will be required to renew their approval to operate and receive an inspection every two years.

A summary of the risk rating system is attached in Appendix B. Among the indicative criteria listed for each category, those relating to the medium-risk rating category have the most relation to the activity proposed at the Subject Site.

The Narromine Shire Council 'On-site Sewage Management Strategy' (2014) does not explicitly specify buffer distances for the on-site wastewater management system. However, the Narromine Shire Council 'Development Control Plan (DCP, 2011) (Chapter 5c Rural Development)' does list buffer distances as well as provide recommendations in regards to system selection. The buffer distances recommended are as follows:

All Land Application Systems

- 100m to permanent surface waters (e.g. river, streams, lakes, etc.);
- 250m horizontal distance to a domestic groundwater well;
- 40m to other water bodies (e.g. farm dams, intermittent waterways and drainage channels, etc.)

Absorption Systems

- 12m if area up-gradient and 6m if area down gradient of swimming pools, property boundaries, driveways and buildings;

Surface Spray Irrigation

- 6m if area up-gradient and 3m if area down-gradient of driveways and property boundaries;
- 15m to dwellings;
- 3m to paths & walkways;
- 6m to swimming pools;

Surface, Trickle & Subsurface Irrigation

- 6m if area up-gradient and 3m if area down-gradient of swimming pools, property boundaries, driveways and buildings;

The DCP further notes that when determining buffer distances, consideration should be given to:

- The type of land application system to be used;
- Surface and sub surface drainage pathways;
- Site factors – soil permeability, geology, vegetation buffering;
- Sensitive environments; and
- Development density.

In addition the DCP notes that

- Sanitary drainage must be disposed of to an effluent disposal field designed and constructed to the requirements of the relevant Australian Standard;
- The sewage management facility treatment disposal field is to be located, where possible, 500mm above the 1% AEP;

- Recommended buffer distances for On-site Sewerage Management Systems (septic tanks). (Local Government Environment and Health Protection Guidelines: on-site sewage management for single households 1998).
- Areas identified as medium or high groundwater vulnerability (according to the Narramine Local Environmental Plan 2011), require consideration of aerated or pump-out systems.

Other site buffer requirement as per AS/NZS 1547:2012 are provided in Appendix C.

2. SITE AND SOIL EVALUATION

2.1. Site Evaluators Details

Table 2.1 provides an overview of the evaluator's particulars.

Table 2.1: Details

Name / Role	Nardus Potgieter
Role/ Qualifications	Environmental Scientist
Company	Barnson Pty Ltd
Company Address	Unit 4 108-110 Market St, Mudgee NSW 2850
Contact Details	Phone: 1300 BARNSON
Date of Assessment	14/08/2023

2.2. Site Information

Table 2.2 provides an overview of the site information.

Table 2.2: Site Particulars

Address/Locality	397 Craigie Lea Lane, Narromine, NSW 2821
Total Subject Site Area	Approx. 830ha
Investigation Area	Approx. 95ha
Local Government Area	Narromine Shire Council
Owner	Australian Rail Track Corporation
Intended Water Supply	Roof rainwater collection
Intended Power Supply	Supplied
Local Experience	Care needs to be taken to minimise runoff and erosion. Systems commonly malfunction due to lack of ongoing maintenance. The system is to be inspected and maintained regularly in accordance with manufacturer details, Council requirements, and prescriptions identified in this report.

2.3. Site Parameters and Constraints

The following information (Table 2.3) was obtained via desktop review of the site.

Table 2.3: Desktop Assessment Details

Climate Overview ¹	Annual Average Rainfall for Narromine is 583.4mm. Warm summers with large evaporative deficit, cool winters with small evaporative deficit. The mean summer monthly rainfall (January) is 56.6mm. The mean winter rainfall (July) is 43.0mm. The mean monthly summer evaporation (January) is 254mm. The mean monthly winter evaporation (July) is 41mm.	
Soil Landscape Reference ²	The Subject Site is mapped within the three hydrogeological landscapes namely the 'Trangie, Terowie and Wyanga', with the Terowie and Wyanga landscapes covering the Investigation Area. In these landscapes, soils are described as comprises a range of unlithified materials including unconsolidated Quaternary alluvial and colluvial sediments and older Cenozoic sediments. The Investigation area mainly include alluvium which consist of gravel, sand, silt and clay.	
	Surface Conditions	Sandy but firm, coarse fragments are not evident. Clay in localised areas (gilgai)
	Drainage	Moderate
	Depth to bedrock	>150cm
	Flood hazard	Nil
	Soil Salinity	This unit is characterised by subsoil salinity rather than salt occurring throughout the soil profile.
	Erosion Hazard	Generally low to moderate erodibility. Highly erodible sodic soils occur throughout the landscape
	Urban Capability	Generally low limitations. Locally high limitations occur where dispersive soils with run-on and runoff pose problems for foundation and road stability.
Underlying Geology ³	Soils have formed on Tertiary alluvium underlain by mudstone and sandstone of the Forbes group.	

¹ Bureau of Meteorology online Climate Data website

² NSW Soil and Land Information System

³ Narromine 1:250000

A portion of the Investigation Area is covered in a series of small mounds and depressions known as gilgai. The depressions seasonally fill with water and retains this water as a result of underlying expanding clay soils. The area of the Investigation Area where the gilgai is most well observed is outlined in Figure 2.1.

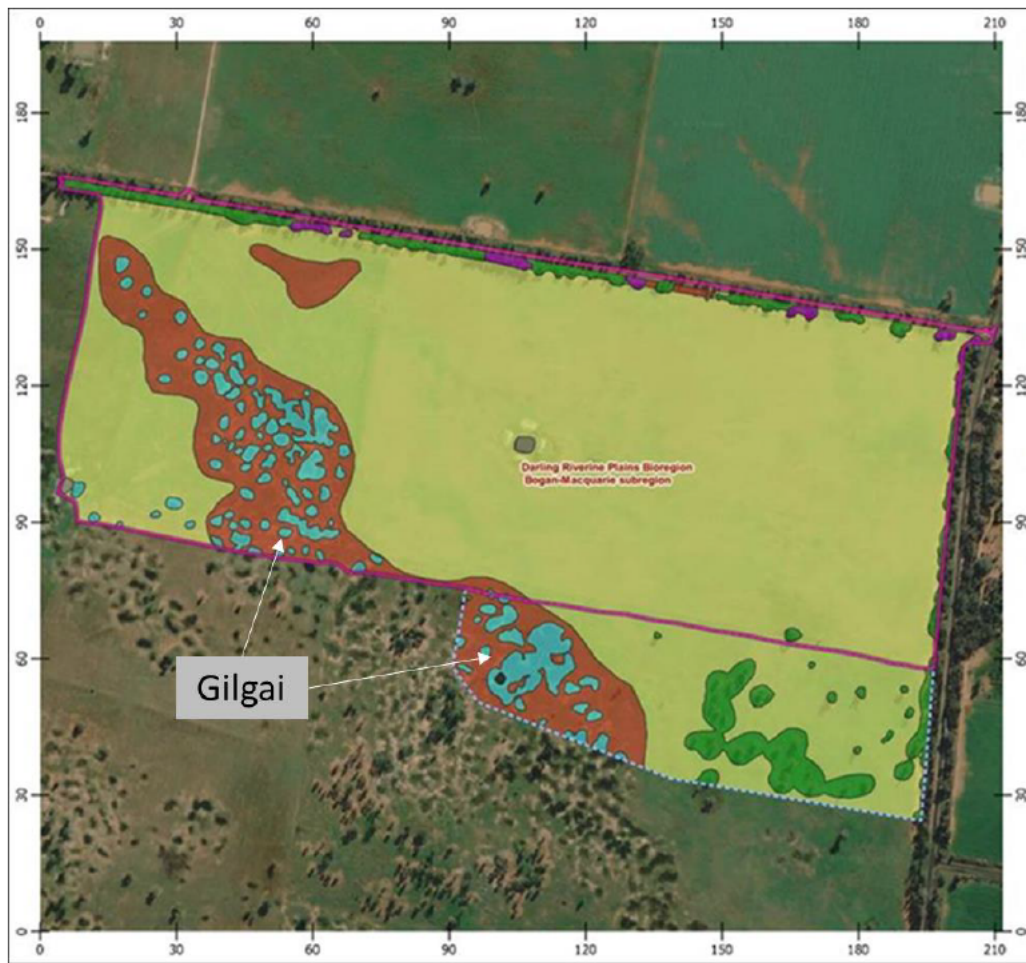


Figure 2.1: Aerial view of Investigation Area indicating location of gilgai.

The Subject Site is not shown as groundwater vulnerable on the Groundwater Vulnerability Map as published in the Narromine Local Environmental Plan (Narromine LEP, 2011). However, the western portion of the investigation area, covering portions of Lot1 and 2, are shown as containing terrestrial biodiversity values (see Figure 2.2) on the Terrestrial Biodiversity Map included in the Narromine LEP (2011).

The Subject Site is not shown as being affected by flooding on the Flood Planning Map included in the Narromine LEP (2011).



Figure 2.2: Environmentally sensitive land inside Investigation Area.

2.4. Groundwater Review

A review of existing groundwater bore records (WaterNSW, 2023) indicate 1 registered groundwater bore within the boundaries of the Subject Site (see Figure 2.3). The information recorded in the database for this bore (GW001565) and two more closest to the Subject Site (GW002441 and GW000306) indicate an average depth of between 89m and 112m deep. Only the on-site bore has data reported for depth of water bearing zones, indicating 50.3m, with standing water level of 42m and average yields 0.38L/s. According to the database all bores are used for stock.

The Subject Site falls outside the area mapped as groundwater vulnerable in the Narromine Local Environmental Plan (Narromine LEP, 2011). Based on the lithology of the area, aquifers are deep and unconfined with groundwater flow occurring vertically and laterally through fractures in bedrock. Most aquifers are isolated from surface by thick layers of clay with low hydraulic conductivity and transmissivity. High runoff rates occur on steeper slopes.

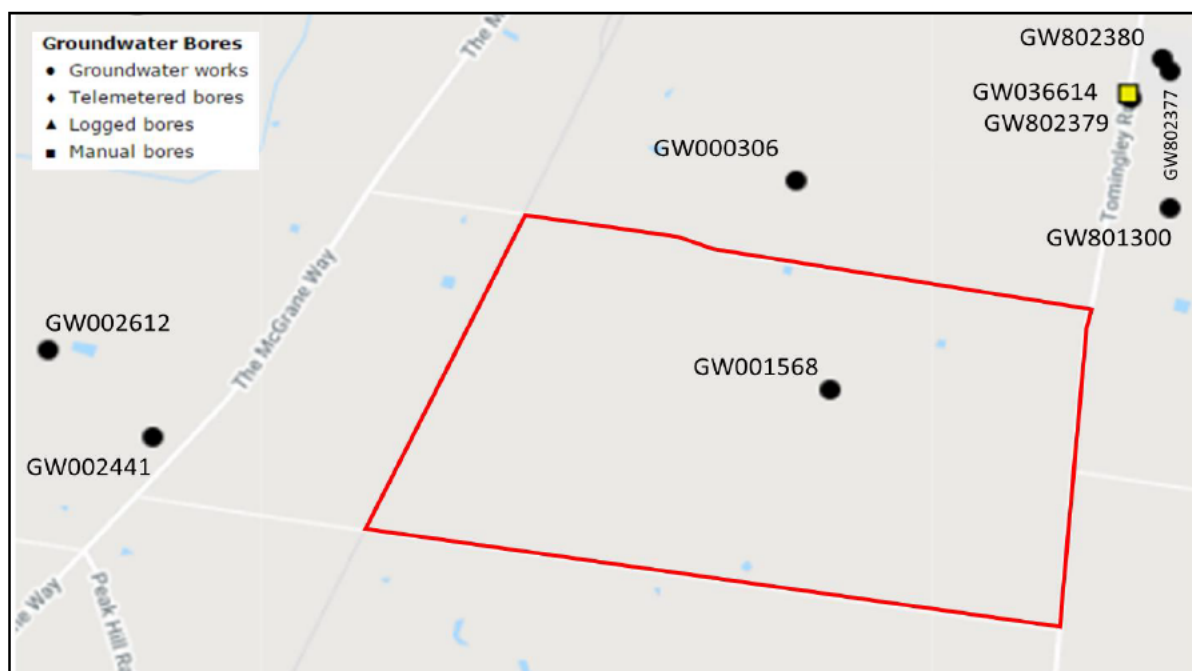


Figure 2.3: Groundwater bores near the Subject Site.

Source: WaterNSW All Goundwater Map, accessed 22/05/2023

The information recorded in the database for the groundwater bores indicates the depth of the bores reach final depths ranging from 61.0m to 85.0m. With a Standing Water Level (S.W.L) of 8m recorded for GW803397 and provided a Water Bearing Zone (W.B.Z) of 22.00m thick, starting at 9m. According to the database, the bores are utilised for domestic or stock watering purposes. Drillers logs record a layer of sticky clay from surface up to

Table 2.4 present details for GW01568 (on site bore) and GW000306 which is located at a distance of approximately 200m north-west of the Subject Site.

Table 2.4: Groundwater Review

Groundwater Bore Reference	Total Depth (m)	Water Bearing Zones (m)	Standing Water Level (m)	Yield (L/s)	Salinity
GW001568 Bore, On-Site Stock	89	50.3	42.7	0.38	no data
GW000306 Bore, 200m NW Unknown	94.4	no data	no data	no data	no data

NA - Information not provided in database

2.5. Surface Water

The closest natural water body is the Yellow Creek, which represents the main drainage for the area, at its closest point it is located approximately 200m to the south from the south-western corner of the Subject Site.

2.6. Topography

The Subject Site generally flat with a gentle slope from an elevated area near the south-eastern corner toward the west and north-west at less than 1%. The Investigation area slopes in the same general direction at less than 1%.

2.7. Field Assessment Information

A geotechnical investigation was undertaken of the Subject Site on 30/03/2023. Samples of soil was collected and submitted to the Australian Laboratory Services laboratory in Mudgee for analysis on 17/03/2023. Four soil samples were collected during the site investigation as per AS1289.1.2.1.6.5.3, two at a depth of 800mm and two at surface (0-150mm). The locations of the soil samples are indicated as A and B in Figure 2.4.



Figure 2.4: Location of soil samples

Laboratory results for the four samples are summarised in Table 2.5. Material test reports are provided at Appendix D. Field assessment parameters were also obtained. Table 2.6 provides detail

on the findings of the site assessment as well as the field and laboratory results. A bore log for geotechnical bores undertaken of the investigation area is attached as Appendix D in confirmation of the observed soil horizons.

Table 2.5: Soil Assessment Details

Depth to bedrock or hardpan via field assessment		>1.0m		
Depth to high soil water table via field assessment		>1.0m		
		Location A	Location B	
	pH (1:5) (surface soil)		6.3	6.5
	Emerson Test Result	surface soil	2 (moderate dispersion)	1 (severe dispersion)
		sub-soil	2 (moderate dispersion)	2 (moderate dispersion)
	Electrical conductivity (µS/cm)		10	26
	Soil Classification,	surface soil	Clay: 20% Silt: 9% Fine sand: 37% Course sand: 31% Gravel: 3%	Clay: 13% Silt: 10% Fine sand: 35% Course sand: 34% Gravel: 8%
		subsoil	Clay: 27% Silt: 9% Fine sand: 32% Course sand: 30% Gravel: 2%	Clay: 35% Silt: 7% Fine sand: 26% Course sand: 26% Gravel: 6%
	Soil Category	-surface soil, -subsoil	4 (Silty Loam) 4 (Silty Clay Loam)	6 (Medium Heavy Clay) 6 (Medium Heavy Clay)
	Structure:	- surface soil, -subsoil	moderate structured moderate structured	
	Soil Particle Density (Clay/Silt/Sand) (g/cm³)		2.57 – 2.59	2.47-2.61
	Exchangeable Sodium - surface soil (%)		0.4	1.8
	Total Nitrogen as N - surface soil (mg/kg)		340	1090
Phosphate Sorption Capacity - surface soil (mg P sorbed/kg soil)		649	506	
Surface soil Permeability (from table 5.2 of AS 1547:2012)		0.5-1.5 (k _{sat}) (m/d) = 20.8-62.5 (mm/hr)	0.06-0.5 (k _{sat}) (m/d) = 2.5-20.8 (mm/hr) (Infiltration is moderate	

	Sub soil Permeability (from table 5.2 of AS 1547:2012)	0.5-1.5 (k_{sat}) (m/d) = 20.8-62.5 (mm/hr)	0.06-0.5 (k_{sat}) (m/d) = 2.5-20.8 (mm/hr) (Infiltration is moderate)
	Recommended Hydraulic Loading for drip or spray irrigation disposal system (from Table 5.2 of AS 1547:2012)	3.5 mm per day (conservative rate for spray irrigation)	2 mm per day (conservative rate for spray irrigation)
	Recommended Hydraulic Loading for trench or bed disposal system (from Table 5.2 of AS 1547:2012)	10mm per day (conservative rate for spray irrigation)	Absorption disposal of effluent not recommended

Table 2.6: Site Assessment Details

Water Balance Attached	See <i>Appendix E</i>	
Exposure	Good exposure.	
Slope	The site has a mild slope in a north-westerly direction.	
Elevation	Approximately 247m.	
Run-On	Minimal	
Seepage	None	
Erosion Potential	Soils are of moderate erodibility but erosion potential is low due to vegetation cover.	
Site Drainage	The site is expected to drain in a north-westerly direction.	
Fill	None encountered (see geotechnical investigation report)	
Surface rock/Outcrops?	None encountered	
Is there sufficient land area for:	Application system, including buffers in each proposed lot.	Yes
	Reserve application system	Yes

3. SITE AND SOIL LIMITATION ASSESSMENT

The following two limitation tables are a standardised guide to the site and soil characteristics which may limit the suitability of the site for effluent disposal and which require attention through specific management practises. The tables have been reproduced from the NSW Government endorsed 'On-Site Sewerage Management for Single Households' (1998), Table 3.1 and Table 3.2. The highlighted categories represent site and soil conditions of the land covered in this report.

Table 3.1: Site Limitation Assessment

Site Feature	Relevant System	Minor Limitation	Moderate Limitation	Major Limitation	Restrictive Feature
Flood Potential	All land application systems	> 1 in 20 years		Frequent below 1 in 20 years	Transport in wastewater off site
	All treatment application systems	Components above 1 in 100 years		Components below 1 in 100 years	Transport in wastewater off site system failure
Exposure	All land application systems	High sun and wind exposure		Low sun and wind exposure	Poor evaporation transpiration
Slope %	Surface Irrigation	0-6	6-12	>12	Runoff, erosion potential
	Sub-surface irrigation	0-10	10-20	>20	Runoff, erosion potential
	Absorption	0-10	10-20	>20	Runoff, erosion potential
Landform	All systems	Hillcrests, convex side slopes and plains	Concave side slopes and foot slopes	Drainage plains and incised channels	Groundwater pollution hazard, resurfacing hazard
Run-on and upslope seepage	All land Application Areas	None-low	Moderate	High, diversion not practical	Transport of wastewater off site
Erosion potential	All land application systems	No sign of erosion potential		Indications of erosion e.g. rills, mass failure	Soil degradation and off-site impact
Site drainage	All land application systems	No visible signs of surface dampness		Visible signs of surface dampness, such as moisture-tolerant veg	Groundwater pollution hazard, resurfacing hazard
Fill	All systems	No fill	Fill present		Subsidence
Land area	All systems	Area available	Area not available		Health and pollution risk
Rock and rock outcrop	All land application systems	<10%	10-20%	>20%	Limits system performance
Geology	All land application systems	None		Major geological discontinuities, fractured or highly porous regolith	Groundwater pollution hazard

Table 3.2: Soil Limitation Assessment (Location A)

Soil feature	Relevant system	Minor limitation	Moderate limitation	Major limitation	Restrictive feature
Depth to bedrock or hardpan (m)	Surface and sub-surface irrigation	> 1.0	0.5-1.0	< 0.5	Restricts plant growth
	Absorption	> 1.5	1.0-1.5	< 1.0	Groundwater pollution hazard
Depth to seasonal water table (m)	Surface and sub-surface irrigation	> 1.0	0.5-1.0	< 0.5	Groundwater pollution hazard
	Absorption	> 1.5	1.0-1.5	< 1.0	Groundwater pollution hazard
Permeability Category	Surface and sub-surface irrigation	2b, 3 and 4	2a, 5	1 and 6	Excessive runoff and waterlogging
	Absorption	3, 4		1, 2, 5, 6	Percolation
Coarse fragments %	All systems	0-20	20-45	>40	Restricts plant growth, affects trench installation
Bulk density (g/cc) SL L, CL C	All land application systems	< 1.8 < 1.6 < 1.4	> 1.8 > 1.6 > 1.4		restricts plant growth, indicator of permeability
pH	All land application systems	> 6.0	4.5-6.0	-	Reduces plant growth
Electrical conductivity (dS/m)	All land application systems	<4	4-8	>8	Restricts plant growth
Sodicity (ESP)	Irrigation 0-40cm; absorption 0-1.2mtr	0-5	5-10	> 10	Potential for structural degradation
CEC mequiv/100g	Irrigation systems	> 15	5-15	< 5	Nutrient leaching
P sorption kg/ha	All land application systems	> 6000	2000-6000	< 2000	Capacity to immobilise P
Modified Emerson Aggregate Test – depressiveness	All land application systems	Classes 3-4	Class 2	class1	Potential for Structural degradation.

Based on the results presented in Table 3.2 and Table 3.3, the Emerson Class 1 and Class 2 dispersion properties of the sub-soil in both areas investigated represents a limitation to the application of absorption based effluent disposal at the Investigation Area. The limitation to wastewater application comes from reduced permeability and potential to compact as the pores block and the soil dries. Amelioration with lime or gypsum may improve the structural stability of the soil by increasing EC, and reducing ESP.

The cation exchange capacity measured represent a moderate limitation and refers to the ability of a soil to attract and hold cations by electrical attraction. A low CEC indicates that important plant nutrients such as calcium, magnesium and potassium may be leached with effluent irrigation and soil is likely to become more sodic.

Table 3.3: Soil Limitation Assessment (Location B)

Soil feature	Relevant system	Minor limitation	Moderate limitation	Major limitation	Restrictive feature
Depth to bedrock or hardpan (m)	Surface and sub-surface irrigation	> 1.0	0.5-1.0	< 0.5	Restricts plant growth
	Absorption	> 1.5	1.0-1.5	< 1.0	Groundwater pollution hazard
Depth to seasonal water table (m)	Surface and sub-surface irrigation	> 1.0	0.5-1.0	< 0.5	Groundwater pollution hazard
	Absorption	> 1.5	1.0-1.5	< 1.0	Groundwater pollution hazard
Permeability Category	Surface and sub-surface irrigation	2b, 3 and 4	2a, 5	1 and 6	Excessive runoff and waterlogging
	Absorption	3, 4		1, 2, 5, 6	Percolation
Coarse fragments %	All systems	0-20	20-45	>40	Restricts plant growth, affects trench installation
Bulk density (g/cc) SL L, CL C	All land application systems	< 1.8 < 1.6 < 1.4	> 1.8 > 1.6 >1.4		restricts plant growth, indicator of permeability
pH	All land application systems	> 6.0	4.5-6.0	-	Reduces plant growth
Electrical conductivity (dS/m)	All land application systems	<4	4-8	>8	Restricts plant growth
Sodicity (ESP)	Irrigation 0-40cm; absorption 0-1.2mtr	0-5	5-10	> 10	Potential for structural degradation
CEC mequiv/100g	Irrigation systems	> 15	5-15	< 5	Nutrient leaching
P sorption kg/ha	All land application systems	> 6000	2000-6000	< 2000	Capacity to immobilise P
Modified Emerson Aggregate Test – depressiveness	All land application systems	Classes 3-4	Class 2	class1	Potential for Structural degradation.

Other site characteristics present only minor limitations. Absorption as option for effluent management in this area may be considered with soil amelioration to prevent structural degradation. Surface irrigation as option for effluent management is recommended but soil nutrients may need to be supplemented to maintain vegetation.

4. TANK SELECTION AND CALCULATION

4.1. Silver Book/ NSW Health Guidelines

The 'On-Site Sewerage Management for Single Households' (1998) guideline is based on the NSW Health guideline for septic tank and collection well capacity. Therefore, the calculation is the same.

Wastewater treatment can be provided by either a standard septic tank, producing primary treated effluent, or an Aerated Wastewater treatment System (AWTS), producing secondary or advanced secondary treated effluent. To treat the wastewater from all lots, either a large septic tank system may be considered or a wastewater collection well from which wastewater is transferred to an AWTS for treatment. The sections below present the capacities required for the different options.

4.2. Septic Tank

A septic tank is a waterproof tank usually located below ground level. Septic tanks provide preliminary treatment for the entire wastewater stream by allowing solids to settle to the base of the tank, and oils and fats to float to the top to form a scum layer. Anaerobic (in the absence of oxygen) bacterial digestion of the stored solids produces sludge, which accumulates in the bottom of the tank. Partly treated odorous effluent flows from the septic tank to either further on-site treatment, a common effluent system, a holding tank for pump out, or directly to a soil absorption system.

The required capacity of a septic tank is determined from the method prescribed in the NSW Health 'Septic Tank and Collection Well Accreditation Guidelines' (2001). The guidelines set a sludge allowance of 1,550L for septic tanks irrespective of the number of persons or which the tank is to be designed.

The general formula to calculate the minimum wastewater capacity in litres is:

$$S + (DF \times N) = C$$

$$\text{Sludge} + (\text{Daily Flow} \times \text{No. of Persons}) = \text{Capacity of the tank}$$

Where a single septic tank system is considered for treatment of the wastewater from the entire development the design flow estimate for 200 persons at 43L/person per day is 8,600L (see Section 1.3.1), the required treatment capacity for the development is then calculated as:

$$1,550L + 8,600L = 10,150L$$

Where it is proposed to join two septic tanks together to form the one septic tank unit for a commercial installation, then two septic tanks with their partition walls removed shall be joined together such the capacity of the first septic tank has about twice the capacity of the second septic tank, and a combined capacity as calculated above. Both septic tanks must be fitted with inlet and outlet fittings and both septic tanks must have inspection and access openings and covers. Both septic tanks must be placed on a common concrete slab to ensure that there is no differential movement.

4.3. Collection Well

A collection well used for the collection of sewage effluent from the development prior to treatment is recommended to be sized at double the capacity calculated for the septic tank system. This is to provide a buffer for prolonged peak flow conditions or a delay in treatment of the collected wastewater. A minimum collection well capacity of 20,300L is recommended.

4.4. System Recommendations

Table 4.1 provides details on the system selection.

Table 4.1: System Selection Details

Consideration of connection to centralised sewerage system	Distance to sewer	>20km
	Potential for future connection?	None planned
	Potential for reticulated water?	None planned
Expected Wastewater volume (litres/day)	Industrial facility, potential occupancy of 200 persons (7 to 8 per lot). Typical wastewater design flow for offices and factories is 43L/person per day, assuming water closet, urinal, basin, shower and kitchen, in accordance with NSW Health 'Septic Tank and Collection Well Accreditation Guidelines' (2001). Therefore, 200 people at 43L per person per day gives a maximum total load of 8,600L/day. Minimum sewage effluent septic tank treatment capacity required for the entire development is recommended as a minimum of 10,150 litres. Wastewater collection capacity required prior to secondary AWTS treatment is recommended at 20,300L	
Type of Treatment system best suited	Accredited standard septic tank or Aerated Wastewater Treatment System. Accreditation of system as per NSW Health accreditation scheme https://www.health.nsw.gov.au/environment/domesticwastewater/Pages/stcw.aspx	

Water conservation measures should be adapted to the greatest extent possible in any effluent producing activity proposed for the Subject Site, particularly in relation to the high water use activities of showering and toilet flushing. AAA rated plumbing appliances and fittings should be used. Measures including use of low volume shower roses and dual flush toilets can reduce water usage by 30-40%. Detergents low in phosphorous and sodium should be used as much as possible. Following these measures will ensure the greatest lifespan for the recommended effluent treatment and disposal system.

5. EFFLUENT MANAGEMENT

Barnson Pty Ltd has analysed the proposed on-site waste management system in accordance with the NSW Government endorsed 'Silver Book' (1998) and the ANZ Standard 1547:2012 On-site Domestic Wastewater Management', with additional advice sought from the NSW Water 'Designing and installing On-site Wastewater Systems' 2019 guideline as well as the Narromine Shire Council 'Sewage Management Plan'.

For this site, both irrigation and absorption are assessed as options for the management of the treated effluent. Due to the differences in the measured characteristics of the soil, the Investigation Area is considered in two areas. Calculations involving soil parameters are performed for each Area. Figure 5.1 present an outline of the two areas distinguished for the assessment.

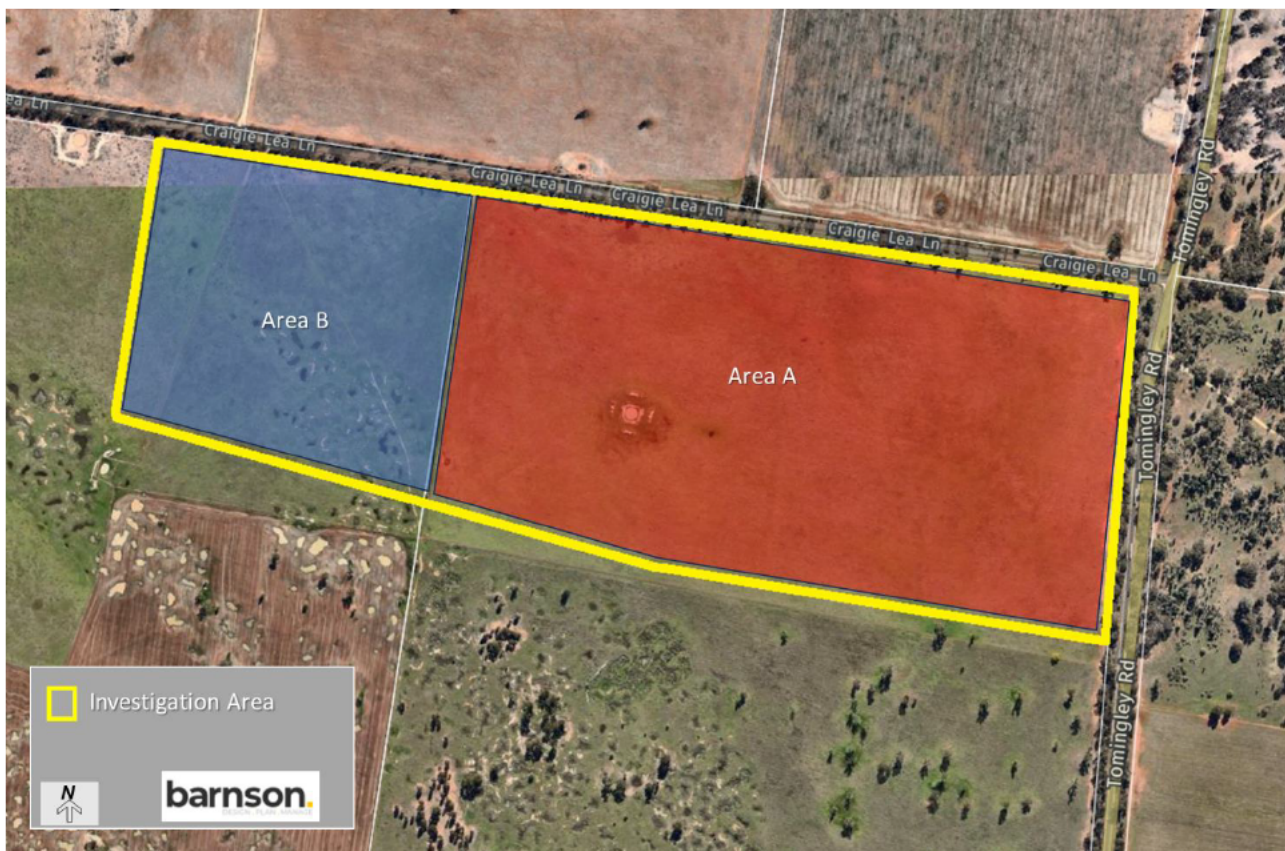


Figure 5.1: Different areas distinguished for the assessment.

In accordance with the Silver Book, the irrigation area for surface and subsurface irrigation must be the largest area calculated considering nutrient and liquid loading.

For calculation purposes, the nutrient balances assume a maximum effluent irrigation rate of 8600L per day.

5.1.1. Nitrogen Loading

The following formula is provided:

$$A = (C \times Q) / L_n$$

Where: A = land area (m²)
 C = concentration of nutrient (mg/L)
 Q = treated wastewater flow rate (L/d)
 L_n = critical loading rate of nutrient (mg/m²/d)

It is appropriate to assume 20% loss by, denitrification. Given nitrogen has a nominal value of 37mg/L in secondary treated effluent, C = 25 X 0.8 = 20.0 mg/L.

In this case, L_n can be determined as 240kg/ha/yr. – this figure is obtained from Appendix 1 of the Sydney Catchment Management Authority 'Designing and installing On-site Wastewater Systems' 2019 guideline, for maintained lawn for the uptake of nitrogen.

$$L_n = 240\text{kg/ha/yr.} = 24000\text{mg/m}^2/\text{year}$$

Therefore

$$A = (20 \times 8,600 \times 365) / 24,000$$

$$A = 2,615.8\text{m}^2$$

5.1.2. Phosphorus Loading

The general formula used to determine irrigation size based on Phosphorous loading is:

$$A = P_{generated} / (P_{Absorbed} + P_{Uptake})$$

The nominal Phosphorus Sorption Capacity (mg/kg) measured for the two areas investigated is 649 mg/kg (Area A) and 506 mg/kg (Area B) respectively together with the nominal bulk density value of Clayey Loams being approximately 1.5g/cm³ (nominal value as per *Interpreting soil results*), the Phosphorus sorption capacities were estimated to range between 9,750 kgP/ha and 7,500 kgP/ha.

P_{generated} = the amount of phosphorus generated over time, and is calculated as –

P_{generated} = total phosphorous (TP) concentration x volume of wastewater produced over 50 years

$$\begin{aligned}
 &= TP \times Q \text{ L/day} \times 365 \text{ days} \times 50 \text{ years, where } 10 \text{ mg/L (concentration of} \\
 &\text{phosphorous in treated sewage effluent as per the 'Silver book') and } Q \text{ of} \\
 &8600 \text{ L/day} \\
 &= 10 \times 8600 \times 365 \times 50 \\
 &= 1569.5 \text{ kg}
 \end{aligned}$$

Where P_{absorbed} = the amount of phosphorus that can be absorbed without leaching over 50 years. As per the 'Silver Book', this is typically 1/3 of the P sorption Value.

$ \begin{aligned} &\text{Area A} \\ &= P_{\text{Sorb}} \times 1/3 \\ &= 9,750 \text{ kg/ha} \times 1/3 \\ &= 3,250 \text{ kg/ha} \\ &= 0.325 \text{ kg/m}^2 \end{aligned} $	$ \begin{aligned} &\text{Area B} \\ &= 7,500 \text{ kg/ha} \times 1/3 \\ &= 2,500 \text{ kg/ha} \\ &= 0.25 \text{ kg/m}^2 \end{aligned} $
---	--

P_{Uptake} = the amount of P uptake by vegetation over 50 years.

For improved pasture, a phosphorous uptake value of 30 kg/ha/year will be used (as per SCA, 2019), which is equivalent to 0.0030 kg/m²/year.

$$\begin{aligned}
 \text{Therefore, } P_{\text{Uptake}} &= 0.0030 \text{ (kg/m}^2\text{/year)} \times 50 \text{ (years)} \\
 &= 0.15 \text{ kg/m}^2
 \end{aligned}$$

$$A = P_{\text{generated}} / (P_{\text{Absorbed}} + P_{\text{Uptake}})$$

Where, $P_{\text{gen}} = 1569.5 \text{ kg}$ $P_{\text{uptake}} = 0.15 \text{ kg/m}^2$

For area A (Category 4 soil) $P_{\text{Abs}} = 0.325 \text{ kg/m}^2$, while for Area B (medium to heavy clay) $P_{\text{Abs}} = 0.25 \text{ kg/m}^2$ the and

Considering phosphorous absorption, the irrigation area required in Area A = 3304.2m² and Area B = 3923.7 m².

5.1.3. Water Balance & Irrigation Area Size

The purpose of the water balance is to assess the sensitivity of the design to the various inputs and outputs of the system. An irrigation area too small will result in saturated soils for long periods. An irrigation area too large will result in poor dispersal of effluent over the area and during dry periods will result in vegetation dying.

A water balance for the area is attached as Appendix E. This balance utilises the 70th percentile monthly rainfall data as provided in the *Bureau of Meteorology* climate database. The water balance calculation utilised in this report is the minimum area method as per Table A6.2 of the *Silver Book*. Based on the average annual liquid loading, H (the amount of wastewater that maybe applied per year, is calculated as 1,344.8mm/year for Area A and 797.3mm/year for Area B. Therefore, using historical data, the land area required for irrigation in the two areas are:

$$A = 365 \times \frac{Q}{H}$$

A = land area (m²)

Q = average treated wastewater flow rate (L/day) – 8,600L/day

H = average annual liquid loading (mm/yr.) –Area A 1,344.8 mm/year, Area B 797.3 mm/year

Area A

Area B

$$A = \frac{365 \times 8600}{1,344.8}$$

$$A = \frac{365 \times 8600}{797.3}$$

$$= 2,334 \text{m}^2$$

$$= 3,937 \text{m}^2$$

Therefore, based on the Phosphorous Loading requirement, irrigation fields of 3,304m² is recommended for the disposal of secondary treated effluent in Area A, while the liquid loading rate calculation requires a minimum area of 3,937m² for irrigation effluent disposal in Area B.

5.2. Absorption Area Calculation

The area required for an absorption bed is determined from the following relationship:

$$\text{Length of Absorption Bed} = (Q) / (DLR \times W)$$

Where Q = 860L, DLR = 10mm/day in Area A (Table L1 AS 1547:2012 –Conservative Rate),

W (Width) = 2m

$$\begin{aligned} \text{Length of Bed} &= \left(\frac{8,600}{10 \times 2\text{m}} \right) \\ &= 430\text{m} \end{aligned}$$

Absorption beds are most effective in 20m lengths. From the above calculation, 21.5 x 20m long, 2m wide beds will be required to accommodate primary treated effluent generated from a septic tank system. Note this applies only to Area A. Absorption based effluent disposal is not recommended for Area B

6. CONCLUSIONS & RECOMMENDATIONS

6.1. Buffer Recommendations

With regard to buffer distances, the Investigation Area present no specific limitations other than potentially protected vegetation identified across Lots 1, 2, 4, 5, 6 and 7. Buffer distances to lot boundaries, roads and structures must be applied in accordance with the stipulations listed in Section 1.3.2.

The primary limitation for the Investigation Area is the presence of Category 6 clay soil in the areas comprising Lots 1 and 2. Absorption based effluent disposal is not recommended in the areas characterised by clay soil.

Buffer distances relevant to the Investigation Area are described in detail in Section 1.3.2, with further guidance from the Australian Standard AS/NZS 1547:2012) provided in Appendix C. Also included in Appendix C, is a site plan with the proposed location of an irrigation area, scaled to the recommended size and annotated with applicable buffer distances. This site plan is for illustrative purposes only and serves to demonstrate that siting of an applicable treated effluent disposal area is possible.

6.2. System Recommendations

6.2.1. General

- Calculation of the system requirements for on-site wastewater management of effluent generated from the proposed development was based on the assumption that up to 200 staff can be accommodated at the proposed subdivision. A maximum total daily flow of 8,600L was thereby estimated.
- Based on site specific measurements from samples of soil collected from the Investigation Area, two areas with different properties were identified. The assessment was conducted for each of the two areas.
- The system requirements derived from this assessment is that either a standard septic tank or an aerated wastewater treatment system (AWTS) may be used in Area A while only systems capable of producing secondary treated effluent is recommended for Area B.
- A standard septic tank treatment system must have a minimum of 10,150L wastewater capacity, with disposal of the primary treated effluent to absorption beds or trenches with a total absorption area of 860m²
- It is recommended that an AWTS system include a surge tank of minimum 20,300L, from which the AWTS will pump the wastewater for treatment.
- Disposal of the secondary treated effluent is recommended to drip or spray irrigation fields, but absorption beds may be used in areas with more permeable soil (Area A).
- Drip or spray irrigation fields must be installed with a minimum area of 3,304m² in the area identified as Area A and 3,937m² in the area of the site where clay rich soils are present (identified as Area B).

- As per the 'On-Site Sewerage Management for Single Households' (1998) publication, stakeholders should be aware that all on site systems and components have a finite life and at some point will require replacement. Septic tanks and AWTs generally require replacement as per the 'On-Site Sewerage Management for Single Households' (1998) publication, stakeholders should be aware that all on site systems and components have a finite life and at some point will require replacement. Septic tanks and AWTs' generally require replacement every 25 years, whereas effluent disposal systems can have an expected life between 5-15 years. The owner is encouraged to obtain a copy of the NSW Government "The Easy Septic Guide" (2000) available from - <http://www.olg.nsw.gov.au/sites/default/files/Easy-septic-guide.pdf>
- AS1547-2012 section 5.5.3.4, recommends that a reserve application area of similar size to the current design should be considered as part of the risk management process to be available on a site for expansion or for resting of the land application system. Although a reserve application is not a requirement it is advised for consideration where the site allows for location of an additional area.
- It is recommended that a registered plumber be engaged to install the system, in accordance with the recommendations of this report.

6.2.2. Recommendations for Absorption Based Effluent Disposal

- Beds/trenches are not recommended for siting on soils of low permeability (e.g. Category 6);
- Beds/trenches are recommended to be built along the contour to ensure even distribution and avoid any section being over loaded;
- Avoid cutting beds into weakened ground;
- Construction is to take place during fine weather. If it rains during construction beds are to be completely covered to protect them from rain damage;
- Where the beds/trenches are dug by an excavator in clay soils, the bed walls are to be scarified to remove any smearing caused by the excavator bucket;
- All distribution pipes and arches should be laid in accordance with the manufactures instructions;
- If multiple beds are utilised, ensure effluent is distributed evenly via a splitter box or sequencing valve or other appropriate method;
- All distribution pipes and arches should be laid in accordance with the manufactures instructions;
- Consideration can be given to using a pressure dosed system, which would allow for a better, more even distribution of effluent along the trench, and prolong trench life;
- Inspection ports shall be provided for the beds/trenches system. The inspection port shall be installed so as to facilitate monitoring of the effluent level in each trench;
- Trenches/Beds may be gravity fed or pressure dosed using pumps or dosing siphons;

- Vegetation cover must be well maintained to ensure strong growth for maximum uptake of transpiration. The surrounding landscape and vegetation must also be maintained to minimise shading and maximise exposure.
- The beds/trenches should be in an enclosed area, with and no exposed to vehicle movement or stock that can cause compaction and premature trench failure;
- The beds/trenches are to be constructed using laser levelling to ensure the base is exactly level;
- A diversion berm/bank/drain should be built upslope of the trench. This will reduce run on. A design sketch is provided at Appendix F.

6.2.3. Recommendations for Effluent Disposal Through Drip and Spray Irrigation

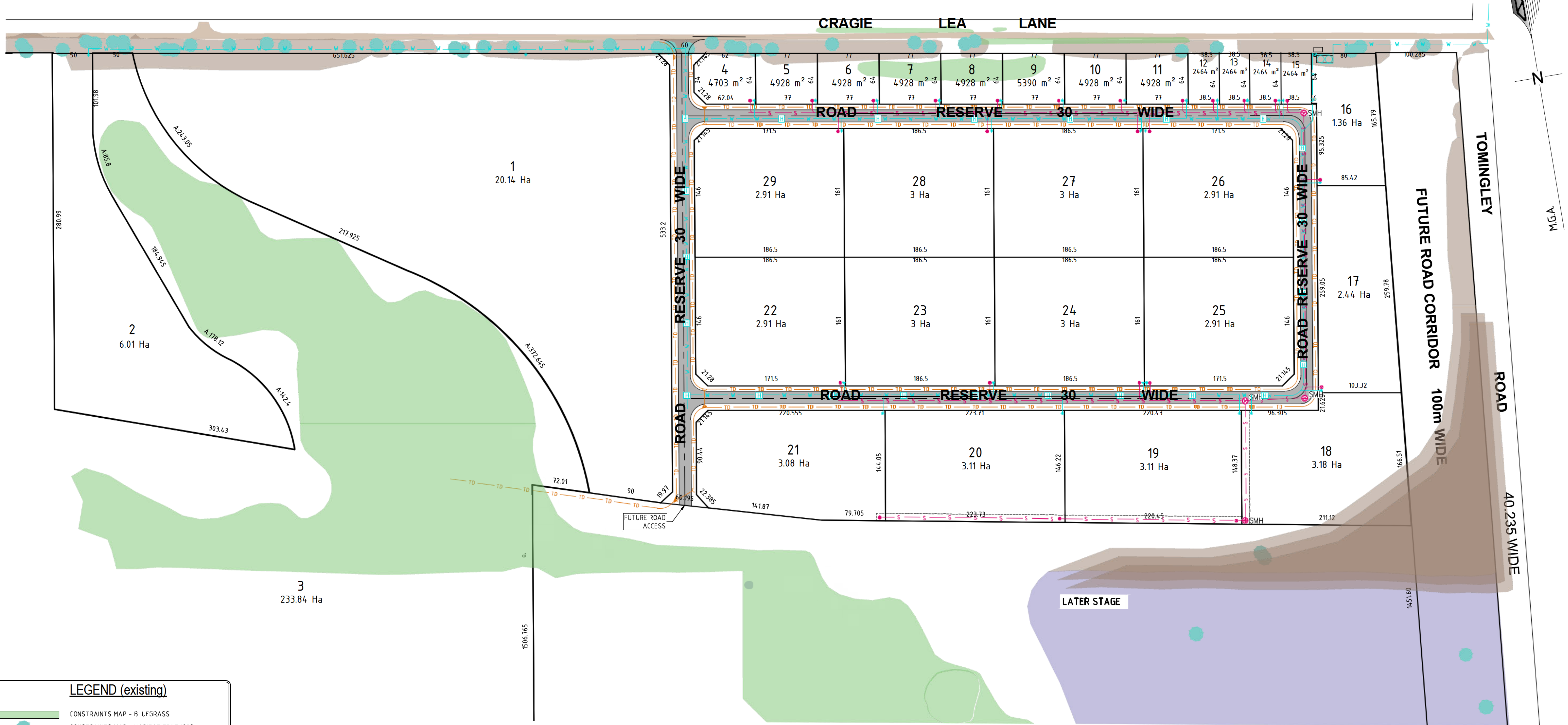
- Effluent can be dispersed by subsurface drip, surface drip or surface spray irrigation.
- Note that subsurface drip and surface drip irrigation offer advantages in utilising effluent for landscape planting, whilst sprays are effective on grassy areas.
- Drip and sub-surface irrigation lines require an in-line filter and a flush valve to guard against blockages. Treated effluent must be applied to vegetated areas and not bare ground.
- Records of maintenance carried out on the system should be kept by the property owners for at least 10 years.
- The area utilised for irrigation is to be protected from disturbances and will not be suitable for lawn growth, play areas and foot traffic. The area should be fenced off and protected from vehicles, livestock, domestic animals and children.
- Pasture grass cover of the area is recommended and should be slashed, removed and kept well maintained when it is greater than 10cm long. Shrub species can also be used in the land application area. Appendix G provides a list of species suitable for use as included in Appendix 7 of the *Silver Book*.
- The drip and spray effluent disposal area should be protected from potential run on and stormwater via an upslope diversion drain or beam. An example from the *Design and Installation of On Site Wastewater Treatment* (2019) guideline is provided at Appendix H.
- It is also critical to ensure an appropriate pump to adequately service the demands of the effluent application area is met.

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APPENDIX A
Site Plan



THIS IS A DRAFT PLAN ONLY AND IS
SUBJECT TO FINAL SURVEY



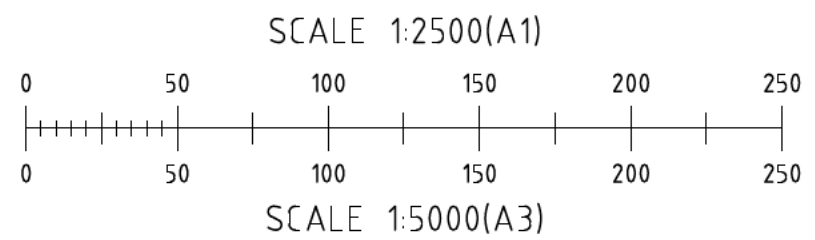
PROPOSED OVERALL SITE PLAN
REDUCTION RATIO 1:2,500 @ A1
1:5,000 @ A3

LEGEND (existing)

- CONSTRAINTS MAP - BLUEGRASS
- CONSTRAINTS MAP - HABITAT FEATURES
- CONSTRAINTS MAP - TECs FUTURE EXPANSION
- CONSTRAINTS MAP - TECs SUBJECT SITE

LEGEND (proposed)

- PROPOSED ROAD
- PROPOSED UNDERGROUND STORMWATER PIPE
- PROPOSED TABLE DRAIN
- PROPOSED GRATED STORMWATER PIT
- PROPOSED SEWER MAIN
- PROPOSED SEWER MANHOLE
- PROPOSED SEWER MAINTENANCE SHAFT
- PROPOSED WATERMAIN
- PROPOSED IN-GROUND HYDRANT
- PROPOSED STOP VALVE



ISSUED FOR REVIEW

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Rev	Date	Description
A	31-08-2023	ISSUED FOR REVIEW

Project
**CIVIL ENGINEERING DOCUMENTATION
FOR NARROMINE FREIGHT HUB**
Site Address
397 CRAGIE LEA LANE
NARROMINE NSW 2821
Client
NARROMINE SHIRE COUNCIL

Drawing Title
PROPOSED OVERALL SITE PLAN
Design DOS
Drawn JS
Check -
Original Sheet Size
Revision

Certification
Project No
Drawing No

40038
C03



APPENDIX B

**Narromine Sewage
Management Plan**



ON-SITE SEWAGE MANAGEMENT STRATEGY

Adopted by Council 12 November, 2014

EXECUTIVE SUMMARY

In 1998 the New South Wales Government introduced regulatory reforms and guidelines to enable effective Council regulation and supervision of domestic sewage management facilities. Council regulates the installation and operation of sewage management systems under the Local Government Act 1993 and Regulations.

Property owners are required to obtain an approval to install and operate a new system or to operate an existing system. The Regulations specify the performance standards to be complied with by owners when operating a system of sewage management as follows:

A system of sewage management must be operated in a manner that achieves the following performance standards:

- *the prevention of the spread of disease by micro-organisms,*
- *the prevention of the spread of foul odours,*
- *the prevention of contamination of water,*
- *the prevention of degradation of soil and vegetation,*
- *the discouragement of insects and vermin,*
- *ensuring that persons do not come into contact with untreated sewage or effluent (whether treated or not) in their ordinary activities on the premises concerned,*
- *the minimisation of any adverse impacts on the amenity of the premises and surrounding lands,*
- *if appropriate, provision for the re-use of resources (including nutrients, organic matter and water).*

A system of sewage management must be operated:

- *in accordance with the relevant operating specifications and procedures (if any) for the sewage management facilities used for the purpose, and*
- *to allow the removal of any treated sewage (and any by-product of any sewage) in a safe and sanitary manner.*

The strategy sets out to develop a way by which the requirements can be put into practice with minimum burden to Council and the community while achieving maximum benefits for the environment, public health and community amenity.

The goals of the strategy are to:

- ❑ minimise the impact of systems on the environment;
- ❑ identify the location of all systems in the Shire area;
- ❑ establish a partnership between stakeholders to support continuing improvement of on-site sewage management;

- ❑ educate owners about on-site sewage management systems;
- ❑ ensure owners are aware of the need to maintain their on-site sewage management systems;
- ❑ ensure owners of installations are aware of the need to hold current approvals;
- ❑ implement a cost effective method of supervision of on-site sewage management systems;
- ❑ provide for charging of fees for registrations and inspection, if Council so chooses; and
- ❑ create links between this strategy and Council's strategic planning process.

The strategy proposes a risk management approach that will allocate a low, medium or high risk rating to systems. Owners of low risk systems will not be required to renew their approval to operate. Owners of medium risk systems will consist of those systems with minor problems and be required to receive an inspection every three years, and owners of high risk systems will be required to renew their approval to operate and receive an inspection every two years.

The legislative reforms were implemented in response to surveys which indicated on-site sewage management systems were failing to meet environmental and health protection standards. The hepatitis A outbreak linked to the consumption of oysters from Wallis Lake and the risk in settlement areas of the Murray Darling Basin from septic tank effluent being examples.

Narromine Shire is a medium rural shire in Western NSW. Its population is 6,850. The two main settlement areas of Narromine and Trangie are sewered, but the remaining areas of the Shire, including the village of Tomingley rely on on-site sewage management systems.

Council proposes to implement this strategy over a period of time using the existing staff resources of its Environmental Services Department.

All installations will be required to comply with the performance standards set out in the Regulation.

Council will implement an inspection regime to ensure that the objectives of this strategy are achieved.

Initial risk assessments will be completed by desktop assessment. A 5% random target group of installations will be inspected to verify the accuracy of those assessments.

The results of the inspection regime will be reported in Council's State of the Environment Report.

Council proposes to establish three categories of risk, which will be applied to installations, high, medium and low. Installations will be assessed against indicative criteria for each category.

Provision is made for reviews of risk assessments.

Provision is made for re-categorisation of systems to a lower category over a period of time.

Council will maintain records of all applications, approvals and exemptions.

As required, notices of renewal will be sent to owners of systems required to hold current approvals.

A monitoring program will be established to ensure the efficiency of the strategy. This will include inspection of systems, assessing the integration of the strategy with Council's other strategic planning processes and assessing the effectiveness of the strategy against its objectives and goals.

Activities undertaken in accordance with this strategy will be reported in Council's annual State of the Environment Report.

The strategy is to be the subject of ongoing review, at least in the early stages, and subsequently on setting the Integrated Planning and Reporting Framework documents.

DEFINITIONS

For the purposes of this strategy, the following definitions apply:

- ❑ Human waste storage facility means a device for holding or disposing of human waste, including a cesspit, septic tank, septic closet, water closet, chemical closet, humus closet and combustion closet.
- ❑ Operate a system of sewage management means hold or process, or re-use or otherwise dispose of; sewage or by-products of sewage (whether or not the sewage is generated on the premises on which the system of sewage management is operated). This includes:
 - a) use artificial wetlands, transpiration mounds, trenches, vegetation and the like in related effluent application areas;

- b) hold or process sewage that is to be subsequently discharged into a public sewer.

However, **operate a system of sewage management** does not include any of the following:

- (a) any action relating to the discharge of sewage directly into a public sewer,
 - (b) any action relating to sewage or by-products of sewage after their discharge into a public sewer.
- ❑ Related effluent application area, in relation to a sewage management facility, means the area of land (if any):
 - a) where it is intended to dispose of the effluent and any by-products of sewage from the facility, or
 - b) to which the effluent and by-products are intended to be applied.
 - ❑ Sewage includes effluent, being any matter or thing, whether solid or liquid or a combination of solids and liquids, which is of a kind that may be removed from a human waste storage facility, sullage pit or grease trap, or from any holding tank or other container forming part of or used in connection with a human waste storage facility, sullage pit or grease trap.

Sewage management facility means:

 - a) a human waste storage facility, or
 - b) a waste treatment device intended to process sewage, and includes a drain connected to such a facility or device.
 - ❑ The regulation means the Local Government (General) Regulation 2005.

1.0 INTRODUCTION

1.1 Legislative Changes

The requirement to obtain approval to operate sewage management systems is not a new concept. Council had the power under the orders provisions of the Local Government Act 1993 to require remedial work to be carried out on faulty sewage management facilities however, this power was reactive to problems and did not seek to ensure problems did not occur as a result of operation of such systems.

Clause 43 of the Local Government (General) Regulation 2005 prescribes the matters to be taken into consideration for approval to operate a system of sewage management. Likewise, Clause 26 of the Regulation prescribes the matters to accompany an application to install or construct sewage management systems. This means the owner of any land must obtain an approval of Council to install, construct or operate any on-site sewage management system(s) on their land.

1.2 Commencement

Systems, which were installed after 6 April 1998 could not be operated unless such approval had been obtained.

Systems installed before 6 April 1998 were able to continue to be operated until 30 June 1999 without an application having been lodged. However, after that date, the system could not be operated unless an application was lodged with Council. If an application for approval to operate had been lodged with Council by that date then the system could continue to be used until such time as the application is finally determined by Council.

2.0 OBJECTIVES

The objective of this strategy is to ensure that there is a system in place to provide oversight and control of on-site sewage management systems within the Shire. To achieve that objective, this strategy intends to ensure:

1. the protection of groundwater;
2. the protection of surface water;
3. the protection of land and vegetation;
4. the protection of public health and the prevention of public health risk;

5. the maintenance and improvement of community amenity;
6. the maximum re-use of resources consistent with other objectives.
7. the principles of ecological sustainable development, water cycle management and total catchment management are considered;
8. the implementation of a cost effective system of oversight in relation to sewage management facilities in the Council area.

3.0 GOALS

The goals of this strategy are to ensure that, by its implementation:

- ❑ the impacts of on-site sewage management facilities on the environment will be minimised;
- ❑ the location of all on-site sewage management facilities will be identified;
- ❑ a partnership will be developed between Council, householders and service agents to support continuing improvement of on-site sewage management;
- ❑ the owners of on-site sewage management facilities will be made aware of the type of systems installed on their premises at the time of inspection and of the limitations which may be placed on the operation of those systems;
- ❑ the owners of on-site sewage management facilities will be made aware of the need for ongoing maintenance and that they can be provided with the necessary information and support to ensure that their systems are maintained so that they meet the performance standards set out in the Regulation;
- ❑ a cost effective system of general performance assurance and supervision of on-site sewage management facilities is implemented;
- ❑ Council may recover all or part costs of implementation of this strategy by charging fees for the issuing of approvals in respect of facilities installed in high, medium and low risk locations;
- ❑ links will be created between this strategy, Council's Delivery Program and Operations Plan, State of the Environment Report and relevant planning instruments to facilitate the achievement of the objectives of this strategy and to ensure Council takes into account the issues related to on-site sewage management in its strategic planning process.

4.0 BACKGROUND

4.1 Legislation and Guidelines

On 9 March 1998 the Minister for Local Government announced new regulatory reforms and guidelines to enable more effective Council regulation and performance supervision of household septic tanks and other small on-site sewage management facilities.

The regulatory changes are included in the Local Government (General) Regulation 2005, which sets the legal framework through which the controls are to operate. The guidelines are entitled "Environmental Health & Protection Guidelines: On-site Sewage Management for Single Households"

4.2 Reasons for Legislation

The implementation of the reforms and the release of the guidelines were a response to a range of issues including:

- surveys in many areas had indicated that septic tanks and other on-site sewage management facilities were failing to meet environmental and health protection standards in all parts of NSW;
- the outbreak of hepatitis A linked to the consumption of oysters from Wallis Lakes was an indicator of the serious health risks involved;
- effluent from septic tanks posing risks in the Murray Darling Basin especially in settlement areas, areas discharging to slow flowing or discontinuous waterways and in areas, which rely on groundwater sources for water supply.

5.9 LOCATION AND CIRCUMSTANCES

5.1 Location

Narromine Shire Council has an area of 5224km² located in central NSW and has a population of 6850.

5.2 Climate

Smith & Cooper (1996) provide the rainfall details for Trangie, dating from 1887 to 1996. These figures indicate that the region receives an annual mean rainfall of 480.9 millimetres (mm). Further to this, Smith & Cooper (1996) suggests that within the region the annual mean number of rain days is 79.9.

It should be noted however that Hoynes Wheeler & Co (1991) suggest that the annual rainfall in Narromine is higher than that of Trangie, due to more summer and spring rains. Unfortunately the data used by

Hoynes Wheeler & Co (1991) relates only to the period between 1965 and 1974.

Whilst there may be some variation between Narromine and Trangie rainfall, it is interesting to note, that Smith & Cooper's (1996) data indicates that during the early 1970's above average rainfall was experienced at Trangie. Therefore, as the Trangie data is averaged over 109 years of collection and not 9 years, the Narromine figures detailed by Hoynes Wheeler & Co (1991) may not be truly indicative of the regional annual rainfall. Hoynes Wheeler & Co (1991) do however suggest that rainfall in the region averages between 479 mm and 653 mm.

Smith & Cooper (1996) state that the mean evaporation at Trangie between the years 1968 and 1996 is 1940.6 mm. Further to this, at no time through the year does the monthly mean rainfall exceed the monthly mean evaporation. Smith & Cooper (1996) state that the lowest monthly evaporation mean of 52.5 mm is experienced in June. The monthly rainfall mean for June remains less than this, at 37.8 mm. Hoynes Wheeler & Co (1991) suggest that the average evaporation rates for the region are between 1890 mm and 1971 mm.

Smith & Cooper (1996) indicate that summers in the region are relatively hot, with an average monthly maximum temperature (between 1948 -1996) from December to February of 32.3°C, with a maximum peak through the day of approximately 43°C. The mean minimum temperature for the months of June to August is 3.9°C.

Mean relative humidity levels taken between 1948 and 1996, suggest higher levels are experienced in the region during the winter of between 76% and 83%. During summer, humidity drops to a mean between 48% and 50%. (Smith & Cooper, 1996)

5.3 Number of System Estimates

It is estimated that 650 to 900 systems are located within the shire.

5.4 Potential Problem Areas

5.4.1

- Small rural properties on the fringe of the Narromine and Trangie townships;
- Tomingley Village;
- Properties along the Macquarie River and other tributaries, creeks and water ways;
- Land Zoned RU4, RU5, and R5; and

- Systems located in areas of groundwater vulnerability as identified in Council's LEP mapping.

5.4.2 Council has not at this stage identified any other particular problem areas associated with on-site sewage management. The following situations however are identified as potential areas where problems may be identified:

1. Village areas where no reticulated sewage system is available;
2. Areas along the Macquarie River, creeks and tributary systems; and
3. Areas where significant numbers of small area subdivision have occurred or are likely to occur. This is particularly relevant to the creation of new rural residential zonings as a result of the Narromine Rural Residential Land Use Strategy and planning proposals currently being prepared and those going through the gateway process.

5.5 Linkages Between this Strategy and Council's Strategic Planning Process

5.5.1 The evaluation section of this strategy sets out the evaluation and reporting processes which would be used to ensure that this strategy is linked with Council's strategic planning and reporting processes, and updated on a regular basis.

5.5.2 Council's current land use and development controls are set out in the Narromine Local Environmental Plan 2011 and the Narromine Comprehensive Development Control Plan 2011. These controls can also be overridden or modified by any relevant Regional Environmental Planning Policies (REPP's) and State Environmental Planning Policies (SEPP's). Development Control Plans which may impact on issues related to on-site sewage management, are:

- Implementing buffer zones around sewage treatment systems;
- Control of development on flood prone lands in Narromine Shire; and
- Control of rural subdivision.

6.0 PROGRAMS

6.1 Requirements

Clause 47 of the Regulation provides temporary exemption for a period of three (3) months for a person who purchases (or otherwise acquires) land on which any sewage management facilities are installed. This applies after the date on which the land is transferred or otherwise conveyed.

Clause 48(e) of the Regulation provides exemption from the need for an approval in the following instances:

- (i) under the authority of a licence in force under the Protection of the Environment Operations Act 1997, or
- (ii) in a vessel used for navigation, or
- (iii) in a motor vehicle that is registered within the meaning of the Road Transport Act 2013 and is used primarily for road transport.

This also applies to the same instances to operate systems under Clause 48(f) of the Regulation.

6.2 Implementation Processes

The Implementation of the requirements will involve Council in the following:

- Requiring the lodgement of applications for approval in respect of all on-site sewage management systems in the Council area;
- Establishing a data base of all installations in the Council's area. A register is currently in place however, may only capture 50-60% of the total number of systems installed in the Shire;
- Carrying out a desktop audit of those applications received;
- Inspect a range of installations of different types and in different locations throughout the Council area. The initial target number of inspections will be 5% of all applications received;
- Ultimately all installations located in identified high and medium risk areas will be inspected;
- Use the information obtained from the above data to identify high, medium and low risk installations. These risks would be related to performance, design or location criteria;
- Requiring the owners of sewage management facilities to obtain approvals to operate. Such approvals may require the provision of statements to Council concerning:
 - the achievement of certain performance standards;

- proof of regular maintenance being provided to Council;
or
 - any other relevant issue;
- Requiring the upgrading of installations only where it is seen that those systems are incapable of meeting the performance standards set out in the regulation;
 - The levying of fees in respect of applications for approvals to operate, only after the implementation of this strategy. Such fees are to be set annually in conjunction with Council's annual budget and would be advertised as required prior to formal adoption. Application fees will be no higher than that recommended by the Office of Local Government.

7.0 APPLICATIONS AND APPROVALS

7.1 Applications

All installations will continue to require approvals to operate. This means that owners will need to submit applications for approvals prior to the expiry of current approvals. Installations classified as low risk will be issued with approvals to operate which last for five years, subject to compliance with specified criteria and will not be subject to inspection. Those installations classified as medium risk will be issued with approvals to operate, which last for three years, subject to compliance with the specified criteria and will be subject to inspection. Those installations classified as high risk installations will be issued with approvals to operate which last for two years and will be subject to inspection. Information outlining the method of risk assessment and the associated inspection regime are set out in clauses 10 and 8 respectively.

7.2 Fees

Council has an obligation to its constituents to finance the various services it provides to the community. Unfortunately, this extends to the wide range of regulatory services Council is responsible for under State legislation and includes managing the regulation of on-site sewage management systems.

Council will therefore need to consider how it funds the regulation of the systems installed and operating in the Narromine local government area. In this regard, the following fee structure is proposed.

Application for approval to operate an on-site sewage management system -: **No charge**

Assessment of applications to operate and categorise on-site sewage management systems -: **No charge**

Where inspections are required (first or additional), the following fee is proposed-: **\$150 per inspection (inc GST)**

Any proposed fees will be set during the preparation of Council's annual estimates. Any fees proposed will be included in the required public participation process prior to adoption of Council's Delivery Program, annual Operational Plan plus rates and charges.

7.3 Performance Standards

Before approving any application to operate a system of sewage management, Council must be satisfied that the system when operating will achieve the following performance standards:

- the prevention of the spread of disease by micro-organisms,
- the prevention of the spread of foul odours;
- the prevention of contamination of water;
- the prevention of degradation of soil and vegetation;
- the discouragement of insects and vermin;
- ensuring that persons do not come into contact with untreated sewage or effluent (whether treated or not) in their ordinary activities on the premises concerned;
- the minimisation of any adverse impacts on the amenity of the premises and surrounding lands;
- if appropriate, provision for the re-use of resources (including nutrients, organic matter and water).

When considering any application for an approval to operate a system of sewage management, Council will take into account those issues raised in the publication, Environment & Health Protection Guidelines: On-site Sewage Management for Single Households and AS1547-2000.

7.4 Failure to Meet Performance Standard

It should be noted that where an installation, which is classified as low or medium risk, fails to operate in accordance with the performance standards of its approval, such installation would automatically be categorised as a high risk installation. This re-categorisation will not apply where the installation is maintained and repaired so that it again meets the performance standards within a period of twenty one (21) days of such failure.

8.0 INSPECTIONS

8.1 General

To support the implementation of this strategy, Council will implement an inspection regime to ensure that the objectives and goals of this strategy are achieved.

8.2 Initial Risk Assessment

When applications, for approval to operate on-site sewage management systems are received by Council, the initial risk assessment of those applications will be completed by way of a desk top assessment. An assessment will be made of the category of risk which will be allocated to each installation. This assessment will be made in accordance with the criteria set out in clause 10. Such assessment will utilise the information provided in the application and any other information which may be held in Council's property records and topographic maps.

The initial approvals to operate will only be issued after completion of that assessment and if Council is of the opinion that the performance standards set out in clause 7.3 can be achieved.

8.3 Site Inspections

To verify the general accuracy of those assessments a target group of 5% of those applications will be confirmed by site inspection.

8.4 Exemptions

Clause 48(e) of the Regulation provides exemption under certain circumstances. Refer to Cl 6.1 in this strategy.

8.5 Renewal Inspections

Applications for renewal of approvals to operate will be determined on the basis of random inspections of a minimum of 5% of applications received. Generally those random inspections will be weighted towards:

- installations in areas where previous inspections have indicated a history of system failure or operational problems; and
- on those types of systems, which previous inspections have indicated are prone to failure or operational problems.

8.6 Inspection and Reporting

Issues raised in Clauses 11.1, 11.2, 11.3 and 11.4 will be reported in Council's Annual State of the Environment Report.

9.0 EXEMPTIONS

9.1 Provision for Exemptions

Clause 47 of the Regulation provides temporary exemption for a period of three (3) months for a person who purchases (or otherwise acquires) land on which any sewage management facilities are installed. This applies after the date on which the land is transferred or otherwise conveyed.

Clause 48(e) of the Regulation provides exemption from the need for an approval in the following instances:

- (i) under the authority of a licence in force under the Protection of the Environment Operations Act 1997, or
- (ii) in a vessel used for navigation, or
- (iii) in a motor vehicle that is registered within the meaning of the Road Transport Act 2013 and is used primarily for road transport.

This also applies to the same instances to operate systems under Clause 48(f) of the Regulation.

On-site sewage management systems will be categorised into high, medium and low risk installations. Although all systems will be required to register, low risk systems may never have to be inspected unless a request is lodged with Council to do so.

9.2 Education

Council will implement a public education program and an inspection regime for systems of sewage management within the Council area. The education will be achieved by media publicity, direct mailing of information to owners and by addressing meetings of affected community groups where it is considered necessary.

9.3 Proposed Exemptions

It is Council's intention that installations, which are determined by Council as being in the low risk category, will not be required to be inspected unless a request is lodged with Council to do so. This exemption from inspection will continue to apply whilst the installation is

being maintained and operated in such a way that it achieves the performance objectives and standards set out in this strategy.

10.0 CATEGORIES OF RISK OF INSTALLATIONS

10.1 Categories of Risk

To allow implementation of this strategy all installations within the Shire will be categorised according to the degree of risk of each installation. In this regard three categories of risk will be implemented ie; low, medium and high. This system will rank the installations in terms of their likely impact on the particular issues set out in the objectives of this strategy. The allocation of premises or installations to risk categories will depend upon an assessment, by Council staff, of the combined effects of all relevant issues related to an installation.

10.2 Indicative Risk Criteria

Set out below are the indicative criteria, which will be used by Council staff when making a risk assessment of installations. With particular installations, there may be other issues which may also be taken into account as part of the risk assessment process.

10.3 Low Risk Indicative Criteria

Low risk indicative criteria for an installation include the following matters. That the system is:

- ❑ operating in accordance with:
 - * the performance objectives of this strategy;
 - * any requirements of the manufacturer of any of the system's components,
 - * any conditions of accreditation imposed by the Director General of the Department of Health in respect of plans and designs for the sewage management facility;
 - * any conditions imposed by Council on any approval to install a system of sewage management.

(In this respect it should be noted that Council is the authority for making the necessary determinations regarding the above issues.)
- ❑ located on a property with a total land area of at least 2 hectares
- ❑ located so that any part of the system is at least 10 metres from any property boundary;
- ❑ located so that any part of the system is 100 metres or more from any permanent surface waters;
- ❑ located where the soil in which the drainage field is located is not highly permeable allowing free flow of effluent which may

contaminate ground water, impact on neighbouring properties or impact on the environment.

- ❑ located so that any part of the system is at least 40 metres from any other waters (eg farm dams, intermittent water ways and drainage channels);
- ❑ not located in an area with a known high water table (less than 20 metres);
- ❑ not located within an area prone to flooding in a 1 in 100 year flood;
- ❑ a type of sewage management system which serves no more than 11 people; and
- ❑ not located within 1.5km of a public water supply bore.

NB. It should be noted that failure to comply with the performance criteria or any conditions of either the Department of Health or Council means that the classification of a system is immediately changed to high risk. This means that an approval to operate is then required.

10.4 Medium Risk Indicative Criteria

Medium risk indicative criteria for an installation include the following matters. That the installation is:

- ❑ operating in accordance with:
 - * the performance objectives of this strategy;
 - * any requirements of the manufacturer of any of the system's components;
 - * any conditions of accreditation imposed by the Director General of the Department of Health in respect of plans and designs for the sewage management facility;
 - * any conditions imposed by Council on any approval to install a system of sewage management.

(In this respect it should be noted that Council is the authority for making the necessary determinations regarding the above issues.)
- ❑ located on a property with a total land area less than 2 hectares.
- ❑ located so that any part of the system is between 3 m and 10m from any property boundary;
- ❑ located so that any part of the system is between 50 metres and 100 metres from any permanent surface waters;
- ❑ located where the soil in which the drainage field is located is not highly permeable allowing free flow of effluent which may contaminate ground water, impact on neighbouring properties or impact on the environment.
- ❑ connected to a reticulated public water supply;

- ❑ located in an area with a known high water table (less than 15 metres);
- ❑ located within an area prone to flooding in a 1 in 20 year flood;
- ❑ a type of sewage management system which relies on mechanical or power driven parts to ensure its continued operation (eg AWTs, systems with collection wells whether with automatic pumps to on-site disposal areas, or pump out installations by tanker).
- ❑ Not located within 1.0km to 1.5km of public water supply bore;
- ❑ a type of sewage management system, which serves from 12 to 20 people.

NB. It should be noted that failure to comply with the performance criteria or any conditions of either the Department of Health or Council means that the classification of a system is immediately changed to high risk. This means that an approval to operate is then required.

10.5 High Risk Indicative Criteria

High risk indicative criteria for an installation include the following matters. That the installation is:

- ❑ not or, in the last three years has not operated in accordance with:
 - * the performance objectives of this strategy;
 - * any requirements of the manufacturer of any of the system's components;
 - * any conditions of accreditation imposed by the Director General of the Department of Health in respect of plans and designs for the sewage management facility;
 - * any conditions imposed by Council on any approval to install a system of sewage management.

(In this respect it should be noted that Council is the authority for making the necessary determinations regarding the above issues.)
- ❑ located on a property with a total land area of less than 2 hectares;
- ❑ located on a property, which is located within zone R1, R5 or RU4 or is located within 100m of dwellings located on adjoining land;
- ❑ located so that any part of the system is less than 3 metres from any property boundary;
- ❑ located so that any part of the system is less than 50 metres from any permanent surface waters;
- ❑ located where the property has a boundary adjoining the Macquarie River, permanent creek or surface water;
- ❑ located where the soil in which the drainage field is located is highly permeable allowing free flow of effluent which may contaminate

ground water, impact on neighbouring properties or impact on the environment.

- ❑ located so that any part of the system is less than 25 metres from any other waters (eg farm dams, intermittent water ways and drainage channels);
- ❑ located in an area with a known high water table (less than 1 metre)
- ❑ a type of sewage management system which serves more than 20 people;
- ❑ within 1km of town or public water supply bore
- ❑ in order to protect town water supply, only AWTs shall be installed within zone R1 where town sewer is not available.

11.0 REVIEW OF AND CHANGES TO CATEGORIES OF RISK

All systems categorised in accordance with this strategy will receive a bi-annual compliance statement (BCS). The owner is required to sign the BCS indicating that their on-site sewage management system is operating in accordance with the performance standards. Failure to return the BCS may result in Council recategorising the system to high risk.

11.1 Review of Categorisation

When an installation has been assessed and allocated to a category of risk by a member of Council's staff, any owner who believes that such allocation is not appropriate may apply to Council to have the risk assessment reviewed. Such a review may or may not involve the carrying out of a site inspection of the installation and may involve the payment of a fee to Council. The level of a fee, if any, for a risk assessment review will be determined annually by Council in conjunction with the fixing of its annual fees and charges.

12.0 RECORDS AND APPLICATIONS FOR RENEWAL

12.1 Records

Council will ensure that all applications received are recorded in a register and that details of the determination of those applications are also entered in the register. Such register will include full details: of,

- the applicant;
- the property concerned;
- the type of installation;
- the date of application;
- any site inspections;

- the determination of the application;
- the date of issue of any approval or refusal and any other relevant details.

This register may be kept in electronic format.

12.2 Notice of Renewal

Notification is to be sent, to each owner of land, in respect of which an approval to operate is issued, at least two months prior to the expiry date of their current approval. Such notification is to incorporate an application form for renewal and full details of the information required to be submitted with the new application. The appropriate renewal fee in accordance with Council's current schedule of fees and charges must accompany each renewal application.

13.0 EVALUATION OF IMPLEMENTATION OF THIS STRATEGY

13.1 Monitoring

The ongoing efficiency of this strategy will be evaluated by a monitoring program. This program will involve:

- ❑ the random inspection of sewage management facilities throughout the Council area. The program of inspections will commence in the first Operational Plan following adoption of this strategy by Council; and
- ❑ an assessment of the integration of this strategy with other Council strategic planning processes. These processes may include but are not limited to the Community Strategic Plan, Delivery Program, development planning, stormwater management planning and catchment management planning; and
- ❑ water and sewerage infrastructure planning; and
- ❑ an assessment of the effectiveness of this strategy in relation to the objectives and goals set out in clauses 2.0 and 3.0 and in relation to the resources required to implement the strategy.

On an annual basis Council may inspect 5% of all installations to determine whether they meet the performance standards set out in the Regulation. Where the inspections indicate that there is a general achievement of the performance standards then the random inspection rate may be decreased. If, on the other hand, the inspections reveal that a large number of installations are not meeting the performance standards then the rate of inspections will be increased.

The actual rate of inspections in any one year will be determined by Council's Director, Planning & Environmental Services after the annual State of the Environment Report has been considered. The % rate of inspection of installations may be varied according to the category of risk of installation (i.e. high, medium or low risk) and the particular risks attached to a particular category or type of installation as evidenced by Council's on-going inspection program.

13.2 Reporting

Council's annual State of the Environment Report will include details of:

- the results of the on-site sewage management inspection program;
- details regarding particular patterns of system failure related to either location criteria or system type;
- an assessment of the ongoing integration of this strategy with the other strategic planning processes of Council;
- the effectiveness of this strategy and its implementation measured against the objectives and goals set out in Clauses 2.0 and 3.0.

14.0 REVIEW OF THIS STRATEGY

This strategy is to be the subject of ongoing review. In the early stages of implementation it is intended that the content of the strategy will be reviewed by Council's Director, Planning & Environmental Services on an annual basis with any proposed changes to be publicly notified prior to formal consideration by Council. Ultimately, it is expected that the review process will stabilise and that reviews will occur every four years in the twelve month period after each general Council election.

In undertaking each review Council will take into account the information provided in Council's State of the Environment Reports and the results of any consultations with relevant Government Departments, the community generally and any local interest groups.

REFERENCE DOCUMENTS

During the preparation of this document the following documents have been used or are acknowledged:

Draft Water Quality Standards. Issued by the Environment Protection Authority.

Environment & Health Protection Guidelines: On-site Sewage Management for Single Households issued by Department of Local Government, Environment Protection Authority, NSW Health, NSW Dept of Land and Water Conservation and the Department of Urban Affairs and Planning.

ATTACHMENTS

1. Application form to operate an on-site sewage management system; and
2. Site assessment form for on-site sewage management systems.

Version Number	Created by	First Adopted	Resolution No.	Last Modified	Review Period
1	Director Planning & Environmental Services	12 November 2014	2014/383		2 Years



APPENDIX C

**Setback Requirements and
Illustrative Buffer Plan**

TABLE R1
GUIDELINES FOR HORIZONTAL AND VERTICAL SETBACK DISTANCES
(to be used in conjunction with Table R2)

Site feature	Setback distance range (m) (See Note 1)	Site constraint items of specific concern (from Table R2) (see Note 1)
<i>Horizontal setback distance (m)</i>		
Property boundary	1.5 – 50 (see Note 2)	A, D, J
Buildings/houses	2.0 – > 6 (see Note 3)	A, D, J
Surface water (see Note 4)	15 – 100	A, B, D, E, F, G, J
Bore, well (see Notes 5 and 6)	15 – 50	A, C, H, J
Recreational areas (Children's play areas, swimming pools and so on) (see Note 7)	3 – 15 (see Notes 8 and 9)	A, E, J
In-ground water tank	4 – 15 (see Note 10)	A, E, J
Retaining wall and Embankments, escarpments, cuttings (see Note 11)	3.0 m or 45° angle from toe of wall (whichever is greatest)	D, G, H
<i>Vertical setback distance (m)</i>		
Groundwater (see Notes 5, 6, and 12)	0.6 – > 1.5	A, C, F, H, I, J
Hardpan or bedrock	0.5 – ≥ 1.5	A, C, J
NOTES:		
1 The overall setback distance should be commensurate with the level of risk to public health and the environment. For example, the maximum setback distance should be adopted where site/system features are on the high end of the constraint scale. The setback distance should be based on an evaluation of the constraint items and corresponding sensitive features in Table R2 and how these interact to provide a pathway or barrier for wastewater movement.		
2 Subject to local regulatory rules and design by a suitably qualified and experienced person, the separation of a drip line system from an upslope boundary, for slopes greater than 5%, may be reduced to 0.5 m.		

TABLE R1
GUIDELINES FOR HORIZONTAL AND VERTICAL SETBACK DISTANCES

(to be used in conjunction with Table R2) (continued)

3	Setback distances of less than 3 m from houses are appropriate only where a drip irrigation land application system is being used with low design irrigation rates, where shallow subsurface systems are being used with equivalent low areal loading rates, where the risk of reducing the bearing capacity of the foundation or damaging the structure is low, or where an effective barrier (designed by a suitably qualified and experienced person) can be installed. This may require consent from the regulatory authority.
4	Setback distance from surface water is defined as the areal edge of the land application system to the edge of the water. Where land application areas are planned in a water supply catchment, advice on adequate buffer distances should be sought from the relevant water authority and a hydrogeologist. Surface water, in this case, refers to any fresh water or geothermal water in a river, lake, stream, or wetland that may be permanently or intermittently flowing. Surface water also includes water in the coastal marine area and water in man-made drains, channels, and dams unless these are to specifically divert surface water away from the land application area. Surface water excludes any water in a pipe or tank.
5	Highly permeable stony soils and gravel aquifers potentially allow microorganisms to be readily transported up to hundreds of metres down the gradient of an on-site system (see R3, Table 1 in Pang et al. 2005). Maximum setback distances are recommended where site constraints are identified at the high scale for items A, C, and H. For reading and guidance on setback distances in highly permeable soils and coarse-grained aquifers see R3. As microbial removal is not linear with distance, data extrapolation of experiments should not be relied upon unless the data has been verified in the field. Advice on adequate buffer distances should be sought from the relevant water authority and a hydrogeologist.
6	Setback distances from water supply bores should be reviewed on a case-by-case basis. Distances can depend on many factors including soil type, rainfall, depth and casing of bore, direction of groundwater flow, type of microorganisms, existing quality of receiving waters, and resource value of waters.
7	Where effluent is applied to the surface by covered drip or spray irrigation, the maximum value is recommended.
8	In the case of subsurface application of primary treated effluent by LPED irrigation, the upper value is recommended.
9	In the case of surface spray, the setback distances are based on a spray plume with a diameter not exceeding 2 m or a plume height not exceeding 0.5 m above finished surface level. The potential for aerosols being carried by the wind also needs to be taken into account.
10	It is recommended that land application of primary treated effluent be down gradient of in-ground water tanks.
11	When determining minimum distances from retaining walls, embankments, or cut slopes, the type of land application system, soil types, and soil layering should also be taken into account to avoid wastewater collecting in the subsoil drains or seepage through cuts and embankments. Where these situations occur setback clearances may need to be increased. In areas where slope stability is of concern, advice from a suitably qualified and experienced person may be required.
12	Groundwater setback distance (depth) assumes unsaturated flow and is defined as the vertical distance from the base of the land application systems to the highest seasonal water table level. To minimise potential for adverse impacts on groundwater quality, minimum setback distances should ensure unsaturated, aerobic conditions in the soil. These minimum depths will vary depending on the scale of site constraints identified in Table R2. Where groundwater setback is insufficient, the ground level can be raised by importing suitable topsoil and improving effluent treatment. The regulatory authority should make the final decision in this instance. (See also the guidance on soil depth and groundwater clearance in Tables K1 and K2.)

TABLE R2
SITE CONSTRAINT SCALE FOR DEVELOPMENT OF SETBACK DISTANCES

(used as a guide in determining appropriate setback distances from ranges given in Table R1)

Item	Site/system feature	Constraint scale (see Note 1)		Sensitive features
		LOWER	HIGHER	
Examples of constraint factors (see Note 2)				
A	Microbial quality of effluent (see Note 3)	Effluent quality consistently producing ≤ 10 cfu/100 mL <i>E. coli</i> (secondary treated effluent with disinfection)	Effluent quality consistently producing $\geq 10^6$ cfu/100 mL <i>E. coli</i> (for example, primary treated effluent)	Groundwater and surface pollution hazard, public health hazard
B	Surface water (see Note 4)	Category 1 to 3 soils (see Note 5) no surface water down gradient within > 100 m, low rainfall area	Category 4 to 6 soils, permanent surface water <50 m down gradient, high rainfall area, high resource/environmental value (see Note 6)	Surface water pollution hazard for low permeable soils, low lying or poorly draining areas
C	Groundwater	Category 5 and 6 soils, low resource/environmental value	Category 1 and 2 soils, gravel aquifers, high resource/environmental value	Groundwater pollution hazard
D	Slope	0 – 6% (surface effluent application) 0 – 10% (subsurface effluent application)	> 10% (surface effluent application), > 30% subsurface effluent application	Off-site export of effluent, erosion
E	Position of land application area in landscape (see Note 6).	Downgradient of surface water, property boundary, recreational area	Upgradient of surface water, property boundary, recreational area	Surface water pollution hazard, off-site export of effluent
F	Drainage	Category 1 and 2 soils, gently sloping area	Category 6 soils, sites with visible seepage, moisture tolerant vegetation, low lying area	Groundwater pollution hazard
G	Flood potential	Above 1 in 20 year flood contour	Below 1 in 20 year flood contour	Off-site export of effluent, system failure, mechanical faults
H	Geology and soils	Category 3 and 4 soils, low porous regolith, deep, uniform soils	Category 1 and 6 soils, fractured rock, gravel aquifers, highly porous regolith	Groundwater pollution hazard for porous regolith and permeable soils
I	Landform	Hill crests, convex side slopes, and plains	Drainage plains and incise channels	Groundwater pollution hazard, resurfacing hazard
J	Application method	Drip irrigation or subsurface application of effluent	Surface/above ground application of effluent	Off-site export of effluent, surface water pollution

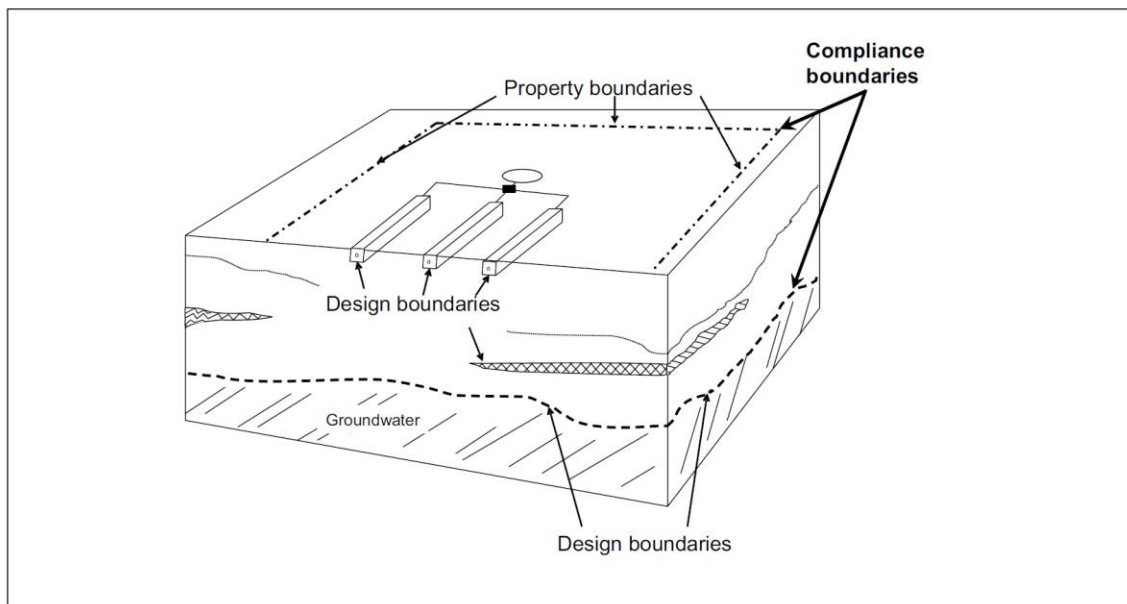
NOTES:

- Scale shows the level of constraint to siting an on-site system due to the constraints identified by SSE evaluator or regulatory authority. See Figures R1 and R2 for examples of on-site system design boundaries and possible site constraints.
- Examples of typical siting constraint factors that may be identified either by SSE evaluator or regulatory authority. Site constraints are not limited to this table. Other site constraints may be identified and taken into consideration when determining setback distances.

TABLE R2
SITE CONSTRAINT SCALE FOR DEVELOPMENT OF SETBACK DISTANCES

(used as a guide in determining appropriate setback distances from ranges given
in Table R1) (continued)

- | | |
|---|--|
| 3 | The level of microbial removal for any on-site treatment system needs to be determined and it should be assumed that unless disinfection is reliably used then the microbial concentrations will be similar to primary treatment. Low risk microbial quality value is based on the values given in ARC (2004), ANZECC and ARMCANZ (2000), and EPA Victoria (<i>Guidelines for environmental management: Use of reclaimed water</i> 2003). |
| 4 | Surface water, in this case, refers to any fresh water or geothermal water in a river, lake, stream, or wetland that may be permanently or intermittently flowing. Surface water also includes water in the coastal marine area and water in man-made drains, channels, and dams unless these are to specifically divert surface water away from the land application area. Surface water excludes any water in a pipe or tank. |
| 5 | The soil categories 1 to 6 are described in Table 5.1. Surface water or groundwater that has high resource value may include potable (human or animal) water supplies, bores, wells, and water used for recreational purposes. Surface water or groundwater of high environmental value include undisturbed or slightly disturbed aquatic ecosystems as described in ANZECC and ARMCANZ (2000). |
| 6 | The regulatory authority may reduce or increase setback distances at their discretion based on the distances of the land application up or downgradient of sensitive receptors. |

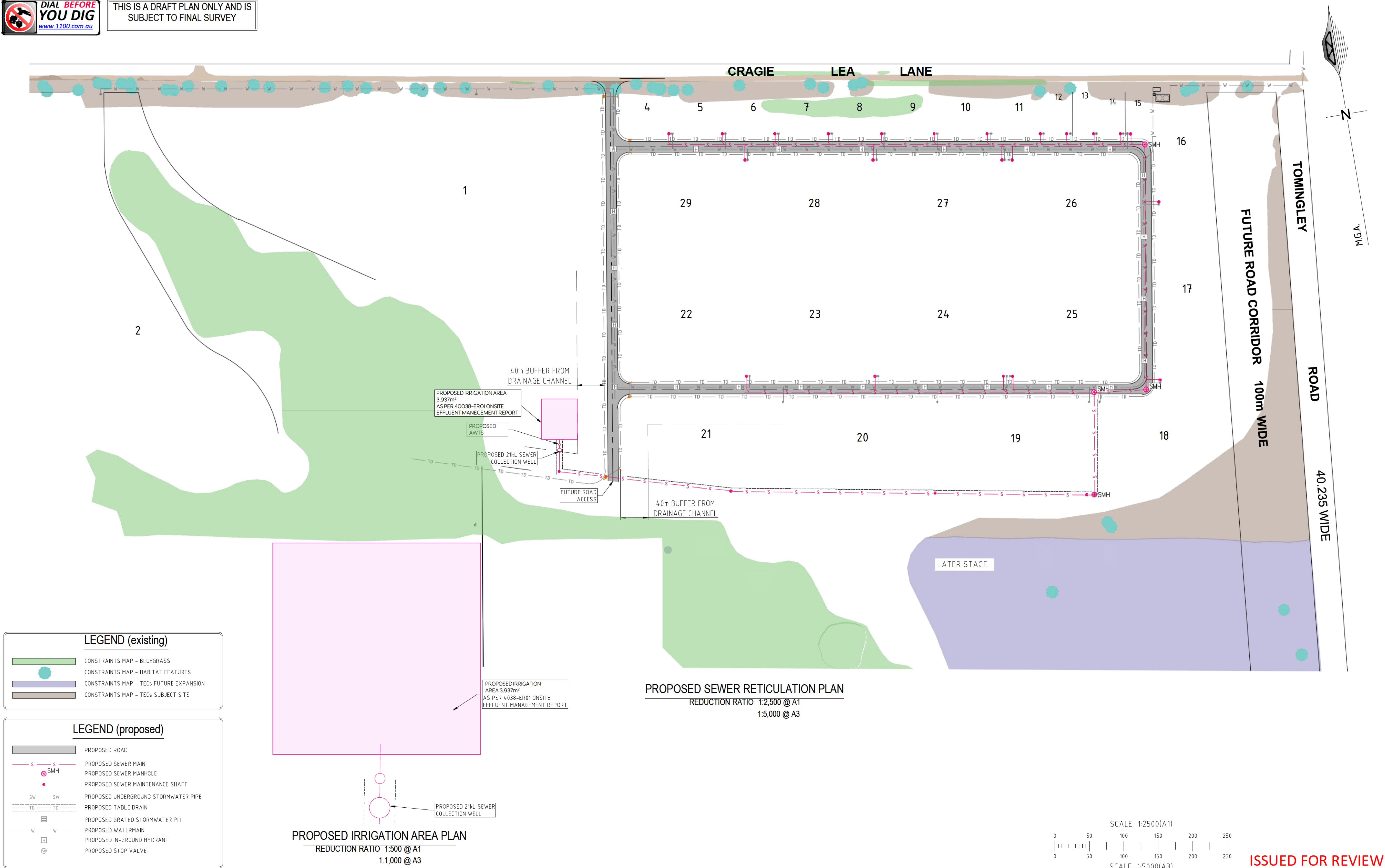


(Adapted from USEPA 2002)

**FIGURE R1 EXAMPLE OF DESIGN AND COMPLIANCE BOUNDARIES FOR APPLICATION
OF SETBACK DISTANCES FOR A SOIL ABSORPTION SYSTEM**



THIS IS A DRAFT PLAN ONLY AND IS
SUBJECT TO FINAL SURVEY

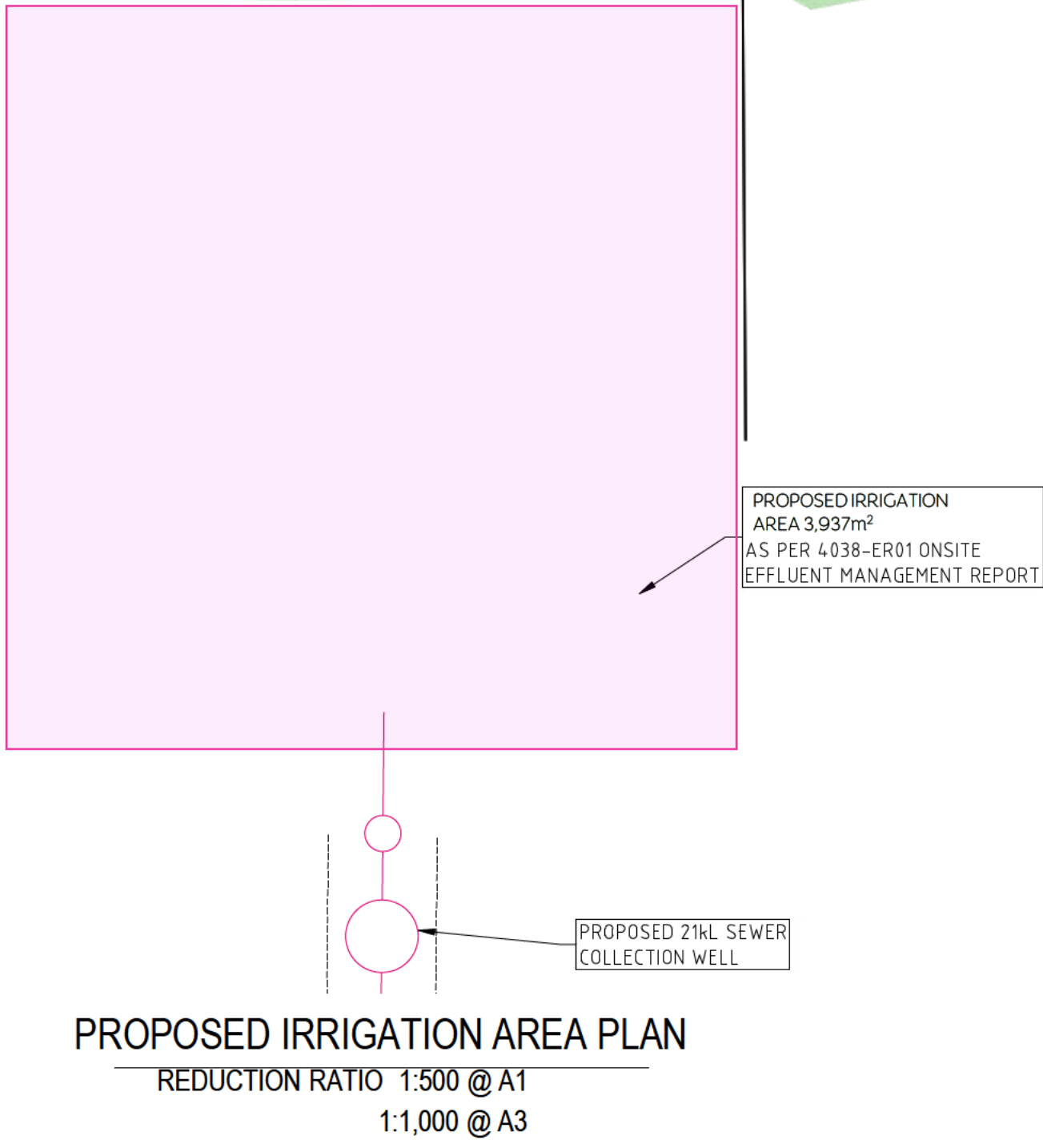


LEGEND (existing)

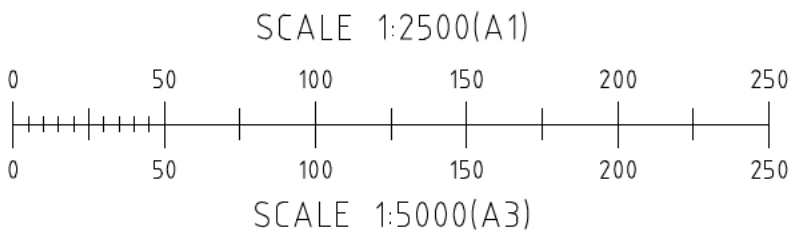
- CONSTRAINTS MAP - BLUEGRASS
- CONSTRAINTS MAP - HABITAT FEATURES
- CONSTRAINTS MAP - TECs FUTURE EXPANSION
- CONSTRAINTS MAP - TECs SUBJECT SITE

LEGEND (proposed)

- PROPOSED ROAD
- PROPOSED SEWER MAIN
- PROPOSED SEWER MANHOLE
- PROPOSED SEWER MAINTENANCE SHAFT
- PROPOSED UNDERGROUND STORMWATER PIPE
- PROPOSED TABLE DRAIN
- PROPOSED GRATED STORMWATER PIT
- PROPOSED WATERMAIN
- PROPOSED IN-GROUND HYDRANT
- PROPOSED STOP VALVE



PROPOSED SEWER RETICULATION PLAN
REDUCTION RATIO 1:2,500 @ A1
1:5,000 @ A3



ISSUED FOR REVIEW

BARNSON PTY LTD

phone 1300 BARNSON (1300 227 676)
email generalenquiry@barnson.com.au
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Rev	Date	Description
A	31-08-2023	ISSUED FOR REVIEW
X	14-12-2023	MARKUP

Project
**CIVIL ENGINEERING DOCUMENTATION
FOR NARROMINE FREIGHT HUB**
Site Address
397 CRAGIE LEA LANE
NARROMINE NSW 2821
Client
NARROMINE SHIRE COUNCIL

Drawing Title PROPOSED SEWER RETICULATION PLAN		
Design	DOS	Original Sheet Size A1
Drawn	JS	X
Check	-	Revision

Certification	
Project No	40038
Drawing No	C21





APPENDIX D

Soil Test Results and Borelogs

**CERTIFICATE OF ANALYSIS**

Work Order	: ME2300735	Page	: 1 of 13
Client	: BARNSON	Laboratory	: Environmental Division Mudgee
Contact	: Nardus Potgieter	Contact	: Mary Monds (ALS Mudgee)
Address	: Unit 4 108-110 Market Street MUDGEES NSW 2850	Address	: 1/29 Sydney Road Mudgee NSW Australia 2850
Telephone	: 0429 464 067	Telephone	: +61 2 6372 6735
Project	: Soil	Date Samples Received	: 17-Apr-2023 14:40
Order number	: ----	Date Analysis Commenced	: 18-Apr-2023
C-O-C number	: ----	Issue Date	: 27-Apr-2023 18:01
Sampler	: Nardus Potgieter (Client Sampler)		
Site	: ----		
Quote number	: SY/053/14		
No. of samples received	: 14		
No. of samples analysed	: 14		



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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
- Surrogate Control Limits

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>
Aleksandar Vujkovic	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Dian Dao	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW



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 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

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.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP068: Where reported, Total OCP is the sum of the reported concentrations of all Organochlorine Pesticides at or above LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EA058 Emerson: V. = Very, D. = Dark, L. = Light, VD. = Very Dark
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H⁺ + Al³⁺).



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 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				CL-01 Surface Soil	CL-02 Surface Soil	CL-03 Surface Soil	CL-04 Surface Soil	CL-05 Surface Soil
Sampling date / time				30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	ME2300735-001	ME2300735-002	ME2300735-003	ME2300735-004	ME2300735-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	7.6	5.8	7.4	6.9	8.1
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	14	11	17	14	15
Copper	7440-50-8	5	mg/kg	6	<5	6	7	7
Lead	7439-92-1	5	mg/kg	6	5	6	7	7
Nickel	7440-02-0	2	mg/kg	5	3	5	7	7
Zinc	7440-66-6	5	mg/kg	8	5	7	9	9
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05



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 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				CL-01 Surface Soil	CL-02 Surface Soil	CL-03 Surface Soil	CL-04 Surface Soil	CL-05 Surface Soil
Sampling date / time				30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	ME2300735-001	ME2300735-002	ME2300735-003	ME2300735-004	ME2300735-005
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5



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 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				CL-01 Surface Soil	CL-02 Surface Soil	CL-03 Surface Soil	CL-04 Surface Soil	CL-05 Surface Soil
Sampling date / time				30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	ME2300735-001	ME2300735-002	ME2300735-003	ME2300735-004	ME2300735-005
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5



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 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				CL-01 Surface Soil	CL-02 Surface Soil	CL-03 Surface Soil	CL-04 Surface Soil	CL-05 Surface Soil
Sampling date / time				30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	ME2300735-001	ME2300735-002	ME2300735-003	ME2300735-004	ME2300735-005
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	96.6	122	113	111	125
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	74.1	94.5	86.5	94.0	88.6
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	61.4	53.2	50.0	61.0	64.6
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	79.9	82.1	76.9	76.2	77.0
2-Chlorophenol-D4	93951-73-6	0.5	%	81.8	86.6	79.8	78.9	79.4
2,4,6-Tribromophenol	118-79-6	0.5	%	54.2	61.8	47.6	44.0	43.8
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	82.9	82.5	81.4	80.5	81.8
Anthracene-d10	1719-06-8	0.5	%	88.9	89.0	85.0	89.0	88.2
4-Terphenyl-d14	1718-51-0	0.5	%	84.2	83.4	80.2	81.0	79.9
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.2	%	110	125	119	120	116
Toluene-D8	2037-26-5	0.2	%	85.4	82.9	88.3	86.4	88.6
4-Bromofluorobenzene	460-00-4	0.2	%	84.3	89.4	87.7	87.7	85.8



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 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				CL-06 Surface Soil	CL-07 Surface Soil	CL-08 Surface Soil	CL-09 Surface Soil	CL-10 Surface Soil
Sampling date / time				30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	ME2300735-006	ME2300735-007	ME2300735-008	ME2300735-009	ME2300735-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	22.7	7.9	6.3	11.0	5.9
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	17	15	16	12	15
Copper	7440-50-8	5	mg/kg	15	5	6	8	6
Lead	7439-92-1	5	mg/kg	12	6	6	7	7
Nickel	7440-02-0	2	mg/kg	10	5	4	7	5
Zinc	7440-66-6	5	mg/kg	25	7	9	11	9
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05



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 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	CL-06 Surface Soil	CL-07 Surface Soil	CL-08 Surface Soil	CL-09 Surface Soil	CL-10 Surface Soil
Sampling date / time					30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	ME2300735-006	ME2300735-007	ME2300735-008	ME2300735-009	ME2300735-010	
				Result	Result	Result	Result	Result	
EP068A: Organochlorine Pesticides (OC) - Continued									
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	



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 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				CL-06 Surface Soil	CL-07 Surface Soil	CL-08 Surface Soil	CL-09 Surface Soil	CL-10 Surface Soil
Sampling date / time				30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	ME2300735-006	ME2300735-007	ME2300735-008	ME2300735-009	ME2300735-010
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5



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 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				CL-06 Surface Soil	CL-07 Surface Soil	CL-08 Surface Soil	CL-09 Surface Soil	CL-10 Surface Soil
Sampling date / time				30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00
Compound	CAS Number	LOR	Unit	ME2300735-006	ME2300735-007	ME2300735-008	ME2300735-009	ME2300735-010
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	114	110	121	110	103
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	73.7	90.8	92.6	108	133
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	70.9	67.1	53.8	98.4	70.8
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	83.7	78.3	81.9	76.5	81.1
2-Chlorophenol-D4	93951-73-6	0.5	%	86.2	81.1	84.6	76.5	82.6
2,4,6-Tribromophenol	118-79-6	0.5	%	66.7	53.0	57.2	46.8	47.1
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	81.7	79.7	81.4	78.8	81.8
Anthracene-d10	1719-06-8	0.5	%	86.6	84.2	86.0	81.9	89.2
4-Terphenyl-d14	1718-51-0	0.5	%	81.5	79.2	80.4	79.4	87.1
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.2	%	102	104	120	119	120
Toluene-D8	2037-26-5	0.2	%	76.0	75.7	96.0	87.8	92.4
4-Bromofluorobenzene	460-00-4	0.2	%	79.2	77.1	106	86.7	101



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 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				CL-A-S Surface Soil	CL-A-D Sub-soil	CL-B-S Surface Soil	CL-B-D Sub-soil	----
Sampling date / time				30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	30-Mar-2023 00:00	----
Compound	CAS Number	LOR	Unit	ME2300735-011	ME2300735-012	ME2300735-013	ME2300735-014	-----
				Result	Result	Result	Result	---
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	6.3	----	6.5	----	----
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	10	----	26	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	7.4	----	8.7	----	----
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Dark Reddish Brown (5YR 3/4)	Dark Red (2.5YR 3/6)	Dark Grayish Brown (10YR 4/2)	Very Dark Grayish Brown (10YR 3/2)	----
Texture	----	-	-	Silty Loam	Silty Clay Loam	Medium Heavy Clay	Clay Loam	----
Emerson Class Number	EC/TC	-	-	2	2	1	2	----
EA150: Soil Classification - National Committee on Soil and Terrain (2009)								
Clay (<2 µm)	----	1	%	20	27	13	35	----
Silt (2-20 µm)	----	1	%	9	9	10	7	----
Fine Sand (0.02-0.2 mm)	----	1	%	37	32	35	26	----
Coarse Sand (0.2-2.0 mm)	----	1	%	31	30	34	26	----
Gravel (>2mm)	----	1	%	3	2	8	6	----
EA152: Soil Particle Density								
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.57	2.59	2.47	2.61	----
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	3.2	----	3.5	----	----
Exchangeable Magnesium	----	0.1	meq/100g	1.0	----	1.3	----	----
Exchangeable Potassium	----	0.1	meq/100g	0.8	----	1.0	----	----
Exchangeable Sodium	----	0.1	meq/100g	<0.1	----	0.1	----	----
Cation Exchange Capacity	----	0.1	meq/100g	5.0	----	5.8	----	----
Exchangeable Sodium Percent	----	0.1	%	0.4	----	1.8	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	340	----	1090	----	----
EK072: Phosphate Sorption Capacity								
Phosphate Sorption Capacity	----	250	mg P sorbed/kg	649	----	506	----	----



Page : 12 of 13
 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2,4,6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	63	125
Toluene-D8	2037-26-5	67	124
4-Bromofluorobenzene	460-00-4	66	131



Page : 13 of 13
 Work Order : ME2300735
 Client : BARNSON
 Project : Soil

Inter-Laboratory Testing

Analysis conducted by ALS Brisbane, NATA accreditation no. 825, site no. 818 (Chemistry) 18958 (Biology).

(SOIL) EA058: Emerson Aggregate Test

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(SOIL) EA150: Soil Classification - National Committee on Soil and Terrain (2009)

(SOIL) EA152: Soil Particle Density

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(SOIL) EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions

(SOIL) EP080/071: Total Petroleum Hydrocarbons

(SOIL) EP080: BTEXN

(SOIL) EP080S: TPH(V)/BTEX Surrogates

(SOIL) EP075(SIM)B: Polynuclear Aromatic Hydrocarbons

(SOIL) EP075(SIM)S: Phenolic Compound Surrogates

(SOIL) EP075(SIM)T: PAH Surrogates

(SOIL) EP068A: Organochlorine Pesticides (OC)

(SOIL) EP068B: Organophosphorus Pesticides (OP)

(SOIL) EP068T: Organophosphorus Pesticide Surrogate

(SOIL) EP068S: Organochlorine Pesticide Surrogate

(SOIL) EA055: Moisture Content (Dried @ 105-110°C)

(SOIL) EP066: Polychlorinated Biphenyls (PCB)

(SOIL) EP066S: PCB Surrogate

(SOIL) EG035T: Total Recoverable Mercury by FIMS

(SOIL) EG005(ED093)T: Total Metals by ICP-AES

(SOIL) EK062: Total Nitrogen as N (TKN + NO_x)

(SOIL) EK072: Phosphate Sorption Capacity

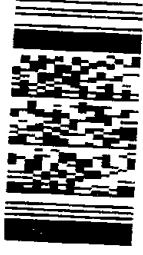
(SOIL) EA002: pH 1:5 (Soils)

(SOIL) EA010: Conductivity (1:5)

(SOIL) ED007: Exchangeable Cations



a Unit 4 / 108-110 Market Street
Mudgee NSW 2850
t 1300 BARNSON (1300 227 676)
e generalenquiry@barnson.com.au
w www.barnson.com.au



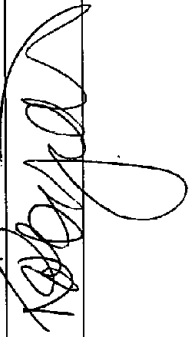
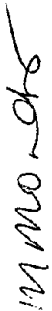
Telephone : 02 6372 6736

CHAIN OF CUSTODY AND ANALYTICAL REQUEST

Job Number	40038	Date	17/04/2023
Laboratory	ALS Mudgee	Report to	Nardus Potgieter npotgieter@barnson.com.au
Sample Temperature on Receipt		Notes	
20 °C	Signature: <i>mm</i>		

Sample ID	Sample Description	Sample Date	Sample type	Analysis request					
				1	2	3	4	5	6
CL-01	Surface soil	30/03/2023	Soil	X					
CL-02	Surface soil	30/03/2023	Soil	X					
CL-03	Surface soil	30/03/2023	Soil	X					
CL-04	Surface soil	30/03/2023	Soil	X					
CL-05	Surface soil	30/03/2023	Soil	X					
CL-06	Surface soil	30/03/2023	Soil	X					
CL-07	Surface soil	30/03/2023	Soil	X					
CL-08	Surface soil	30/03/2023	Soil	X					
CL-09	Surface soil	30/03/2023	Soil	X					
CL-10	Surface soil	30/03/2023	Soil	X					
CL-A-S	Surface soil	30/03/2023	Soil		X	X	X	X	X
CL-A-D	Sub-soil	30/03/2023	Soil					X	X
CL-B-S	Surface soil	30/03/2023	Soil		X	X	X	X	X
CL-B-D	Sub-soil	30/03/2023	Soil					X	X

Analysis request	Method Code
1 TRH (C6-C40) / BTEXN / PAH / OC / OP / PCB / 8 Metals	S-16
2 pH plus EC (Saturated Paste) plus Exchangeable Cations and ECEC plus ESP	AG-1
3 P Sorption Capacity	EK072
4 Total Nitrogen as N*	EK062
5 Soil Classification by Particle Size Analysis (Sieve Hydrometer and SPD analysis to "Yellow Book" spec)	EA150H-Y
6 Emerson Aggregate Testing	EA058

Relinquished by / Affiliation	Accepted by / Affiliation	Date
 / Barnson	 / ALS Mudgee	17/04/2023 240

CLIENT Narromine Shire Council PROJECT NAME Pavement Investigation
PROJECT NUMBER 40860 PROJECT LOCATION 397 Craigie Lea Lane, Narromine NSW

DATE STARTED 30/3/23 COMPLETED 30/3/23 R.L. SURFACE _____ EASTING _____
DRILLING CONTRACTOR Barnson SLOPE 90° NORTHING _____
EQUIPMENT GT-10 Drill Rig HOLE LOCATION Borehole 1
HOLE SIZE 90mm LOGGED BY HC CHECKED BY NR

NOTES

Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Dynamic Cone Penetrometer Blows / 100mm	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit		0.1			Sandy GRAVEL: brown: slightly moist: very dense: low plasticity	0	FILL
		0.2		ML	Sandy SILT: dark brown: slightly moist: hard: low plasticity	8	ALLUVIAL
		0.5		CL	Sandy Silty CLAY: brown-orange: slightly moist: hard: medium plasticity	10	ALLUVIAL
	Disturbed Sample CBR = 2.0%	1.0				7	
		1.5				6	
						6	
						6	
						10	
						8	
						7	
						9	
						10	
						12	

Borehole 1 terminated at 1.5m

CLIENT Narromine Shire Council PROJECT NAME Pavement Investigation
PROJECT NUMBER 40860 PROJECT LOCATION 397 Craigie Lea Lane, Narromine NSW

DATE STARTED 30/3/23 COMPLETED 30/3/23 R.L. SURFACE _____ EASTING _____
DRILLING CONTRACTOR Barnson SLOPE 90° NORTHING _____
EQUIPMENT GT-10 Drill Rig HOLE LOCATION Borehole 2
HOLE SIZE 90mm LOGGED BY HC CHECKED BY NR

NOTES





Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Dynamic Cone Penetrometer Blows / 100mm	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit		0.1			Sandy GRAVEL: brown: slightly moist: dense: low plasticity	0	FILL
		0.5		CL	Sandy Silty CLAY: brown-orange: slightly moist: very stiff to hard: medium plasticity	7 7 7 8 10 9 7 7 8 8 10 12 12	ALLUVIAL
	Disturbed Sample CBR = 4.5%	1.0					
		1.5					

BOREHOLE / TEST PIT WITH DCP 40038-G01A-G10A.GPJ GINT STD AUSTRALIA GDT 27/4/23

CLIENT Narromine Shire Council PROJECT NAME Pavement Investigation
PROJECT NUMBER 40860 PROJECT LOCATION 397 Craigie Lea Lane, Narromine NSW

DATE STARTED 30/3/23 COMPLETED 30/3/23 R.L. SURFACE _____ EASTING _____
DRILLING CONTRACTOR Barnson SLOPE 90° NORTHING _____
EQUIPMENT GT-10 Drill Rig HOLE LOCATION Borehole 3
HOLE SIZE 90mm LOGGED BY HC CHECKED BY NR

NOTES

Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Dynamic Cone Penetrometer Blows / 100mm	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit		0.1			Sandy GRAVEL: brown: slightly moist: dense: low plasticity	0	FILL
		0.5		ML	Clayey SILT: pale brown: slightly moist: hard: low plasticity	10	ALLUVIAL
	Disturbed Sample CBR = 6%	1.0				7	
		1.5				10	

Borehole 3 terminated at 1.5m

CLIENT Narromine Shire Council PROJECT NAME Pavement Investigation
PROJECT NUMBER 40860 PROJECT LOCATION 397 Craigie Lea Lane, Narromine NSW

DATE STARTED 30/3/23 COMPLETED 30/3/23 R.L. SURFACE _____ EASTING _____
DRILLING CONTRACTOR Barnson SLOPE 90° NORTHING _____
EQUIPMENT GT-10 Drill Rig HOLE LOCATION Borehole 4
HOLE SIZE 90mm LOGGED BY HC CHECKED BY NR

NOTES


Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Dynamic Cone Penetrometer Blows / 100mm	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit		0.1			Sandy SILT: brown-orange	0	TOPSOIL
		0.5		ML	Clayey SILT: brown: slightly moist: very stiff to hard: low plasticity	6	ALLUVIAL
	Disturbed Sample CBR = 6%	1.0				10	
		1.5				6	
						6	
						7	
						9	
						10	
						12	
						12	

Borehole 4 terminated at 1.5m

CLIENT Narromine Shire Council PROJECT NAME Pavement Investigation
PROJECT NUMBER 40860 PROJECT LOCATION 397 Craigie Lea Lane, Narromine NSW

DATE STARTED 30/3/23 COMPLETED 30/3/23 R.L. SURFACE _____ EASTING _____
DRILLING CONTRACTOR Barnson SLOPE 90° NORTHING _____
EQUIPMENT GT-10 Drill Rig HOLE LOCATION Borehole 5
HOLE SIZE 90mm LOGGED BY HC CHECKED BY NR

NOTES

Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Dynamic Cone Penetrometer Blows / 100mm	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit		0.1			Sandy SILT: brown	0	TOPSOIL
		0.5		ML	Clayey SILT: brown: slightly moist: stiff to very stiff: low plasticity	4 3 3	ALLUVIAL
	Disturbed Sample CBR = 3.5%	0.6		ML	Clayey SILT: brown: slightly moist: hard: low plasticity	7 13 14 16 17	ALLUVIAL
		1.0					
		1.5					

Borehole 5 terminated at 1.5m

CLIENT Narromine Shire Council PROJECT NAME Pavement Investigation
PROJECT NUMBER 40860 PROJECT LOCATION 397 Craigie Lea Lane, Narromine NSW

DATE STARTED 30/3/23 COMPLETED 30/3/23 R.L. SURFACE _____ EASTING _____
DRILLING CONTRACTOR Barnson SLOPE 90° NORTHING _____
EQUIPMENT GT-10 Drill Rig HOLE LOCATION Borehole 6
HOLE SIZE 90mm LOGGED BY HC CHECKED BY NR

NOTES

Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Dynamic Cone Penetrometer Blows / 100mm	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit		0.1			Sandy SILT: brown	0	TOPSOIL
				ML	Clayey SILT: brown: slightly moist: stiff: low plasticity	5	ALLUVIAL
	Disturbed Sample CBR = 10%	0.5				7	
		0.7		ML	Sandy SILT: brown-orange: slightly moist: very stiff to hard: medium plasticity	10	ALLUVIAL
		1.0				12	
		1.5				14	

Borehole 6 terminated at 1.5m

CLIENT Narromine Shire Council PROJECT NAME Pavement Investigation
PROJECT NUMBER 40860 PROJECT LOCATION 397 Craigie Lea Lane, Narromine NSW

DATE STARTED 30/3/23 COMPLETED 30/3/23 R.L. SURFACE _____ EASTING _____
DRILLING CONTRACTOR Barnson SLOPE 90° NORTHING _____
EQUIPMENT GT-10 Drill Rig HOLE LOCATION Borehole 7
HOLE SIZE 90mm LOGGED BY HC CHECKED BY NR

NOTES

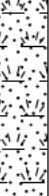



Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Dynamic Cone Penetrometer Blows / 100mm	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit		0.1			Sandy SILT: brown	0	TOPSOIL
		0.5		ML	Clayey SILT: brown: slightly moist: very stiff to hard: low plasticity	5 5 6 6 9 12 10 12	ALLUVIAL
	Disturbed Sample CBR = 5.0%	1.0					
		1.5					

Borehole 7 terminated at 1.5m

CLIENT Narromine Shire Council PROJECT NAME Pavement Investigation
PROJECT NUMBER 40860 PROJECT LOCATION 397 Craigie Lea Lane, Narromine NSW

DATE STARTED 30/3/23 COMPLETED 30/3/23 R.L. SURFACE _____ EASTING _____
DRILLING CONTRACTOR Barnson SLOPE 90° NORTHING _____
EQUIPMENT GT-10 Drill Rig HOLE LOCATION Borehole 8
HOLE SIZE 90mm LOGGED BY HC CHECKED BY NR

NOTES

Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Dynamic Cone Penetrometer Blows / 100mm	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit					Sandy SILT: brown	0	TOPSOIL
		0.2		ML	Clayey SILT: brown: slightly moist: hard: low plasticity	5 6 7 9	ALLUVIAL
	Disturbed Sample CBR = 7%	0.5		CL	Sandy Silty CLAY: brown: slightly moist: hard: medium plasticity	9 10 12 12	ALLUVIAL
		1.2		CL	Sandy Silty CLAY: brown: slightly moist: hard: medium plasticity		ALLUVIAL
		1.5					

Borehole 8 terminated at 1.5m

CLIENT Narromine Shire Council PROJECT NAME Pavement Investigation
PROJECT NUMBER 40860 PROJECT LOCATION 397 Craigie Lea Lane, Narromine NSW

DATE STARTED 30/3/23 COMPLETED 30/3/23 R.L. SURFACE _____ EASTING _____
DRILLING CONTRACTOR Barnson SLOPE 90° NORTHING _____
EQUIPMENT GT-10 Drill Rig HOLE LOCATION Borehole 9
HOLE SIZE 90mm LOGGED BY HC CHECKED BY NR

NOTES

Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Dynamic Cone Penetrometer Blows / 100mm	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit					Sandy SILT: brown	0	TOPSOIL
		0.2		ML	Clayey SILT: brown: slightly moist: hard: low plasticity	4	ALLUVIAL
	Disturbed Sample CBR = 2.5%	0.5				8	
						9	
						9	
						10	
						12	
						15	
		1.0		CL	Sandy Silty CLAY: brown: slightly moist: hard: medium plasticity		ALLUVIAL
		1.5					

Borehole 9 terminated at 1.5m

CLIENT Narromine Shire Council PROJECT NAME Pavement Investigation
PROJECT NUMBER 40860 PROJECT LOCATION 397 Craigie Lea Lane, Narromine NSW

DATE STARTED 30/3/23 COMPLETED 30/3/23 R.L. SURFACE _____ EASTING _____
DRILLING CONTRACTOR Barnson SLOPE 90° NORTHING _____
EQUIPMENT GT-10 Drill Rig HOLE LOCATION Borehole 10
HOLE SIZE 90mm LOGGED BY HC CHECKED BY NR

NOTES

Method	Samples	Depth (m)	Graphic Log	Classification Symbol	Material Description	Dynamic Cone Penetrometer Blows / 100mm	Additional Observations
Flight Auger & Tungsten Carbide (T.C) Bit					Sandy SILT: brown	0 4 8 12 16 20 24 2832	TOPSOIL
		0.2		ML	Clayey SILT: brown: slightly moist: very stiff to hard: low plasticity	3	ALLUVIAL
	Disturbed Sample CBR = 2.5%	0.5				3 5 7 10 12 16	
		1.0		CL	Sandy Silty CLAY: brown: slightly moist: hard: medium plasticity		ALLUVIAL
		1.5					

Borehole 10 terminated at 1.5m



APPENDIX E

Water and Nutrient Balances

Attachment No. 1

Barnson Job No	40038	
Location :	Narromine	

Design Wastewater Flow	Q	l/day	8600
Design Loading Rate	R	mm/day	10

Climate Zone	2 C	As per Soil Landscapes of Dubbo 1:250 000 Dropbox
--------------	-----	--

1	2	3	4	5	6	7	8	9	Days In Month
Month	Pan evap E (mm)	Evapo Transpiration Et (ET=0.75E)mm	Rainfall R (mm)	Retained Rainfall Rr (Rr=0.75R) mm	DLR per Month (mm)	Disposal Rate (3-5+6) mm	luent applied per mo (L)	Size of Area (8/7) m ²	
Jan	226	169.5	75	56.25	310	423.25	266600	629.8877732	31
Feb	173	129.75	78	58.5	290	361.25	249400	690.3806228	29
Mar	140	105	73	54.75	310	360.25	266600	740.0416378	31
Apr	91	68.25	83	62.25	300	306	258000	843.1372549	30
May	53	39.75	75	56.25	310	293.5	266600	908.3475298	31
Jun	41	30.75	78	58.5	300	272.25	258000	947.6584022	30
Jul	38	28.5	78	58.5	310	280	266600	952.1428571	31
Aug	51	38.25	73	54.75	310	293.5	266600	908.3475298	31
Sep	81	60.75	64	48	300	312.75	258000	824.940048	30
Oct	114	85.5	76	57	310	338.5	266600	787.5923191	31
Nov	155	116.25	72	54	300	362.25	258000	712.2153209	30
Dec	216	162	73	54.75	310	417.25	266600	638.9454763	31
Mean area								798.6m ²	

Month	First trial area	Application rate	Disposal rate	mm	Increase in Depth of Stored Effluent	th of Effluent for Mo	Increase in Depth of Effluent	Computed	Reset if Et<0	Equiv Storage
Dec	860m ²	310	417.25	-107.25	-357.5	0	-357.5	-357.5	0	0
Jan		310	423.25	-113.25	-377.5	0	-377.5	-377.5	0	0
feb		290	361.25	-71.25	-237.5	0	-237.5	-237.5	0	0
Mar		310	360.25	-50.25	-167.5	0	-167.5	-167.5	0	0
Apr		300	306	-6	-20	0	-20	-20	0	0
May		310	293.5	16.5	55	0	55	55	55	47300
Jun		300	272.25	27.75	92.5	55	147.5	147.5	147.5	126850
Jul		310	280	30	100	147.5	247.5	247.5	247.5	212850
Aug		310	293.5	16.5	55	247.5	302.5	302.5	302.5	260150
Sep		300	312.75	-12.75	-42.5	302.5	260	260	260	223600
Oct		310	338.5	-28.5	-95	260	165	165	165	141900
Nov		300	362.25	-62.25	-207.5	165	-42.5	-42.5	0	0
Dec		310	417.25	-107.25	-357.5	0	-357.5	-357.5	0	0
Jan		310	423.25	-113.25	-377.5	0	-377.5	-377.5	0	0
Feb		290	361.25	-71.25	-237.5	0	-237.5	-237.5	0	0
Mar		310	360.25	-50.25	-167.5	0	-167.5	-167.5	0	0
Apr		300	306	-6	-20	0	-20	-20	0	0
May		310	293.5	16.5	55	0	55	55	55	47300

Estimated area of effluent drainfield	860m ²
Maximum depth of stored effluent (must not exceed 350mm)	302.5mm
Bed/Trench dimensions	2000mm
Length of bed/trench required	430m
<20m lengths of bed/trench	21.5

Trench Depth	450
--------------	-----

Attachment No. 1

Phosphorus Balance

Job Number 40038

Phosphorus Sorption capacity - calculated to a depth of 1m if possible

Weighted pSorb from lab results - as per SCA pg 203

Soil Depth	pSorption (mg/	pSorption/soil layer
0-20	250	5000
20-40	420	8400
40-70	560	16800
70-100	580	17400

Weighted Psorp = Column C/thickness

Weighted Psorp = 650 mg/kg

OR USE Psorption Uptake values for soil type as per Appendix 1 of SCA pg 207

BULK Density - use the following, unless determined by lab/field (SCM pg, 207)

Soil Type	g/cm3
Sandy Soil	1.8
Fine sandy loam*	1.6
Intermediate	1.5
clay	1.3

*Interpreting soil test results

Need to calculate the pSorption of the soil in kg/ha, using the bulk density and Weighted Psorb mg/kg

Note - use top 1m of the soil

1 hectare = 10,000m²

Therefore in the top 1m of soil = 10,000m² X 1m X Bulk density

15000 tonnes/hectare of soil (update with Bulk density)

Convert tonnes to kg 15000000 kg

Therefore the pSorption is value mg/kg X kg of soil you have

975000000 mg/hectare

Convert mg/ha to kg/ha	9750
------------------------	------

$$\text{Irrigation Area} = P_{\text{generated}} / (P_{\text{absorbed}} + P_{\text{uptake}})$$

P_{generated} = total phosphorus (TP) concentration x volume (V) of wastewater produced in 50 years

TP = 12mg/L (from Sydney Catchment Management Authority, 2019: Designing and Installing On-Site Wastewater Systems)

V = Q x 365 days x 50 years, where Q is daily flow L/d

Q L/day =	8600
P _{generated} =	1569500000 mg
Convert to kg	1569.50 kg

P_{absorbed} = in soil is between 1/4 and 1/2 of the the phosphorus sorption capacity, therefore in accordance with the silver book, use 1/3

Is value x 1/3 =	3250 kg/ha
convert to kg/m ²	0.325 kg/m ²

P_{uptake} = the amount of vegetation uptake over 50 years

Is value from SCA pg207 X 365 days X 50 years

Value (kg/ha/year) 30 (choose from SCM Appendix 1 for maintained lawn)

Convert to mg/m²/day 8.21373 (using conversion factor from per year to per day)

Therefore total = amount mg/m²/day X 365 days X 50 years

Which is 149900.532

Convert to kg/m² 0.14990 kg/m²

$$\text{Irrigation Area} = P_{\text{generated}} / (P_{\text{absorbed}} + P_{\text{uptake}})$$

P _{generated} =	1569.50
P _{absorbed} =	0.325
P _{uptake} =	0.1499
Irrigation Area =	3304.9 m ²

Attachment No. 1

Minimum Area Method Water Balance an Wet Weather Storage Calculations

Barnson Job No	40038		
Location :	Narromine		

Design Wastewater Flow	Q	l/day	8600
Design Percolation Rate	R	mm/day	3.5

Climate Zone	2 C	As per Soil Landscapes of Dubbo 1:250 000 Dropdown Box
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Paramter	Symbol	Formula	Units	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Days in Month	(D)	n/a	days	31	28	31	30	31	30	31	31	30	31	30	31	365
Precipitation (70th percentile)	(P)	n/a	mm/month	75	78	73	83	75	78	78	73	64	76	72	73	898
Evaporation	(E)	n/a	mm/month	226	173	140	91	53	41	38	51	81	114	155	216	1379
Crop Factor (as per Silver Book)	(C)	n/a	n/a	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7

Outputs																
Evapotranspiration	(ET)	E X C	mm/month	158.2	121.1	98	63.7	37.1	28.7	26.6	35.7	56.7	79.8	108.5	151.2	965.3
Percolation	(B)	(R/7)xD	mm/month	108.5	98.0	108.5	105.0	108.5	105.0	108.5	108.5	105.0	108.5	105.0	108.5	1277.5
Outputs		(ET +B)	mm/month	266.7	219.1	206.5	168.7	145.6	133.7	135.1	144.2	161.7	188.3	213.5	259.7	2242.8
Inputs																
Precipitation (70th percentile)	(P)	n/a	mm/month	75	78	73	83	75	78	78	73	64	76	72	73	898
Possible Effluent Irrigation	(W)	(ET + B) -P	mm/month	191.7	141.1	133.5	85.7	70.6	55.7	57.1	71.2	97.7	112.3	141.5	186.7	1344.8
Actual Effluent Production	(I)	H/12	mm/month	112.1	112.1	112.1	112.1	112.1	112.1	112.1	112.1	112.1	112.1	112.1	112.1	112.1
Inputs		(P +I)	mm/month	187.1	190.1	185.1	195.1	187.1	190.1	190.1	185.1	176.1	188.1	184.1	185.1	1010.1

Storage	(S)	(P+I) - (ET+B)	mm/month	-79.6	-29.0	-21.4	26.4	41.5	56.4	55.0	40.9	14.4	-0.2	-29.4	-74.6	
Cumulative Storage	(M)	n/a	mm	0.0	0.0	0.0	26.4	67.8	124.2	179.2	220.0	234.4	234.2	204.7	130.1	

Note - H = sum of W

Irrigation Area	(L)	365 x Q/H	m ²	2334.2
Storage	(v)	Largest M	mm	234.4
		(V xL)/1000	m ³	547.1

Attachment No. 1

Phosphorus Balance

Job Number 40038

Phosphorus Sorption capacity - calculated to a depth of 1m if possible

Weighted pSorb from lab results - as per SCA pg 203

Soil Depth	pSorption (mg/	pSorption/soil layer
0-20	250	5000
20-40	420	8400
40-70	560	16800
70-100	580	17400

Weighted Psorp = Column C/thickness

Weighted Psorp = 500 mg/kg

OR USE Psorption Uptake values for soil type as per Appendix 1 of SCA pg 207

BULK Density - use the following, unless determined by lab/field (SCM pg, 207)

Soil Type	g/cm3
Sandy Soil	1.8
Fine sandy loam*	1.6
Intermediate	1.5
clay	1.3

*Interpreting soil test results

Need to calculate the pSorption of the soil in kg/ha, using the bulk density and Weighted Psorb mg/kg

Note - use top 1m of the soil

1 hectare = 10,000m²

Therefore in the top 1m of soil = 10,000m² X 1m X Bulk density

15000 tonnes/hectare of soil (update with Bulk density)

Convert tonnes to kg 15000000 kg

Therefore the pSorption is value mg/kg X kg of soil you have

7500000000 mg/hectare

Convert mg/ha to kg/ha	7500
------------------------	------

$$\text{Irrigation Area} = P_{\text{generated}} / (P_{\text{absorbed}} + P_{\text{uptake}})$$

P_{generated} = total phosphorus (TP) concentration x volume (V) of wastewater produced in 50 years

TP = 12mg/L (from Sydney Catchment Management Authority, 2019: Designing and Installing On-Site Wastewater Systems)

V = Q x 365 days x 50 years, where Q is daily flow L/d

Q L/day =	8600
P _{generated} =	1569500000 mg
Convert to kg	1569.50 kg

P_{absorbed} = in soil is between 1/4 and 1/2 of the the phosphorus sorption capacity, therefore in accordance with the silver book, use 1/3

Is value x 1/3 =	2500 kg/ha
convert to kg/m ²	0.250 kg/m ²

P_{uptake} = the amount of vegetation uptake over 50 years

Is value from SCA pg207 X 365 days X 50 years

Value (kg/ha/year) 30 (choose from SCM Appendix 1 for maintained lawn)

Convert to mg/m²/day 8.21373 (using conversion factor from per year to per day)

Therefore total = amount mg/m²/day X 365 days X 50 years

Which is 149900.532

Convert to kg/m² 0.14990 kg/m²

$$\text{Irrigation Area} = P_{\text{generated}} / (P_{\text{absorbed}} + P_{\text{uptake}})$$

P _{generated} =	1569.50
P _{absorbed} =	0.250
P _{uptake} =	0.1499
Irrigation Area =	3924.7 m ²

Attachment No. 1

Minimum Area Method Water Balance an Wet Weather Storage Calculations

Barnson Job No	40038		
Location :	Narromine		

Design Wastewater Flow	Q	l/day	8600
Design Percolation Rate	R	mm/day	2

Climate Zone	2 C	As per Soil Landscapes of Dubbo 1:250 000 Dropdown Box
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Paramter	Symbol	Formula	Units	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Days in Month	(D)	n/a	days	31	28	31	30	31	30	31	31	30	31	30	31	365
Precipitation (70th percentile)	(P)	n/a	mm/month	75	78	73	83	75	78	78	73	64	76	72	73	898
Evaporation	(E)	n/a	mm/month	226	173	140	91	53	41	38	51	81	114	155	216	1379
Crop Factor (as per Silver Book)	(C)	n/a	n/a	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7

Outputs																
Evapotranspiration	(ET)	E X C	mm/month	158.2	121.1	98	63.7	37.1	28.7	26.6	35.7	56.7	79.8	108.5	151.2	965.3
Percolation	(B)	(R/7)xD	mm/month	62.0	56.0	62.0	60.0	62.0	60.0	62.0	62.0	60.0	62.0	60.0	62.0	730.0
Outputs		(ET +B)	mm/month	220.2	177.1	160.0	123.7	99.1	88.7	88.6	97.7	116.7	141.8	168.5	213.2	1695.3
Inputs																
Precipitation (70th percentile)	(P)	n/a	mm/month	75	78	73	83	75	78	78	73	64	76	72	73	898
Possible Effluent Irrigation	(W)	(ET + B) -P	mm/month	145.2	99.1	87.0	40.7	24.1	10.7	10.6	24.7	52.7	65.8	96.5	140.2	797.3
Actual Effluent Production	(I)	H/12	mm/month	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4	66.4
Inputs		(P +I)	mm/month	141.4	144.4	139.4	149.4	141.4	144.4	144.4	139.4	130.4	142.4	138.4	139.4	964.4

Storage	(S)	(P+I) - (ET+B)	mm/month	-78.8	-32.7	-20.6	25.7	42.3	55.7	55.8	41.7	13.7	0.6	-30.1	-73.8	
Cumulative Storage	(M)	n/a	mm	0.0	0.0	0.0	25.7	68.1	123.8	179.7	221.4	235.2	235.8	205.7	132.0	

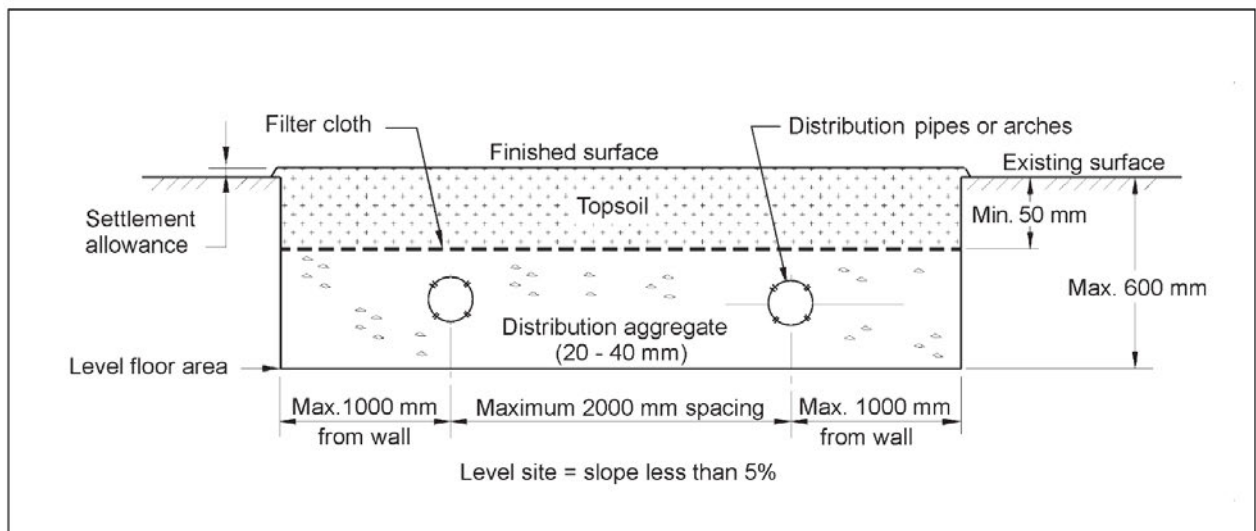
Note - H = sum of W

Irrigation Area	(L)	365 x Q/H	m ²	3937.0
Storage	(v)	Largest M	mm	235.8
		(V xL)/1000	m ³	928.3



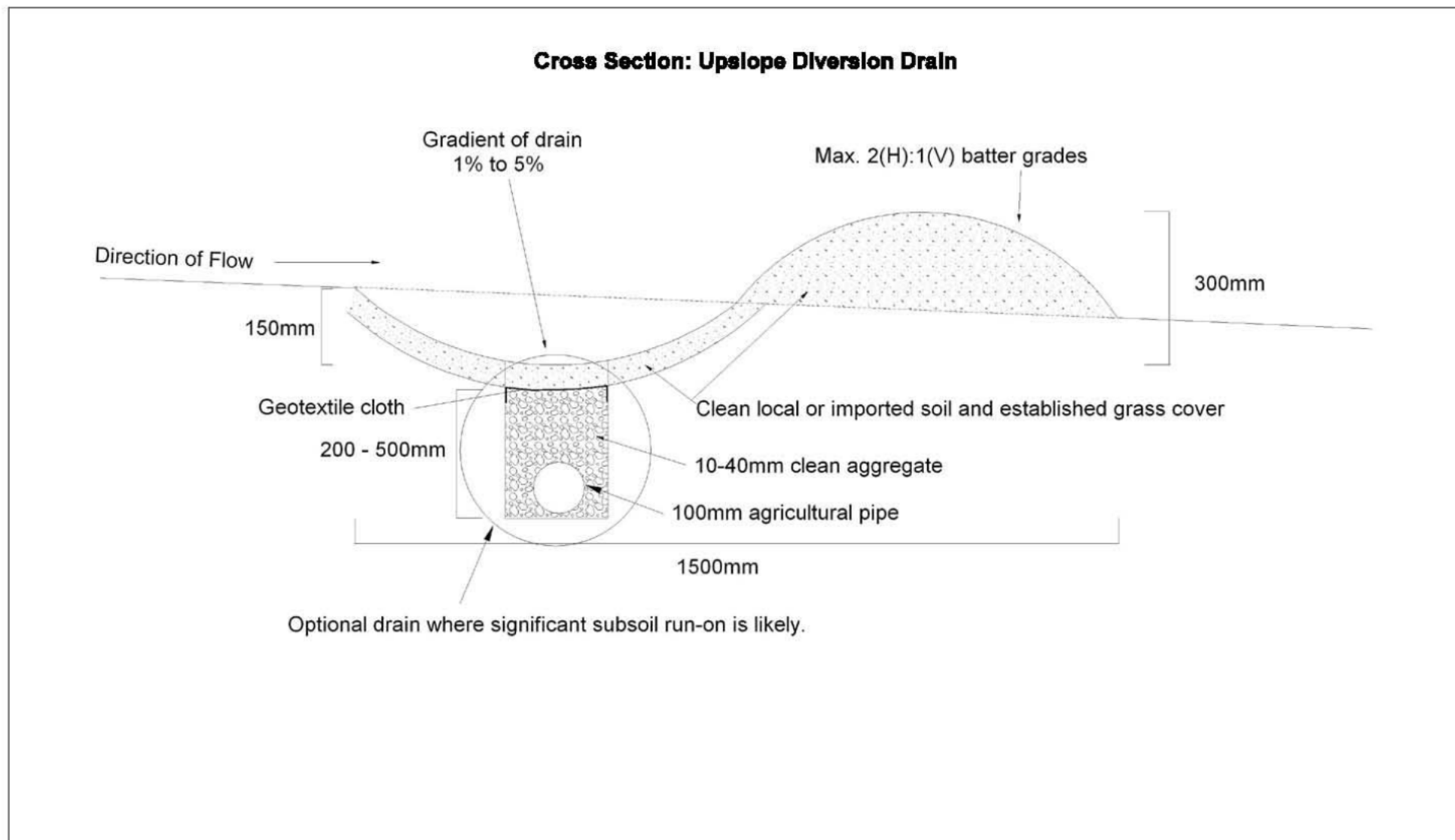
APPENDIX F

**Concept Design Sketches –
Absorption System**

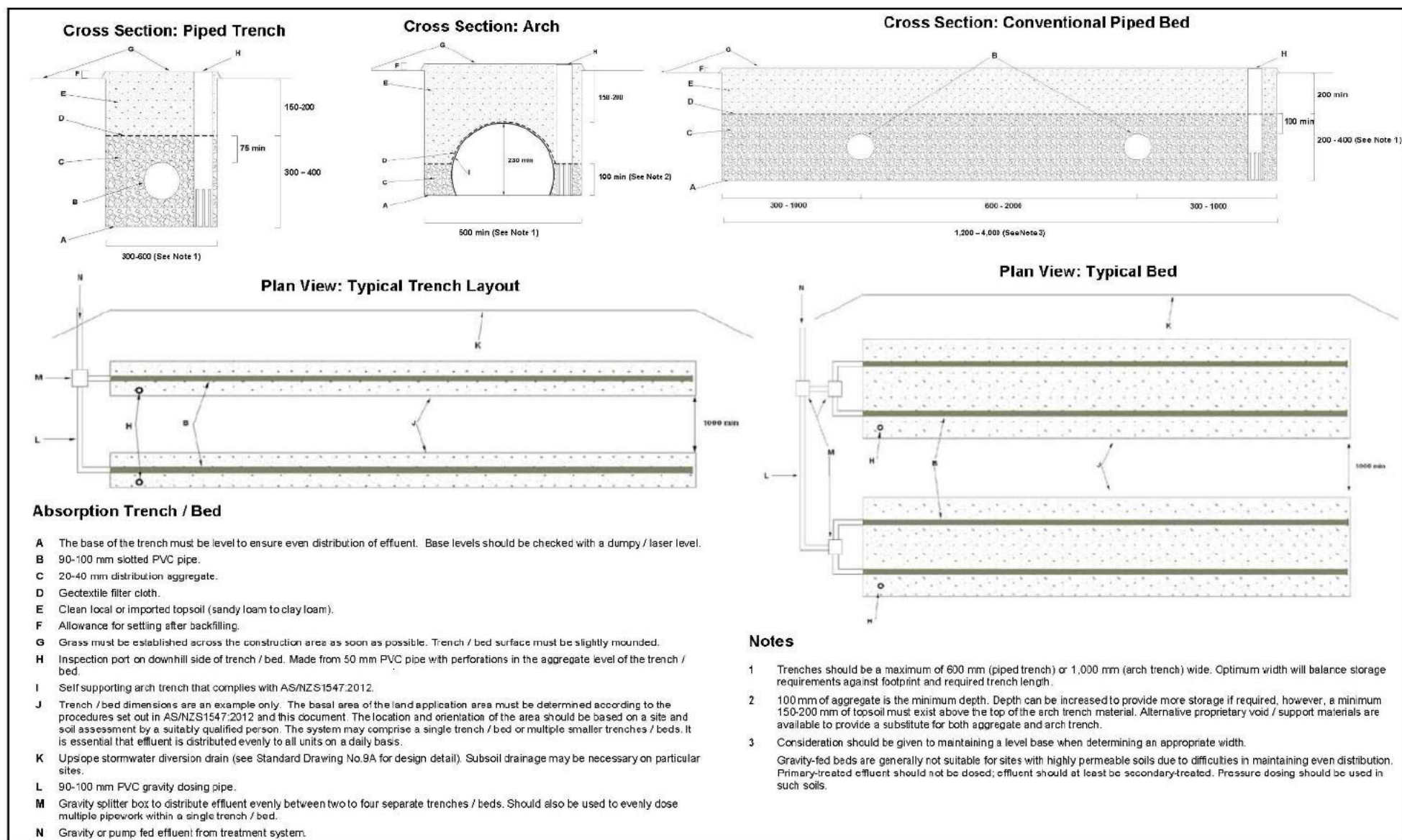


NOTE: LPED lines can be used instead of distribution pipes when dose loading effluent into beds.

FIGURE L5 CONVENTIONAL BED

**Standard Drawing 10A - Upslope Diversion Drain**

(not to scale)



Standard Drawing 10B - Absorption Trench / Bed

(not to scale)



APPENDIX G
Species List

APPENDIX 7

VEGETATION SUITABLE FOR LAND APPLICATION AREAS

Botanical Name	Approximate Height	Common Name or Variety
Grasses		
<i>Carex</i> spp. <i>Lomandra longifolia</i> <i>Microlaena stipoides</i> <i>Oplismenus imbecillis</i> <i>Pennisetum alopecuroides</i> <i>Poa</i> lab <i>Stipa</i> spp.	40 - 80 cm	Available as lawn turf
Ground cover/ climbers		
<i>Hibbertia scandens</i> <i>Hibbertia stellaris</i> <i>Isotoma fluviatilis</i> <i>Kennedia rubicunda</i> <i>Scaevola albida</i> <i>Scaevola ramosissima</i> <i>Veronica plebeia</i> <i>Viola hederacea</i>	Prostrate Climber	Snake vine Dusky coral pea Native violet
Sedges/ grasses/ small plants		
<i>Anigozanthus flavidus</i> <i>Baumea acuta</i> <i>Baumea articulata</i> <i>Baumea juncea</i> <i>Baumea nuda</i> <i>Baumea rubiginosa</i> <i>Baumea teretifolia</i> <i>Blandfordia grandiflora</i> <i>Blandfordia nobilis</i> <i>Brachyscome diversifolia</i> <i>Carex appressa</i> <i>Cotula coronopifolia</i> <i>Crinum pedunculatum</i> <i>Cyperus polystachyos</i> <i>Dianella caerulea</i> <i>Epacris microphylla</i> Ferns <i>Gahnia</i> spp. <i>Juncus</i> spp. <i>Lobelia trigonocaulis</i> <i>Lomandra</i> spp. <i>Patersonia fragilis</i> <i>Patersonia glabrata</i> <i>Patersonia occidentalis</i> <i>Ranunculus graniticola</i> <i>Restio australis</i> <i>Restio tetraphyllus</i> <i>Sowerbaea juncea</i> <i>Tetratheca juncea</i> <i>Xyris operculata</i>	2m Sedge Sedge Sedge Sedge Sedge 30-90cm 30-90cm Clump Sedge 10-20cm <2m Sedge Low plant 50cm -1m Tall Grass 0.5 m Rush 5-10cm Grass 5cm Reed 1m Sedge <30cm <1m	Kangaroo Paw Christmas Bell Christmas Bell Native Daisy Waterbutton Swamp Lily Blue Flax Lily Native Iris Native Iris Native Iris Rush Lily Tall Yellow Eye

Botanical Name	Approximate Height	Common Name or Variety
Shrubs		
<i>Agonis flexuosa nana</i>		
<i>Baekea linifolia</i>	1 - 2.5 m	
<i>Baekea utilis</i>	1-2.5 m	
<i>Baekea virgata</i>	< 4 m	
<i>Banksia aemula</i>	1 - 7 m	
<i>Banksia robur</i>	0.5 - 2 m	
<i>Bauera rubroides</i>	0.5 - 1.5 m	
<i>Callistemon</i>	2 - 3 m	Burgundy
<i>Callistemon</i>	2 - 4 m	Eureka
<i>Callistemon</i>	3 - 4 m	Harkness
<i>Callistemon</i>	3 - 4.5 m	Kings Park Special
<i>Callistemon</i>	2 - 3 m	Mauve Mist
<i>Callistemon</i>	1 - 2.5 m	Red Clusters
<i>Callistemon</i>	2 - 3 m	Reeves Pink
<i>Callistemon citrinus</i>	50 - 80 cm	Austraflora Firebrand
<i>Callistemon citrinus</i>	2 - 4 m	Splendens
<i>Callistemon citrinus</i>	60cm – 1m	White Ice
<i>Callistemon linearis</i>	1 - 3 m	
<i>Callistemon macropunctatus</i>	2 - 4 m	
<i>Callistemon pachyphyllus</i>	2 - 3 m	
<i>Callistemon pallidus</i>	1.5 - 4 m	
<i>Callistemon paludosus</i>	3 - 7 m	
<i>Callistemon pinifolius</i>	1 - 3 m	
<i>Callistemon rigidus</i>	1.5 - 2.5 m	
<i>Callistemon salignus</i>	3 – 10m	
<i>Callistemon shiresii</i>	4 - 8 m	
<i>Callistemon sieberi</i>	1.5 - 2 m	
<i>Callistemon sieberi</i>	50 - 80 cm	Austraflora Little Cobber
<i>Callistemon subulatus</i>	1 - 2 m	
<i>Callistemon viminalis</i>	1 - 2 m	Captain Cook
<i>Callistemon viminalis</i>	5 - 10 m	Dawson River
<i>Callistemon viminalis</i>	3 - 5 m	Hannah Ray
<i>Callistemon viminalis</i>	50 cm - 1 m	Little John
<i>Callistemon viminalis</i>	1.5 - 2 m	Rose Opal
<i>Callistemon viminalis</i>	2 - 3 m	Western Glory
<i>Goodenia ovata</i>	1 - 1.5 m	
<i>Hibiscus diversifolius</i>	1 - 2 m	Swamp hibiscus
<i>Kunzea capitata</i>	1 - 2 m	
<i>Leptospermum flavescens</i>	< 2 m	Tea-tree
<i>Leptospermum juniperinum</i>	1 m	Tea-tree
<i>Leptospermum lanigerum</i>	1 - 2 m	Woolly tea-tree
<i>Leptospermum squarrosum</i>	< 2 m	Tea-tree
<i>Melaleuca alternifolia</i>	4 - 7 m	
<i>Melaleuca decussata</i>	1 - 2 m	Cross-leaved honey myrtle
<i>Melaleuca lanceolata</i>	4 - 6 m	
<i>Melaleuca squamea</i>	1 - 2 m	
<i>Melaleuca thymifolia</i>		

Botanical Name	Approx Height	Common Name or Variety
Trees		
<i>Acacia elongata</i>	> 2 m	
<i>Acacia floribunda</i>	2 - 4 m	Gossamer wattle
<i>Agonis flexuosa</i>	5 - 6 m	Willow myrtle
<i>Allocasuarina diminuta</i>	1.5 m	
<i>Allocasuarina paludosa</i>	0.5 - 2 m	
<i>Angophora floribunda</i>	Large tree	
<i>Angophora subvelutina</i>	Large tree	
<i>Callicoma serratifolia</i>	< 4m	
<i>Casuarina cunninghamiana</i>	10 - 30 m	River she-oak
<i>Casuarina glauca</i>	6 - 12 m	Swamp oak
<i>Baeocarpus reticulatis</i>	Large tree	Blueberry ash
<i>Eucalyptus amplifolia</i>	Large tree	
<i>Eucalyptus botryoides</i> (coastal areas)	10 - 30 m	
<i>Eucalyptus camaldulensis</i> (west of ranges)	15 - 20 m	River red gum
<i>Eucalyptus deanei</i>	Large tree	Blue Mountains blue gum
<i>Eucalyptus elata</i>	Large tree	River Peppermint
<i>Eucalyptus grandis</i>	10 - 20 m	Flooded gum
<i>Eucalyptus longifolia</i>	20 m	Woollybutt
<i>Eucalyptus pilularis</i>	30 - 40 m	Blackbutt
<i>Eucalyptus punctata</i>	< 35 m	Greygum
<i>Eucalyptus robusta</i>	20 - 30 m	Swamp mahogany
<i>Eucalyptus saligna</i> (coastal)	30 - 50 m	Sydney blue gum
<i>Eucalyptus tereticornis</i>	30 - 40 m	Forest red gum
<i>Eucalyptus viminalis</i> (ranges)	20 - 40 m	Ribbon gum
<i>Acmena smithii</i>	10 - 20 m	Lilli pilli
<i>Flindersia australis</i>	< 40 m	Native teak
<i>Hymenosporum flavuum</i>	3 - 6 m	Native frangipani
<i>Melaleuca armillaris</i>	3 - 4 m	Bracelet honey myrtle
<i>Melaleuca decora</i>	4 - 7 m	
<i>Melaleuca ericifolia</i>	6 m	
<i>Melaleuca halmaturorum</i>	4 - 6 m	
<i>Melaleuca hypericifolia</i>	2 - 3 m	
<i>Melaleuca linariifolia</i>	4 - 8 m	Snow in summer
<i>Melaleuca quinquenervia</i>	5 - 7 m	Broad paperbark
<i>Melaleuca squarrosa</i>	6 m	
<i>Melaleuca stypheloides</i>	6 - 15 m	
<i>Melia azedarach</i>	15 - 20 m	
<i>Pittosporum</i> spp.		
<i>Syzygium paniculatum</i>	8 - 10 m	Bush cherry
<i>Tristania laurina</i>	5 - 15 m	Kanuka
<i>Viminaria juncea</i>	2 - 3 m	Golden spray

Source: Australian Plants Society



APPENDIX H

**Concept Design Sketches –
Irrigation System**

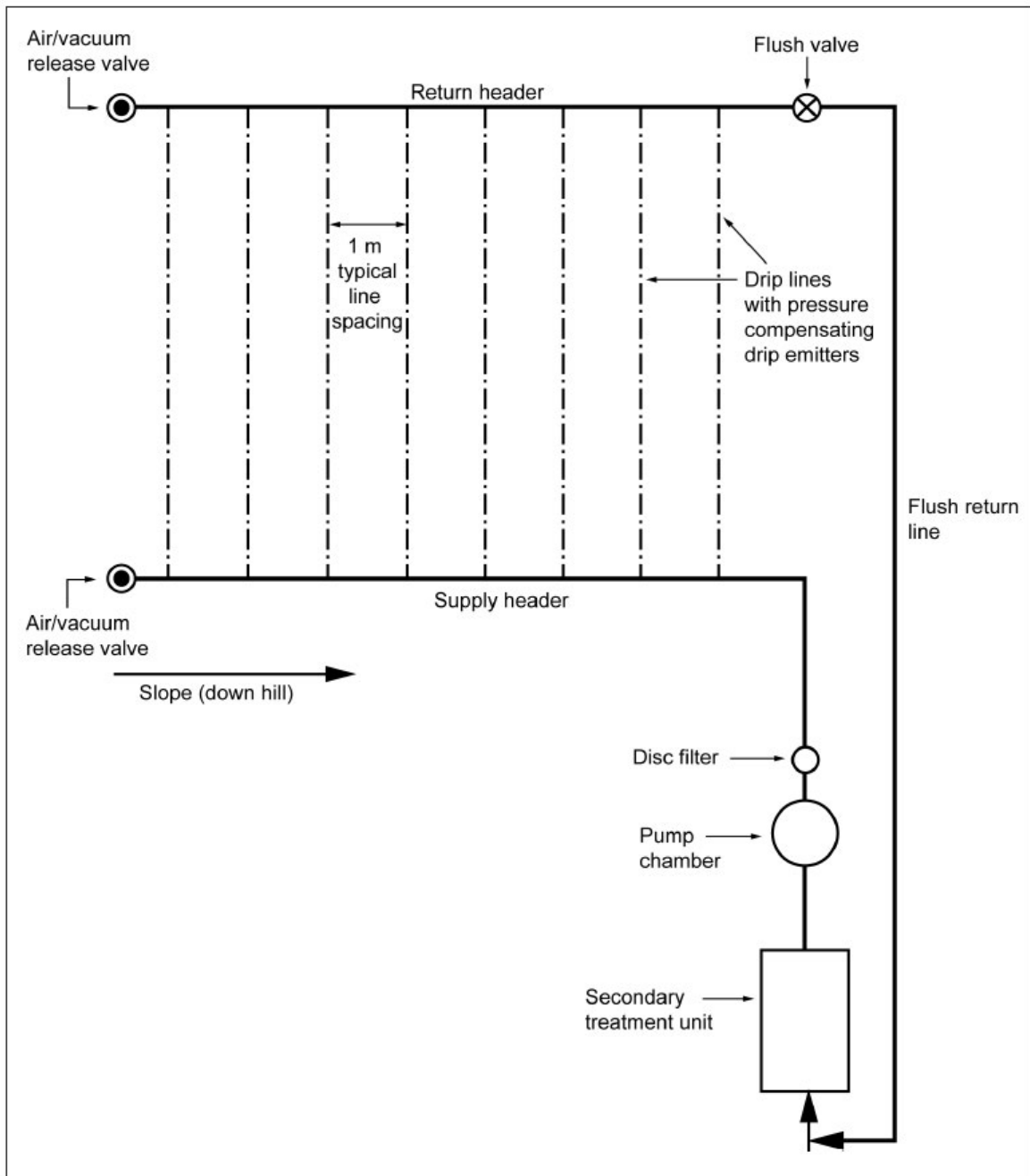


FIGURE M1 DRIP IRRIGATION SYSTEM – EXAMPLE LAYOUT OF COMPONENTS

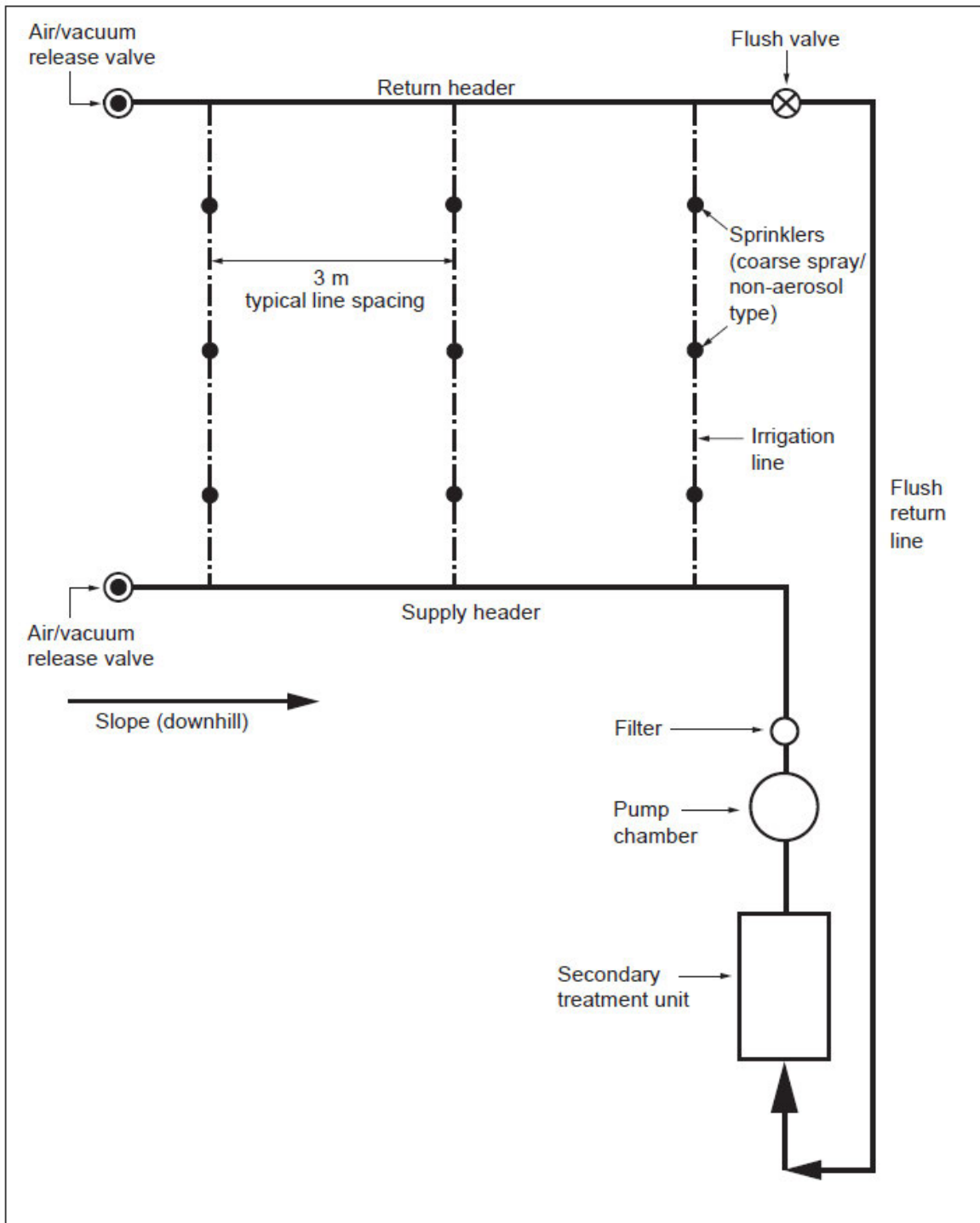
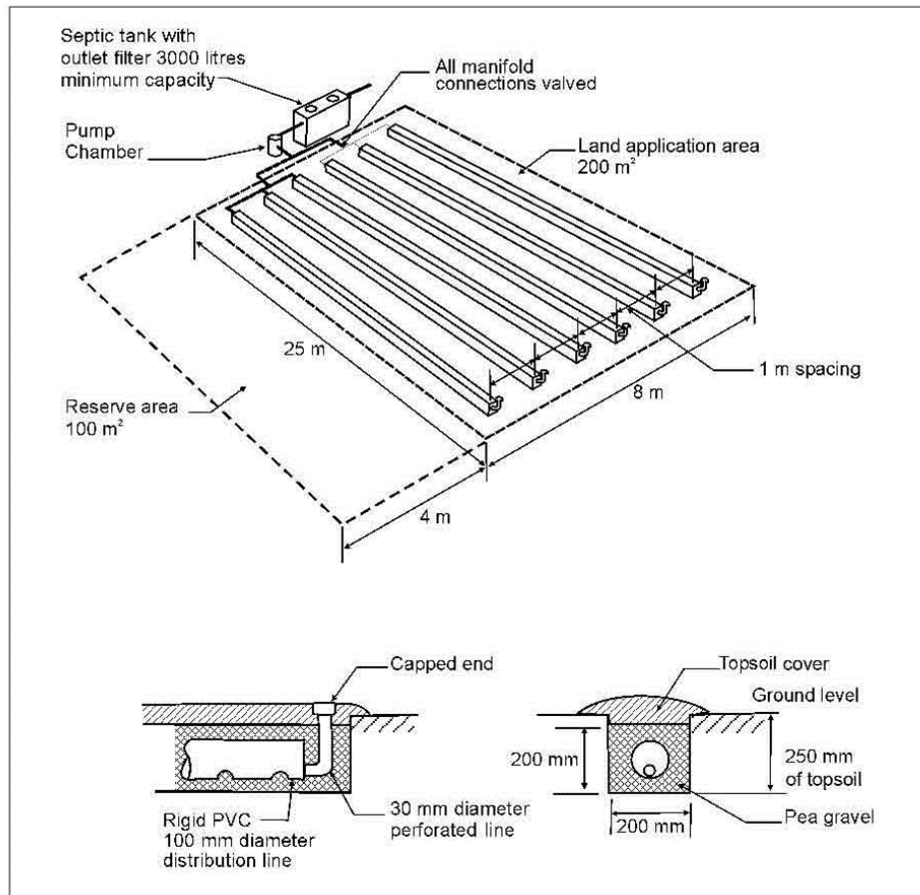


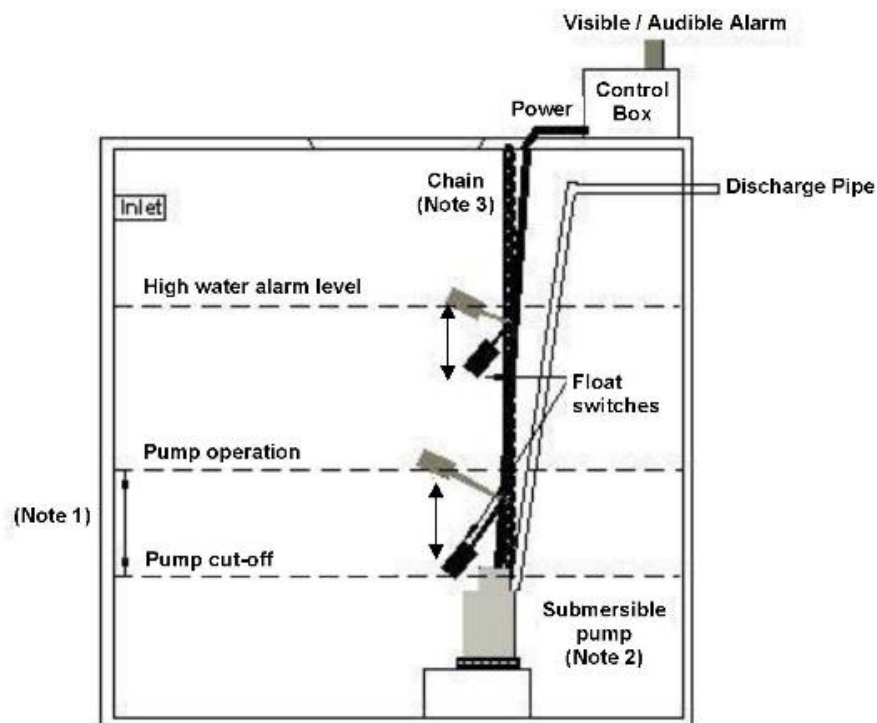
FIGURE M2 SPRAY IRRIGATION SYSTEM – EXAMPLE LAYOUT OF COMPONENTS



NOTES:

- 1 Example system sized for 700 L/d and DIR of 3.5 mm/d in soil Category 3 (see Table M1).
- 2 Preferred dosing method is by a 6-way automatic sequencing valve.
- 3 Good quality topsoil to 250 mm depth is required.
- 4 Flexible 100 mm diameter corrugated drainage line can be used in place of rigid PVC.
- 5 Distribution aggregate of 10 mm to 15 mm size can be used in place of pea gravel.

FIGURE M3 SHALLOW SUBSURFACE LPED IRRIGATION – EXAMPLE SYSTEM



Notes

- 1 The depth of effluent pumped within each cycle of the float switch (ie the depth between pump Cut-off and Operation) is calculated by:

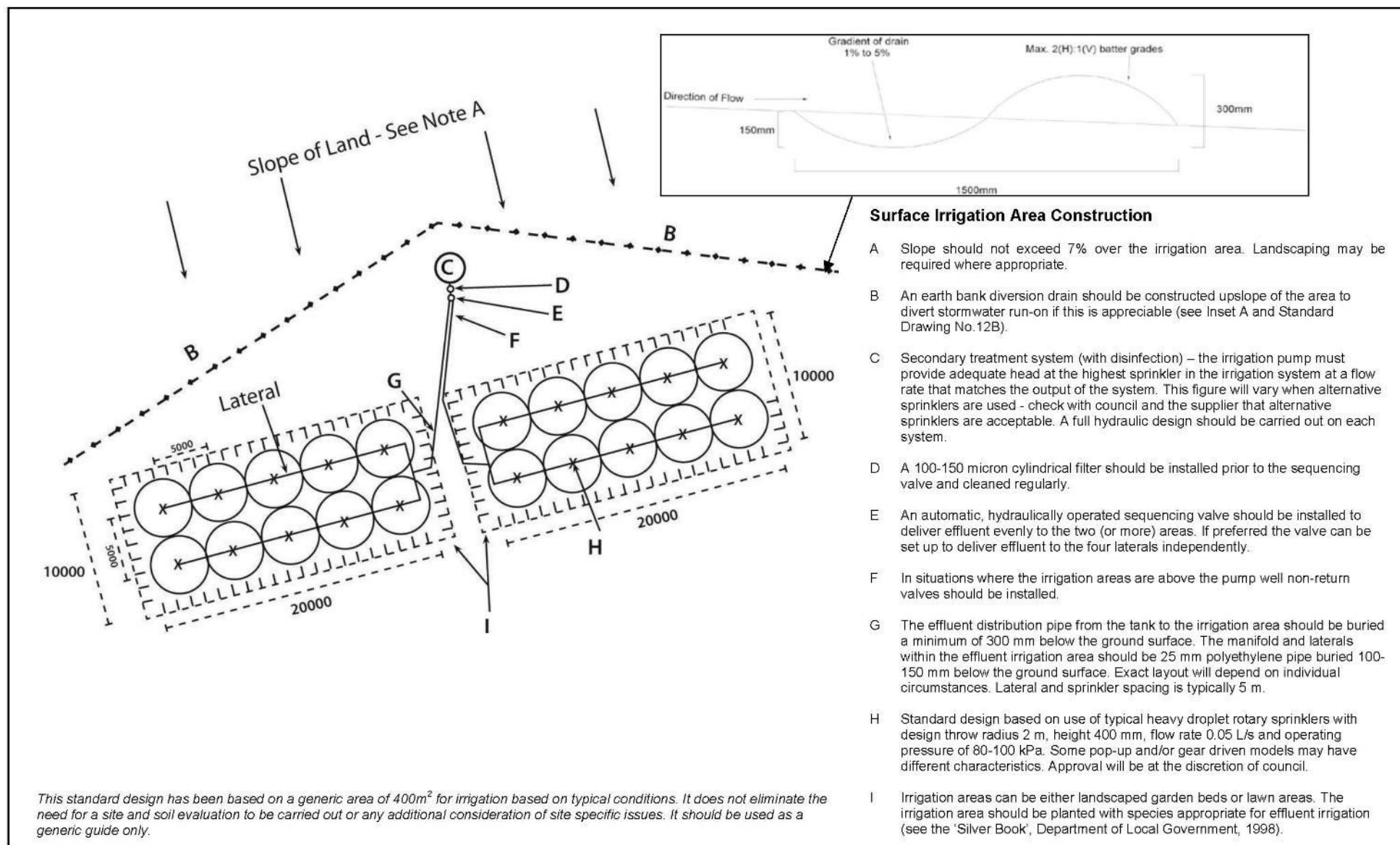
$$\text{depth of pumped effluent (m)} \times \text{basal tank area (m}^2\text{)} \times 1,000 \\ = \text{discharge volume (litres per pump cycle)}.$$

This volume must match the hydraulic capabilities of the receiving component based on flow rate and total dynamic head.

- 2 Submersible pump used as an example only. The pump will need to be selected based on the specific task. It may be a centrifugal pump or vortex pump depending on the type of effluent being pumped and the hydraulic characteristics of the system. It may sit on top of the tank and draw effluent from the tank.
- 3 Submersible pumps must not be removed from a tank by their power cord. Heavier pumps may require the installation of a solid steel bar configuration according to manufacturer's specifications.
- 4 Cumulative storage must be assessed carefully to ensure that the pump well is large enough to buffer peak loads without the level exceeding that at which the high level alarm is triggered. The pump well should be sized to ensure that the volume of storage in the pump well reaches the low-level cut-off depth at least once every week.

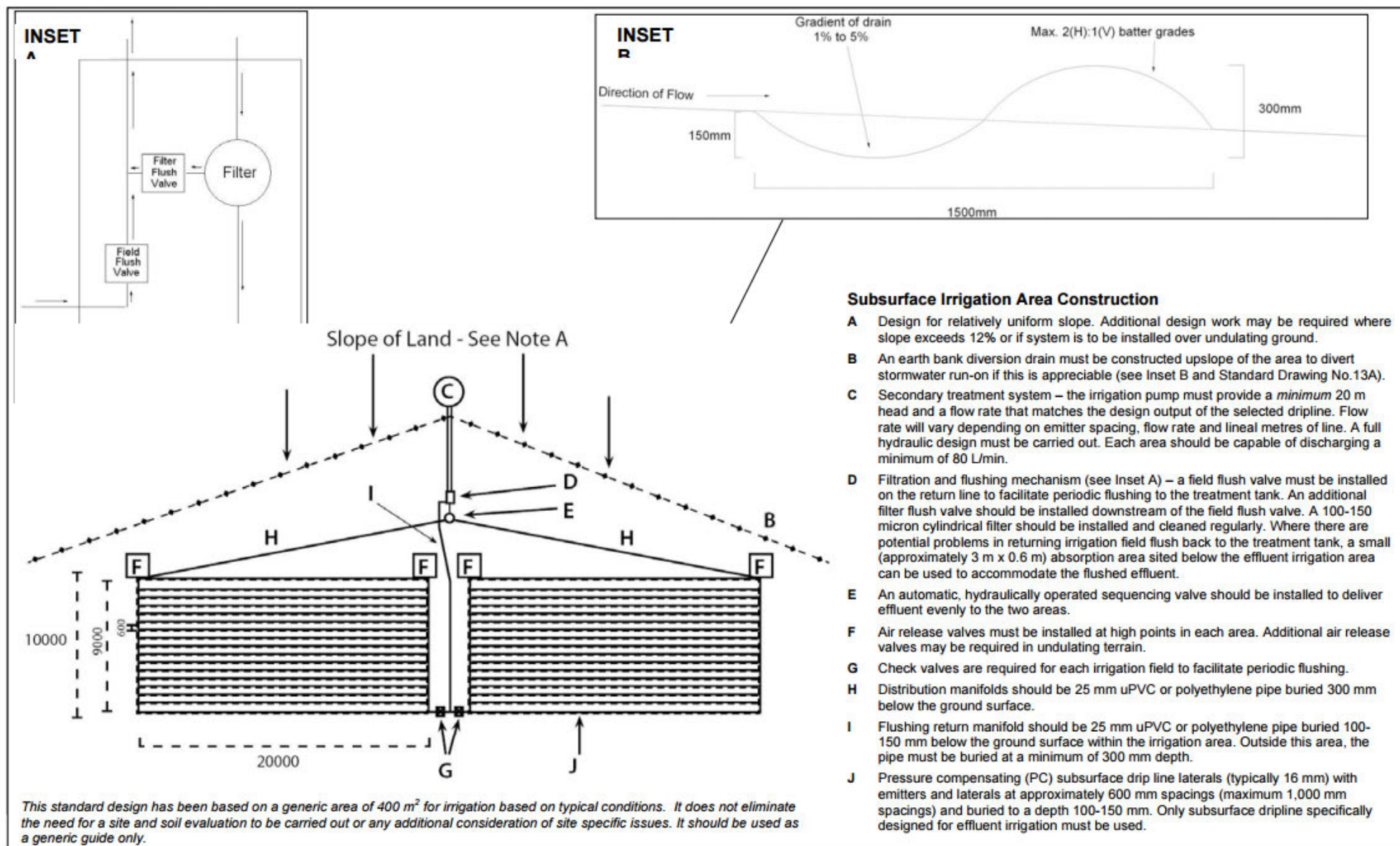
Standard Drawing 12B - Demand Dose Pump well

(not to scale)



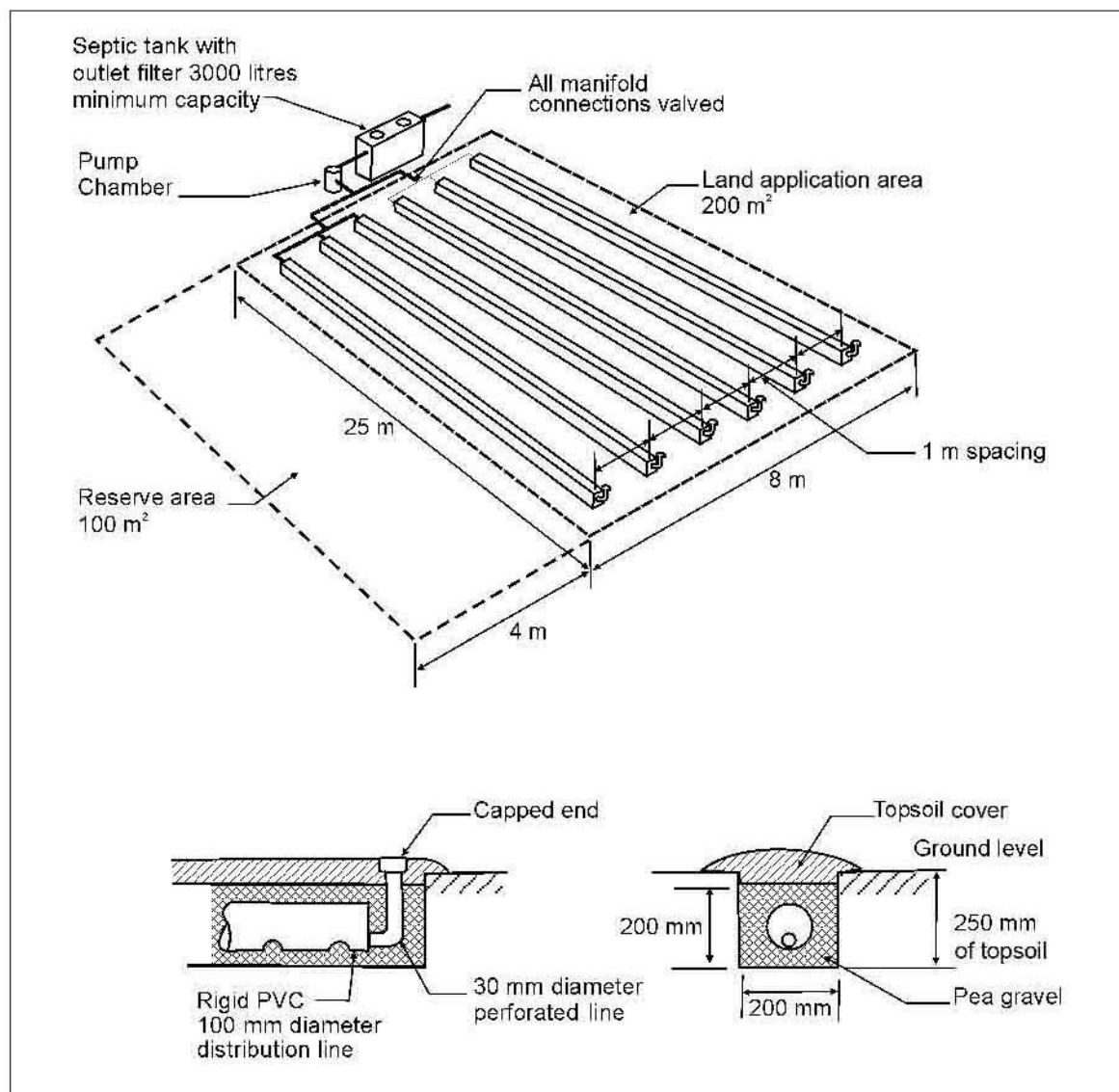
Standard Drawing 12C - Surface Irrigation of Effluent

(not to scale)



Standard Drawing 13B - Subsurface Effluent Irrigation

(not to scale)



NOTES:

- 1 Example system sized for 700 L/d and DIR of 3.5 mm/d in soil Category 3 (see Table M1).
- 2 Preferred dosing method is by a 6-way automatic sequencing valve.
- 3 Good quality topsoil to 250 mm depth is required.
- 4 Flexible 100 mm diameter corrugated drainage line can be used in place of rigid PVC.
- 5 Distribution aggregate of 10 mm to 15 mm size can be used in place of pea gravel.

FIGURE M3 SHALLOW SUBSURFACE LPED IRRIGATION – EXAMPLE SYSTEM



APPENDIX I

Mapping and Concept Plan



THIS IS A DRAFT PLAN ONLY AND IS
SUBJECT TO FINAL SURVEY



KEY

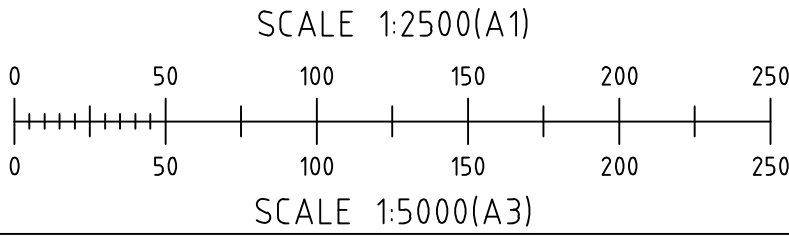
CONSTRAINTS MAP - BLUEGRASS

CONSTRAINTS MAP - HABITAT FEATURES

CONSTRAINTS MAP - TECs FUTURE EXPANSION

CONSTRAINTS MAP - TECs SUBJECT SITE

PROPOSED PLAN OF SUBDIVISION
REDUCTION RATIO 1:2,500 @ A1
1:5,000 @ A3



ISSUED TO CLIENT

BARNSON PTY LTD

phone 1300 BARNSON (1300 227 676)
email generalenquiry@barnson.com.au
web barnson.com.au

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Rev	Date	Description
A	27-10-2023	ISSUED TO CLIENT
B	8-12-2023	UPDATED PLAN

Project
PROPOSED SUBDIVISION OVER
PROPOSED LOT 101
Site Address
397 CRAIGIE LEA LANE
NARROMINE NSW 2821
Client
NARROMINE SHIRE COUNCIL

Drawing Title
PROPOSED PLAN OF SUBDIVISION

Survey RB
Drawn JS
Check RB

Original Sheet Size
Revision

A1
B

Certification
Project No
Drawing No

37228
P03



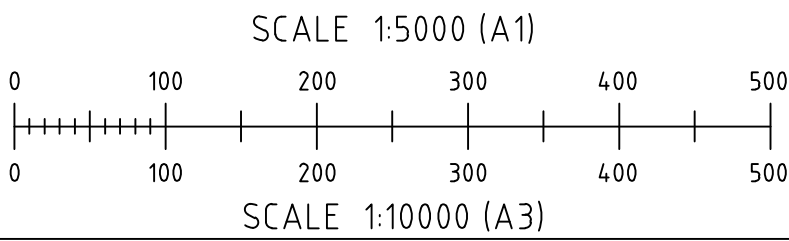
THIS IS A DRAFT PLAN ONLY AND IS
SUBJECT TO FINAL SURVEY



KEY

- CONSTRAINTS MAP - BLUEGRASS
- CONSTRAINTS MAP - HABITAT FEATURES
- CONSTRAINTS MAP - TECs FUTURE EXPANSION
- CONSTRAINTS MAP - TECs SUBJECT SITE

PROPOSED PLAN OF SUBDIVISION
REDUCTION RATIO 1:5,000 @ A1
1:10,000 @ A3



ISSUED TO CLIENT

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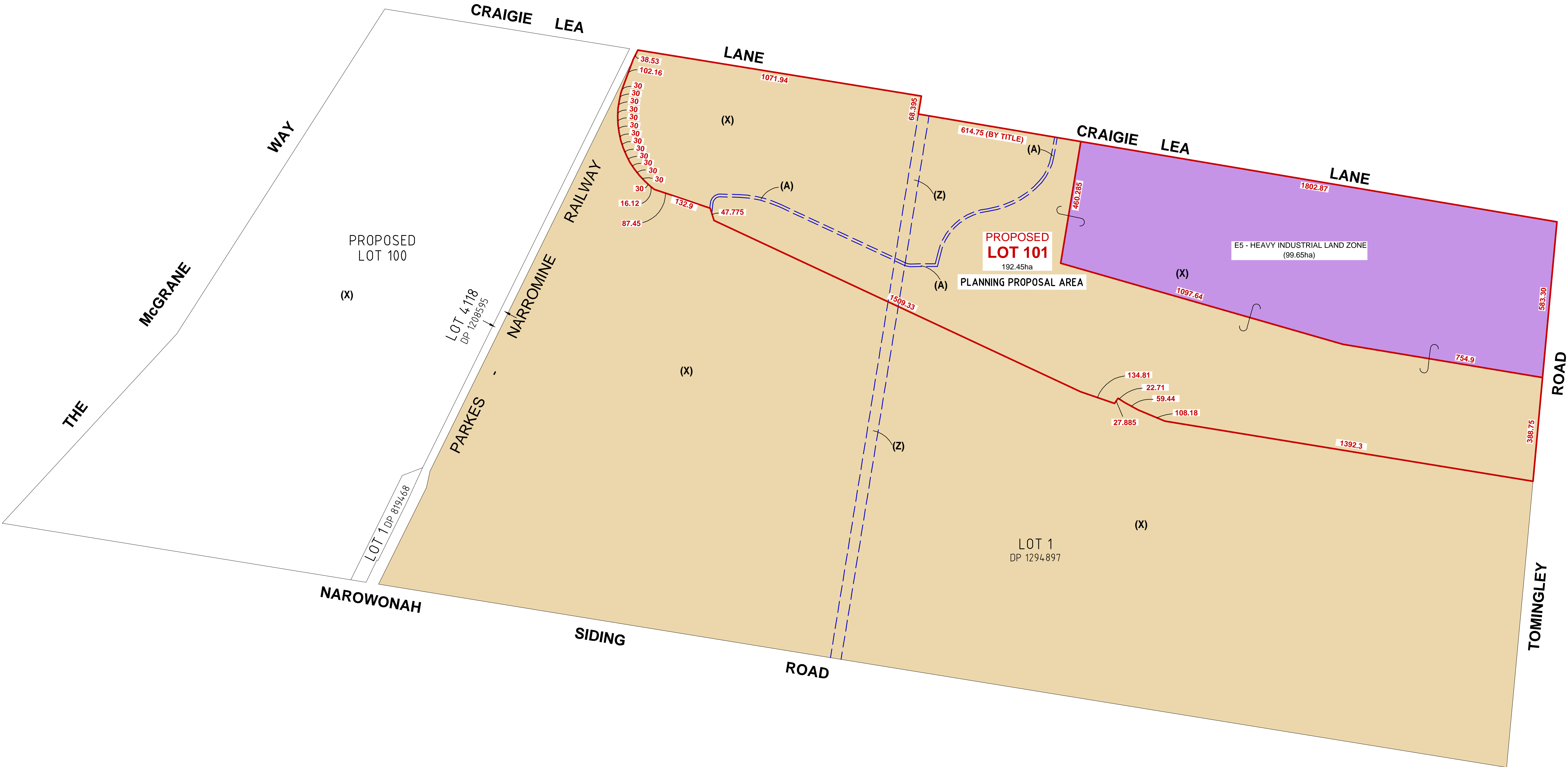
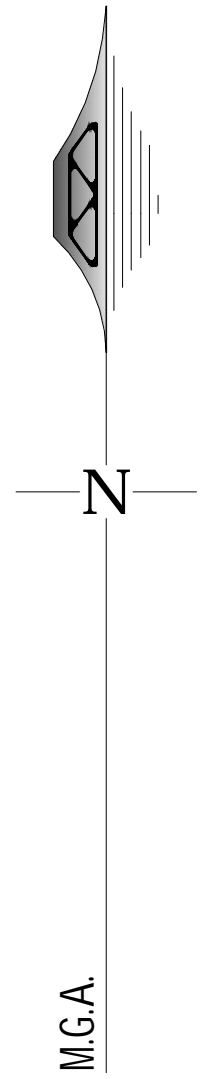
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Project
**PROPOSED SUBDIVISION OVER
PROPOSED LOT 101**
Site Address
397 CRAIGIE LEA LANE
NARROMINE NSW 2821
Client
NARROMINE SHIRE COUNCIL

Drawing Title
**PROPOSED PLAN OF SUBDIVISION
OVERALL SITE PLAN**
Survey RB
Drawn JS
Check RB
Original Sheet Size A1
Revision A

Certification
Project No
Drawing No



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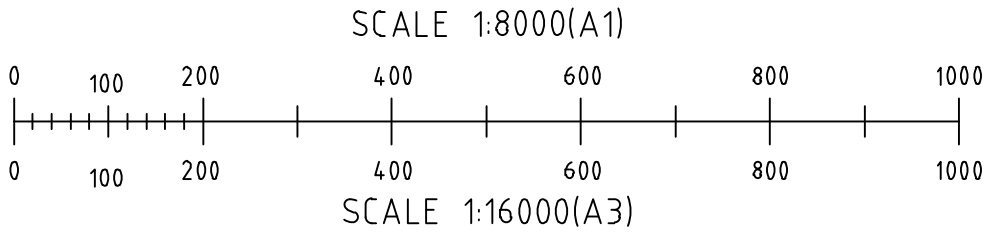
SUBJECT CADASTRAL BOUNDARIES

E5 - HEAVY INDUSTRIAL LAND ZONE

RU1 - PRIMARY PRODUCTION LAND ZONE

PROPOSED REZONE AREA PLAN

REDUCTION RATIO 1:8,000 @ A1
1:16,000 @ A3



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B	6-02-2024	PROPOSED ZONES UPDATED

Project
PROPOSED PLAN OF SUBDIVISION OVER
LOT 2 IN DP 1294897
Site Address
CRAIGIE LEA LANE
NARROMINE NSW 2821
Client
NARROMINE SHRIE COUNCIL

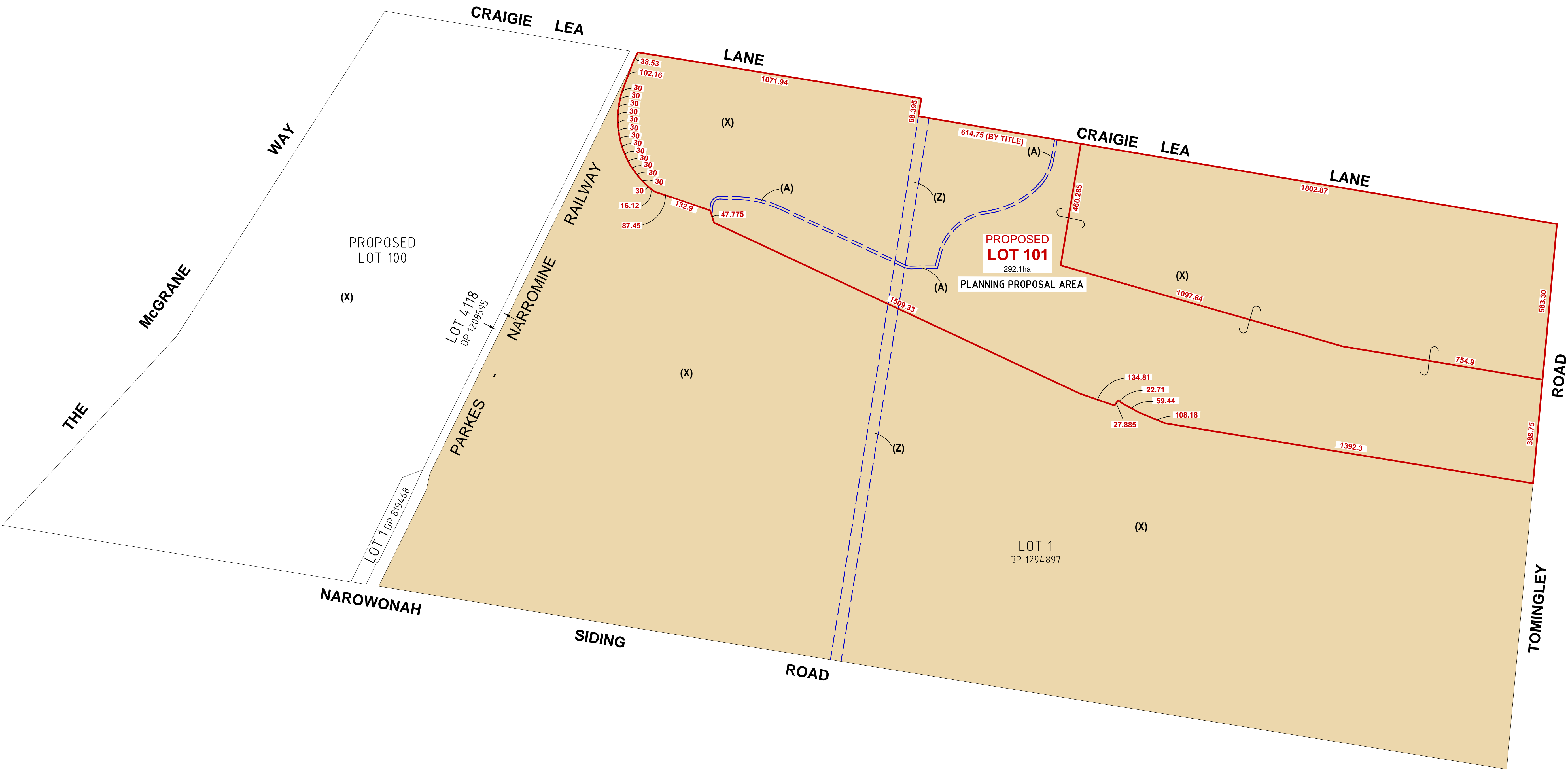
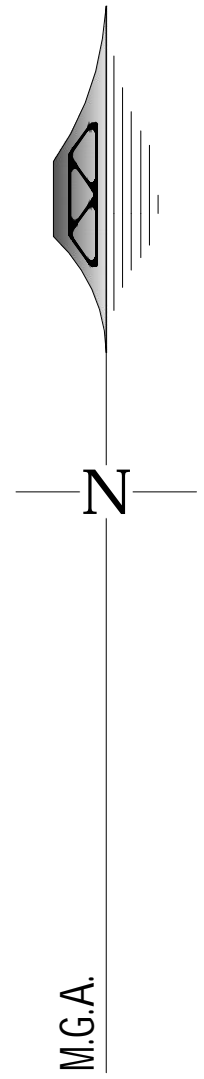
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PROPOSED REZONE AREA PLAN

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Drawn	JS		
Check	RB	Revision	A

Certification

Project No

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NOTES:

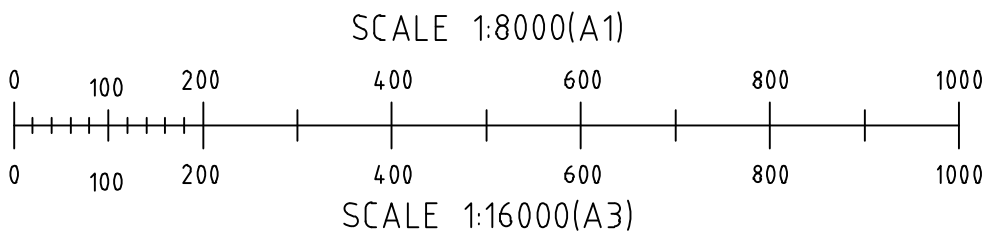
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- SUBJECT CADASTRAL BOUNDARIES
- RU1 - PRIMARY PRODUCTION LAND ZONE

EXISTING LAND ZONING PLAN

REDUCTION RATIO 1:8,000 @ A1
1:16,000 @ A3



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LOT 2 IN DP 1294897
Site Address
CRAIGIE LEA LANE
NARROMINE NSW 2821
Client
NARROMINE SHRIE COUNCIL

Drawing Title
EXISTING LAND ZONING PLAN

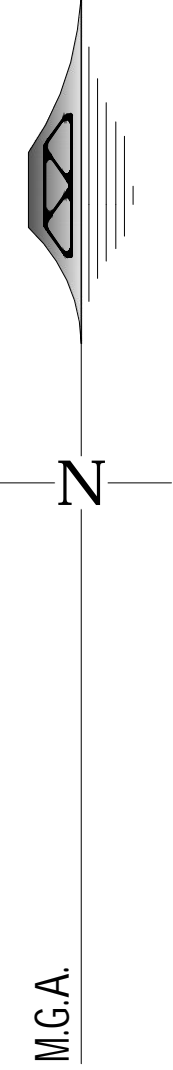
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Revision

A1
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Project No
Drawing No

40038
P04



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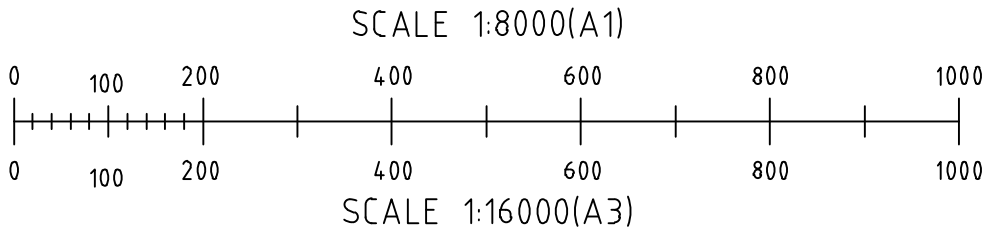
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SUBJECT CADASTRAL BOUNDARIES

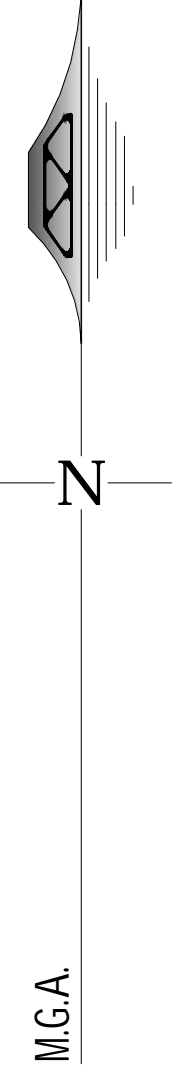
80ha - MINIMUM ALLOTMENT SIZE

400ha - MINIMUM ALLOTMENT SIZE

EXISTING MINIMUM ALLOTMENT PLAN
REDUCTION RATIO 1:8,000 @ A1
1:16,000 @ A3



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SUBJECT CADASTRAL BOUNDARIES

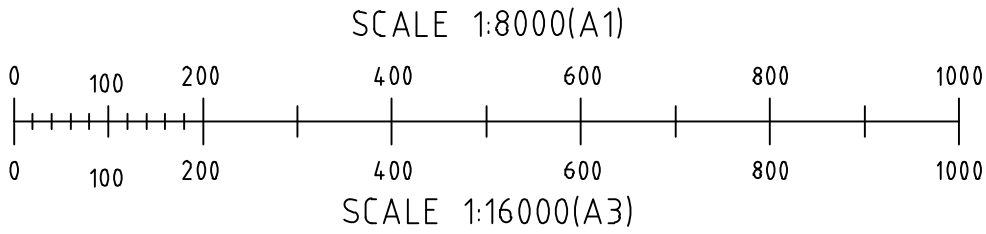
2000m² - MINIMUM ALLOTMENT SIZE

80ha - MINIMUM ALLOTMENT SIZE

400ha - MINIMUM ALLOTMENT SIZE

PROPOSED MINIMUM ALLOTMENT PLAN

REDUCTION RATIO 1:8,000 @ A1
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LOT 2 IN DP 1294897
Site Address
CRAIGIE LEA LANE
NARROMINE NSW 2821
Client
NARROMINE SHRIE COUNCIL

Drawing Title
PROPOSED MINIMUM
ALLOTMENT PLAN

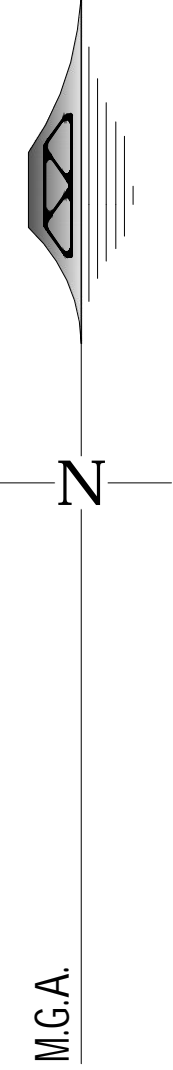
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Revision

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SUBJECT CADASTRAL BOUNDARIES

2000m² - MINIMUM ALLOTMENT SIZE

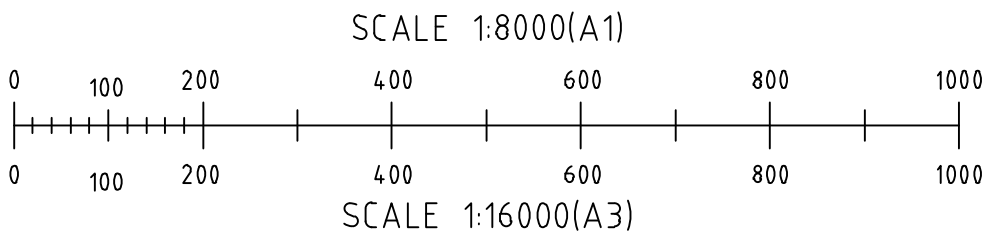
80ha - MINIMUM ALLOTMENT SIZE

400ha - MINIMUM ALLOTMENT SIZE

SPECIAL SERVICE AREA A

SPECIAL SERVICE PROVISION PLAN

REDUCTION RATIO 1:8,000 @ A1
1:16,000 @ A3



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Reports to Council - Community and Economic Development
Page 580

Project
PROPOSED PLAN OF SUBDIVISION OVER
LOT 2 IN DP 1294897
Site Address
CRAIGIE LEA LANE
NARROMINE NSW 2821
Client
NARROMINE SHRIE COUNCIL

Drawing Title		Certification	
SPECIAL SERVICE PROVISION PLAN		Project No	
Survey	RB	Original Sheet Size	A1
Drawn	JS		
Check	RB	Revision	A

Drawing No

40038
P06



APPENDIX J

Land Use Conflict Risk Assessment



Land Use Conflict Risk Assessment

**397 Craigie Lea
Lane, Narromine**

Rezoning of land RU1 to E5

20th February 2024

This report has been prepared by Narromine Shire Council for inclusion in the Planning Proposal Report for the purposes of rezoning land at Craigie Lea Lane, Narromine.

The report has been developed utilizing the Land Use Conflict Risk Assessment Guide developed by the Department of Primary Industries, dated October 2011.



Image 1: General view of area to be rezoned and developed. Looking from north eastern corner to the west.

Source: Barnson Pty Ltd

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1. Introduction

The aim of this Land Use Conflict Risk Assessment (LUCRA) is to identify and assess the potential for land use conflict issues and risk of occurrence before a proposed change in land use proceeds and disputes arise.

This report documents the nature of the proposed land use change, documents changes that have recently occurred under other approvals and describes these changes in the context of the surrounding precinct.

The proposed change of land use is that part lot 2 DP 1294897 is intended to be rezoned from RU1 Primary Production to E5 Heavy Industrial.

The land that is being proposed to be rezoned is a parcel of 99.65 Ha on the north eastern corner of Part lot 2 DP 1294897. (total size 292.1Ha) The rezoned portion will be bound by the previously approved Inland Rail Materials Distribution Centre and Inland Rail line on the western and southern boundary, the Tomingley Road on the eastern boundary and Craigie Lea Lane on the northern boundary. This is highlighted in the plan below with the area proposed for rezoning shown in purple.

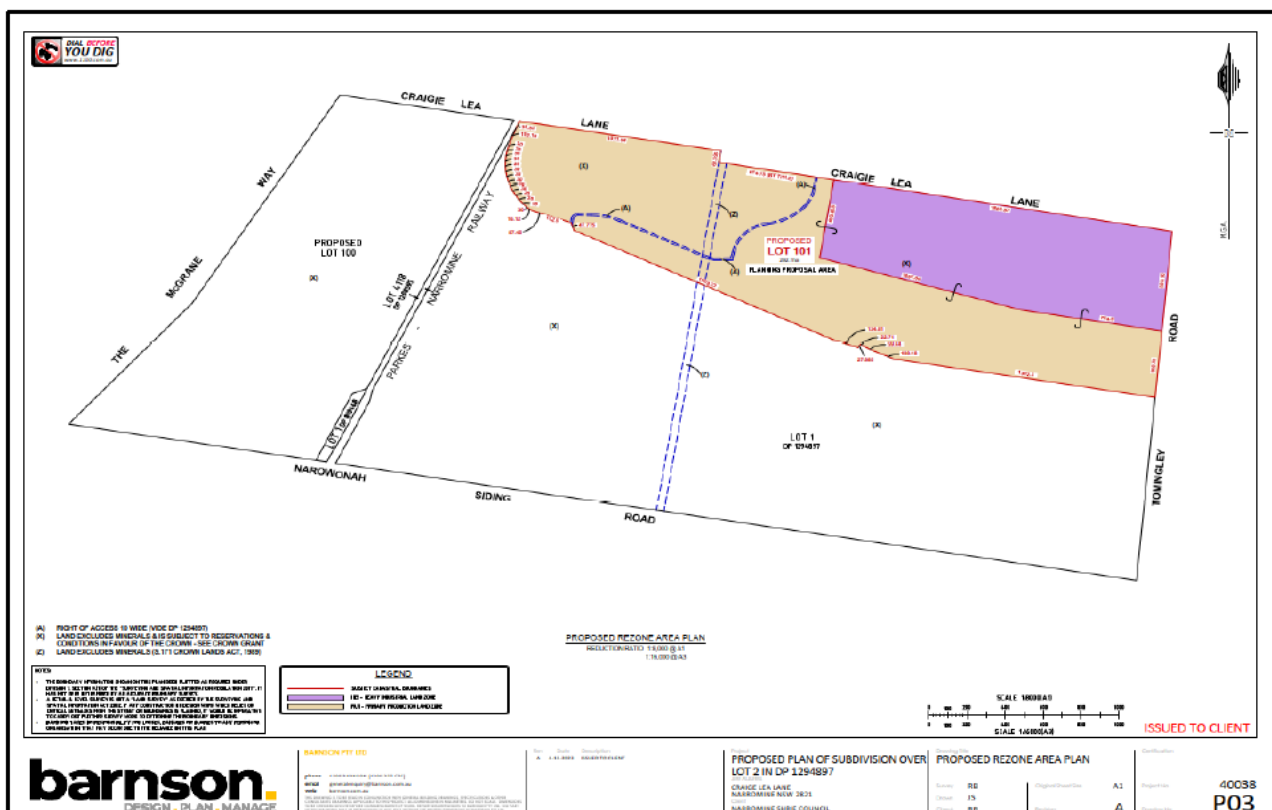


Figure 1: Proposed Land Zone Map
Source: Barnson Pty Ltd

2. Subject Land

The LUCRA relates to land located at 397 Craigie Lea Lane, Narromine, described as Part Lot 2 in DP 1294897. See Figure 2 below. The whole lot is 292.1 Ha and is part of a former grazing property.

The allotment has had recent approval to develop a Materials Distribution Centre (10 June 2022, Review of Environmental Factors, ARTC) which will be utilized in the construction of Inland Rail which transects the property from west to east on the southern boundary of Part Lot 2 in DP 1294897.

Inland Rail ARTC own the land to the immediate south of the rail line. The area immediately surrounding the proposed rezoned land is RU1 land. There are no properties (other than owned by Narromine Shire Council) that are contiguous to the land proposed to be rezoned.

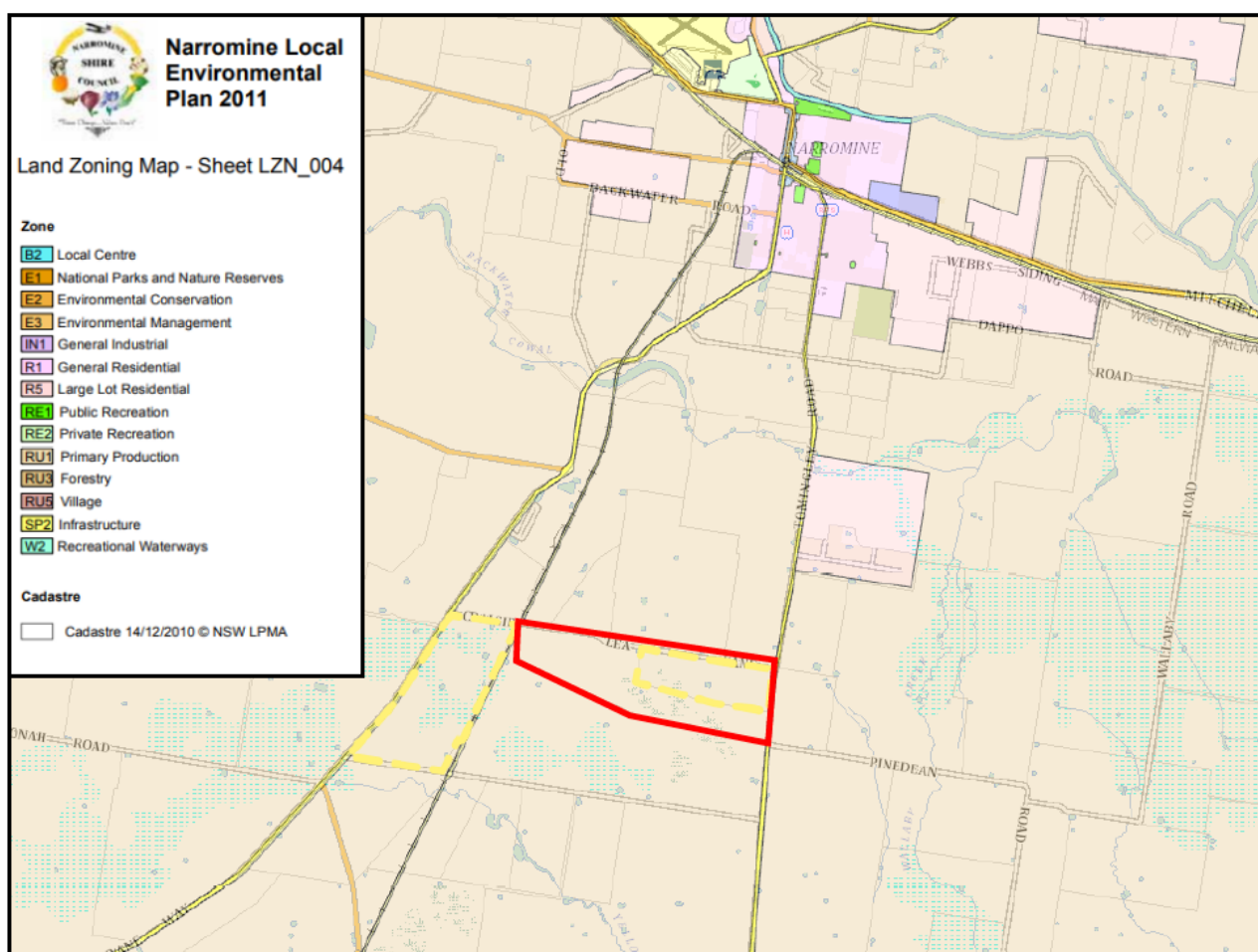


Figure 2: Existing land use zones- Narromine Local environmental Plan 2011

Source: Barnson Pty Ltd

It is Council's intention to rezone only part lot 2 DP 1294897. This is for the purpose of a future industrial area development for which Narromine Shire Council has received a State Government Grant to construct the enabling infrastructure on the site. Narromine Shire Council will continue to lease the balance of this lot to Inland Rail ARTC for the purposes of the Materials Distribution Centre.



Image 2: Materials Distribution Centre under development (south and west of the area proposed for subdivision)

Source: ARTC website 21st February 2024

The approval and development of the Materials Distribution Centre has constrained the further development of Part lot 2 as a farming property. Of the whole portion of 292.1 Ha, 190 Ha is leased for the industrial purpose of the Materials Distribution Centre. The review of Environmental Factors (ARTC) approves the use throughout the construction of the Inland Rail with the REF outlining in regard to decommissioning; *“Upon completion of the Inland Rail corridor works, ARTC will consider the most effective ongoing use of the proposal site or Lot B and decommission the MDC according to what its proposed future use would be”*.

Given the level of infrastructure that will be built it is likely the best future use of the infrastructure will be to utilize the facility to load trains and further its industrial use, subject to future approvals.

3. Methodology

The approach taken in this LUCRA is based on the NSW DPI Land Use Conflict Risk Assessment Guide published in October 2011. The approach is essentially to:

1. Gather information about the site and locality;
2. Undertake an inspection;
3. Talk to key land holders;
4. Undertake a land use conflict risk assessment; and
5. Make recommendations to reduce the risk or consequences of any conflict that should arise.

4. Background Information

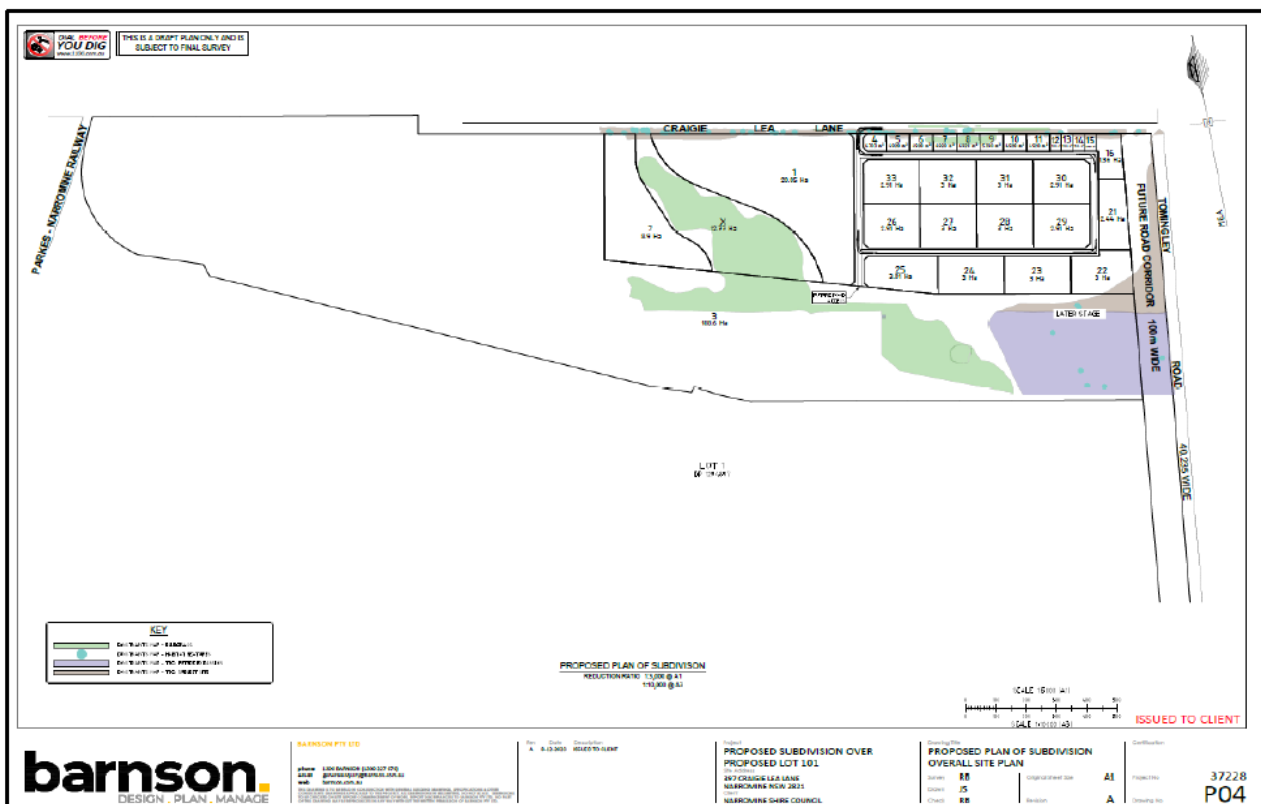
The Planning proposal seeks to rezone part of lot 2 DP 1294897 (99.65 Ha to be rezoned) from RU1 to E5 to allow for the development of an industrial precinct on Craigie Lea Lane. The precinct will ultimately provide for 29 lots (approx.) of industrial land ranging in size from 2,000m² to 20Ha.

The rezoning proposal is supported by a number of strategic documents which highlight the importance of planning for industrial development along the new Inland rail corridor to grow in particular the Transport and Agricultural (value adding) sectors.

In planning the rezoning and ultimately the precinct, allowance is made for 200 staff to be directly employed in the precinct which is 5.4Km from the southern outskirts of Narromine township.

In order to satisfy the industrial needs of the future development there will need to be extensive power supply upgrades to the surrounding area, potable water piped from the Narromine town supply and an upgrade to Craigie Lea Lane (existing gravel road).

Figure 3 below shows the indicative lot layout of the future industrial precinct.



In support of the Planning Proposal for the rezoning Barnson Pty Ltd have been engaged to undertake the necessary assessments required. These are seen in the substantive Planning Proposal document. Significant areas of study have included:

- Existing land use
- Topography
- Heritage
- Flora and Fauna
- Flooding
- Land and soil capability
- Contamination
- Access and traffic

Narromine Shire Council had previously engaged Barnson Pty Ltd to undertake a site Feasibility Study (September 2023) which concluded:

Barnson Pty Ltd has been engaged by Narromine Shire Council (NSC) to conduct an investigation and prepare information in support of a future Narromine Freight Hub (Industrial Hub) over part of the site at 397 Craigie Lea Lane, Narromine. The site is located approximately 6km south of the township of Narromine and is in proximity to the east-west greenfield take-off point for the Narromine to Narrabri (N2N) Inland rail corridor...

The future Industrial Hub hopes to take advantage of and support the Inland Rail development which objectives are to provide improved network efficiency and reliability, safety improvements, boost to the Australian economy, job creation and improved sustainability.

The feasibility study provides background site information for a planning proposal that shall consider amongst other things an appropriate zoning for complementary land uses supporting the intermodal facility/industrial hub.

In summary, based on investigations to date the site appears capable of supporting a future Industrial hub subject to considering further appropriate matters such as biodiversity impacts, civils augmentation and planning site suitability.

Land surrounding the proposed area for rezoning and future industrial development is used for plant agriculture, cropping and livestock grazing. Comment is made within the Planning Proposal document in regard to the land and soil. Summarized by:

An examination of the Land and Soil Capability mapping in New South Wales was conducted, affirming that the Planning Proposal Area falls within Land and Soil Capability Class 4. Class 4 denotes land with moderate to severe

limitations for certain uses, necessitating careful management to avert soil and land degradation. Specialised management practices, backed by substantial knowledge, expertise, inputs, investment, and technology, can effectively overcome these limitations. Notably, the site is not within the boundary of State Significant Farmland.

A review of groundwater bore records (WaterNSW, 2023) by Barnson Pty Ltd indicated one registered bore within the lease area of the Materials Distribution Centre (GW001568, 89m deep) and south of the area proposed for rezoning.

The two closest bores external to the property being rezoned are GW000306 and GW801300, drilled to a depth of 94.5m and 60m. According to the database GW801300 is abandoned.

The bore associated with land GW000306 has a basic rights entitlement. (Lower Macquarie Zone 4 Groundwater source).

The bore associated with land GW801300 has a basic rights entitlement. (Lower Macquarie Zone 6 Groundwater source). (WaterNSW, 2024).

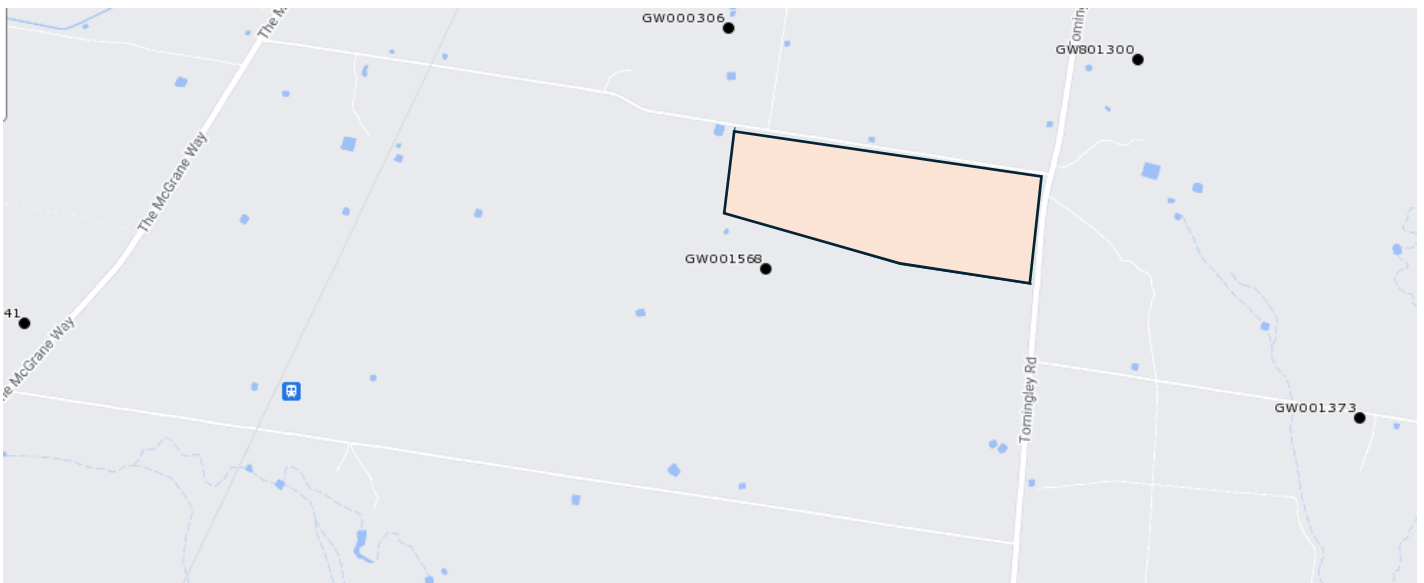


Figure 4: Local bore map

Source: Water NSW 2024, Sourced from waternsw.com.au



Image 3: General view of the area under consideration for the planning proposal looking to the south.

Source: Barnson Pty Ltd



Image 4: General view of the area under consideration for the planning proposal looking to the north west.

Source: Barnson Pty Ltd



Image 5: General view of the Craigie Lea Lane on northern edge of development looking to the east.

Source: Barnson Pty Ltd



Image 6: Property entrance at Craigie Lea Lane.

Source: Barnson Pty Ltd

5. Site Inspection

The subject land has been extensively surveyed by Barnson Pty Ltd and consultant representatives. As the subject land is owned by Narromine Shire Council and part leased to Inland Rail ARTC it can be confirmed that the subject land has not been used for farm purposes in recent times. The land was inspected most recently on the 20th of February 2024 and as outlined in the Planning Proposal document there is evidence of both native and non native grasses and trees.

Generally, there is only light tree growth within the farm paddocks. There is extensive growth in the adjacent road corridors.

The land is fully fenced. Approximately 10 workers were present at the Materials Distribution site.

6. Consultation

The only entity directly affected by the rezoning and the future usage is ARTC Inland rail who both lease adjacent land and own land to the south.

The area to the south of the future Inland Rail line (owned by ARTC Inland Rail) is being grazed by cattle at this time. This is a casual arrangement between Inland rail and the land owner on the southern side of Narwonnah Siding Road. This arrangement has been confirmed by the Inland Rail- property manager responsible for the maintenance of the balance of Inland Rail land not under construction.

The area leased to ARTC Inland Rail for the purpose of the Materials Distribution Centre will not be utilized for grazing purposes but rather for the ongoing development of Inland Rail.

7. Use of adjacent lands

The land to the north of Craigie Lea Lane is largely held by one property owner. The property is seasonally cropped.

The area to the east of the proposed rezoning and industrial subdivision will be the subject of future road works by Transport for New South Wales. The farm area to the east of the Tomingley road is heavily timbered and cropped seasonally beyond the timber. This is highlighted in Figure 5 below.



Figure 5: Adjacent land uses shown

Source: Google Earth; Narromine Shire Council

The closest residence to the north east is 630m. The closest residence to the east of the proposed area to be rezoned is 650m. The closest residence to the north of the proposed area to be rezoned is 800m.

8 Land Use Conflict Risk Assessment

Risk identification and risk controls

The main land use activities that are likely to generate conflict in this situation are existing residences on adjacent RU1 land and industrial uses. (including the resulting traffic generation). The potential for conflict can occur in either direction.

There is minimal risk of conflict between the industrial use of the land to be rezoned and the industrial use of the Materials Distribution Centre or rail line.

There is minimal risk of conflict between the industrial use of the future precinct and the use of the neighboring agriculture land.

The activities related to the industrial use of the rezoned precinct and the neighboring residences are outlined in Table 1. Each potential conflict is given a risk ranking based on probability (likelihood) and consequence. The tables used as a baseline are included below in Appendix A. Risk rankings greater than 10 are regarded as serious and need to be addressed.

Table 1: Risk ranking for Residences in close proximity

Activity	Potential conflict	Probability level	Consequence level	Risk ranking
<i>Residences in close proximity</i>	Noise generation	C	4	8
	Increased levels of traffic in area	B	3	17
	Disturbance from lights within industrial precinct	C	4	8

Table 2: Risk ranking for Grazing/ cropping and industrial conflict

Activity	Potential conflict	Probability level	Consequence level	Risk ranking
<i>Grazing and cropping/ industrial precinct</i>	Noise from cropping works/ industrial use	D	3	9
	Spray drift	D	3	9
	Dust from fields	B	5	7
	Groundwater contamination	E	3	6

Table 3: Risk ranking industrial land to be rezoned and Materials Distribution Centre

Activity	Potential conflict	Probability level	Consequence level	Risk ranking
<i>Materials Distribution Centre/ Industrial use</i>	Noise from rail line	C	5	4
	Noise from working with steel from MDC	C	4	8
	Trespassing Rail land	C	4	8

9. Risk Reduction Controls

Risk consequences are naturally minimized by the distances to the residential receptors and the different land uses buffered by road ways, existing approved industrial uses and an existing timbered road corridor.

Residences in close proximity

The distances from the boundary of the proposed rezoned land to the residential receptors is greater than 500m and separated by tree coverage. The highest risk rating in this category is the risk associated with increased traffic in this precinct.

The risk level of conflict between the industrial use and the nearby residences is noted as B3 prior to mitigation with the consequence likely to occur or known to have happened. It is noted that the increased traffic is likely to have a moderate impact on the local community, there may be some complaints and will likely require ongoing management. (risk ranking 17).

In order to mitigate this issue of increased traffic causing an impact it is planned that Craigie Lea Lane will be upgraded to a bitumen sealed road and widened for at least the length of road between the Tomingley Road and the entrance to the Materials Distribution Centre.

In order to mitigate the additional traffic on the intersection of the Tomingley Road and Craigie Lea Lane the intersection will be upgraded to include additional turning lanes in both the north and south direction.

The sealing of Craigie Lea lane will ensure that there is less dust attributed to the road, it will be less noisy, will remain open in wet weather and storm culverts will ensure that water travels under the road and minimizes the chances of wash outs. This additional work will benefit the local residences.

The upgraded Tomingley Road intersection will assist to ensure that access to local residences is as safe as practicable.

This mitigation, combined will reduce the conflict level to C4 (risk rating of 8).

Grazing and cropping conflicts

The risk scores for items identified remain lower than a risk rating of 11 where consequences are seen to be minor or negligible.

The biggest risks are noise from cropping and or industrial use but in a rural area with seasonal cropping this is low and no additional mitigation is suggested other than to

maintain the tree line buffers in an equivalent way to what exists today. (note that this is consistent with the approach to managing biodiversity on the site).

While dust from fields may also occur from time to time in a rural setting this is to be expected and will be minimized with the maintenance of a tree buffer.

Narromine Shire Council accepts the 'Right to Farm Policy' developed by the NSW Government and the common interpretation that; *"relates to a desire by farmers to undertake lawful agricultural practices without conflict or interference arising from complaints from neighbors and other land users"*.

In regard to groundwater contamination there are no bores on the part lot to be rezoned and any industry assessed for approval will be required to mitigate the potential to contaminate any aquifer that may be present.

There is no irrigated cropping that exists close by. In this instance contamination would be rare/ unlikely to occur.

Materials Distribution Centre

The Materials Distribution Centre has previously been approved (Review of Environmental Factors, ATRC) and operates to the south and west of the proposed industrial rezoning on land leased from Narromine Shire Council.

The risk rankings are deemed to be lower than 11 and as such no particular mitigations are suggested.

Notwithstanding the low risk score, the area between the Materials Distribution Centre will be fenced to a minimum or rural type fencing and no trespassing signs will be displayed.

A summary of risk mitigation strategies for land use conflict are seen below.

Table 4: Summary of risk mitigation measures

Activity	Mitigation measure	Risk reduction
<i>Residences in close proximity</i>	Traffic generation:	B3-17 risk rating to C4-8
	Ensure Craigie Lea Lane widened and sealed.	
	Intersection upgrade Craigie Lea Lane	
<i>Grazing and industrial usage</i>	Maintain tree line buffers	Good practice. Minimal risk considered D3-9
<i>Materials Distribution Centre</i>	Maintain rural fencing- to minimize trespass	Good practice. Minimal risk considered C4-8
	Erect no trespass signage	

Appendix A

Tables describing probability, consequence and risk ranking

Probability Table- likelihood of the consequence occurring

Level	Descriptor	Description
A	Almost certain	Common or repeating occurrence
B	Likely	Known to occur, or 'it has happened'
C	Possible	Could occur, or 'I've heard of it happening'
D	Unlikely	Could occur in some circumstances, but not likely to occur
E	Rare	Practically impossible

Measure of consequence

Level: 1	Descriptor: Severe
Description	<ul style="list-style-type: none"> •Severe and/or permanent damage to the environment •Irreversible •Severe impact on the community •Neighbours are in prolonged dispute and legal action involved
Example/ Implication	<ul style="list-style-type: none"> •Harm or death to animals, fish, birds or plants •Long term damage to soil or water •Odours so offensive some people are evacuated or leave voluntarily •Many public complaints and serious damage to Council's reputation •Contravenes Protection of the Environment & Operations Act and the conditions of Council's licenses and permits. Almost certain prosecution under the POEO Act
Level: 2	Descriptor: Major
Description	<ul style="list-style-type: none"> •Serious and/or long-term impact to the environment •Long-term management implications •Serious impact on the community •Neighbours are in serious dispute
Example/ Implication	<ul style="list-style-type: none"> •Water, soil or air impacted, possibly in the long term •Harm to animals, fish or birds or plants

	<ul style="list-style-type: none"> •Public complaints. Neighbour disputes occur. Impacts pass quickly •Contravenes the conditions of Council's licences, permits and the POEO Act •Likely prosecution
Level:3	Descriptor: Moderate
Description	<ul style="list-style-type: none"> •Moderate and/or medium-term impact to the environment and community •Some ongoing management implications •Neighbour disputes occur
Example/ Implication	<ul style="list-style-type: none"> •Water, soil or air known to be affected, probably in the short term •No serious harm to animals, fish, birds or plants •Public largely unaware and few complaints to Council •May contravene the conditions of Council's Licences and the POEO Act •Unlikely to result in prosecution
Level: 4	Descriptor: Minor
Description	<ul style="list-style-type: none"> •Minor and/or short-term impact to the environment and community •Can be effectively managed as part of normal operations •Infrequent disputes between neighbours
Example/ Implication	<ul style="list-style-type: none"> •Theoretically could affect the environment or people but no impacts noticed •No complaints to Council •Does not affect the legal compliance status of Council
Level: 5	Descriptor: Negligible
Description	<ul style="list-style-type: none"> •Very minor impact to the environment and community •Can be effectively managed as part of normal operations •Neighbour disputes unlikely

Example/ Implication	<ul style="list-style-type: none">•No measurable or identifiable impact on the environment•No measurable impact on the community or impact is generally acceptable
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Risk ranking matrix

		Probability				
		A	B	C	D	E
Consequence	1	25	24	22	19	15
	2	23	21	18	14	10
	3	20	17	13	9	6
	4	16	12	8	5	3
	5	11	7	4	2	1

Note areas highlighted as red require specific mitigation.

Appendix B

Land Use Conflict Reduction Strategies map

For Part lot 2 DP 1294897





APPENDIX K

Agency Consultation

Josh Eagleton
Barnson

jeagleton@barnson.com.au pjohnston@narromine.nsw.gov.au, eyule@narromine.nsw.gov.au

Re: Narromine Industrial Land Scoping Proposal concerning 397 Craig Lea Lane, Part Lot 2 DP 1294897 and Proposed Lot 101.

Dear Mr Johnston,

Thank you for your correspondence of 6 December 2023 and the opportunity to provide comments on the Narromine Industrial Land Scoping Report.

The NSW Department of Primary Industries (DPI) Agriculture collaborates and partners with our stakeholders to protect and enhance the productive and sustainable use and resilience of agricultural resources and the environment.

DPI Agriculture has reviewed the Scoping Report which proposes the rezoning of Part Lot 2 DP1294897 (99.65 ha) from zone RU1 Primary Production to zone E5 Heavy Industrial to 'service the agriculture and transport sectors'. We note Council is also intending to permit subdivision on Proposed Lot 101 zoned RU1 Primary Production to the south and west of Part Lot 2 adjacent to the ARTC Materials Distribution Centre although it is unclear from the Scoping Report the intention for this site.

The project site has Land and Soil Capability (LSC) Class 4 land and does not have Biophysical Strategic Agricultural Land or draft mapped State Significant Agricultural Land. However, there are productive agricultural enterprises being carried out in the immediate locality including irrigation and cropping.

At this stage NSW DPI Agriculture has concerns with the proposal's lack of demonstrated strategic merit and clarity of intention, the potential impact on surrounding agricultural land uses and inconsistency with the local and regional strategic planning framework. These concerns are set out below in more detail:

- The proposal appears to be inconsistent with the Central West Orana Regional Plan 2041 (CWORP) which requires detailed strategic planning to underpin new freight and agricultural value-adding facilities in regional areas. A strategic approach is also important to consider the government's investment in the Parkes Freight Hub (Special Activation Precinct).

- It is also considered to be inconsistent with the Narromine Local Strategic Planning Statement (LSPS), which again requires strategic planning to identify the need for and optimum location of any secondary inland freight hub with a focus on agricultural commodities. I note the LSPS promotes new investment in the zoned and serviced Aerodrome business park and existing E4 General Industrial land.
- The subject land is isolated from other industrial land and does not appear to provide a logical progression of industrial development. The planning proposal should also justify the appropriateness of an E5 Heavy Industrial zone given the scoping report states that the intention of the site is to *'service largely the agricultural and transport sectors'*. Also given its isolated location and potential for impacts on surrounding land uses, a master plan process for the site and adjoining land should be undertaken if the planning proposal is to progress.
- The Scoping Report does not include evidence or economic justification for an additional 99 ha of heavy industrial land or the implications for the viability of existing industrial zoned land in Narromine. The impacts on businesses related to agriculture which are in existing industrial land should be considered. A market sounding or economic report would be expected to justify such a significant change in land use in this location, particularly where connected to the Inland Rail project.
- The Scoping Report lacks an assessment of surrounding land uses, which include intensive plant agriculture, extensive cropping and livestock grazing immediately adjacent to the site and rural residential development within 1.3km. There is no information on potential land use conflict impacts associated with the E5 Heavy Industry zone land uses due to emissions of dust, odour, noise or vibration etc, or any mitigation of such impacts including establishing separation distances or buffers to nearby land used for agricultural production.
- The proposed LEP amendment provides for an open E5 Heavy Industry land use zone that includes 'freight transport facilities', 'rural industries', 'waste or resource management facilities', 'hazardous and offensive industries', as well as 'general industries'. The scope of the zone land use table extends beyond that of agricultural and transport sectors. The Scoping Report does not clearly detail the intended land uses on Proposed Lot 101 nor the use of Schedule 1 Additional Permitted Uses. This should be clarified if the planning proposal progresses.

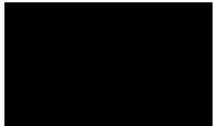
We consider that a comprehensive assessment of the site's feasibility in relation to the amount of land proposed to be rezoned, the actual land uses being pursued for the site, the impacts on existing zoned land in Narromine and at Parkes, and the potential conflict impacts on surrounding agricultural and residential land uses should be carried out prior to the consideration of this *ad hoc* amendment.

It is strongly recommended that Council prepare a Land Use Conflict Risk Assessment (LUCRA) to support the planning proposal and address the compatibility of the proposal with adjoining land uses, both agricultural and residential. The LUCRA process may also give guidance on the need for

any formal vegetated buffers within the subject site to adjoining land uses to mitigate potential impacts such as noise, dust and traffic movements associated with the site, and assist in managing expectations for neighbouring development.

The current DPI LUCRA guide is found at <https://www.dpi.nsw.gov.au/agriculture/lup/development-assessment/development-assessment2/lucra> and the 2018 Interim Buffer guideline is at <https://www.dpi.nsw.gov.au/agriculture/lup/development-assessment/development-assessment2/buffer-zones-to-reduce-land-use-conflict-with-agriculture-an-interim-guideline>

Should you require clarification on any of the information contained in this response, please do not hesitate to contact me on 0487 023 845 or by email at landuse.ag@dpi.nsw.gov.au.



Nita Scott

Agricultural Land Use Planner
Central West and Orana Region

21 December 2023



Department of Climate Change, Energy, the Environment and Water

Our ref:DOC24/62895

Your ref: SC132

Phil Johnston
Director Community and Economic Development
Narromine Shire Council
pjohnston@narromine.nsw.gov.au

Dear Phil

Rezoning RU1 Primary Production to E5 Heavy Industrial – 397 Craigie Lea Lane, Narromine - Planning Proposal

Thank you for referring the abovementioned planning proposal to the Biodiversity, Conservation and Science Group (BCS) of the NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) for comment. We understand that the planning proposal comprises a rezoning of the subject land from RU1 Primary Production to E5 Heavy Industrial, and amendments to the minimum lot size on the rezoned land.

BCS have reviewed the Scoping Proposal and the Site Suitability Assessment including Attachment D, the Ecology Site Suitability Assessment (ESSA) and support the project objective. BCS acknowledge that significant ecological survey has been undertaken as part of the ESSA. This provides a strong foundation for making informed strategic decisions at the planning proposal stage.

BCS supports the intention of the concept layout to avoid development on the land with the highest levels of biodiversity including the Gilgai area and natural watercourse. The proposal is in an optimal position to take advantage of the detailed knowledge of biodiversity constraints. One such advantage is using further lot layout refinement to reduce the biodiversity offset obligations at the development application (DA) stage.

Additional avoidance of some small areas along the boundary of the proposal is recommended. These areas contain high environmental value (HEV) including over-cleared vegetation types, threatened ecological communities (TECs), threatened species and their habitats, and Serious and Irreversible Impact (SAIL) candidate entities. Avoidance of these areas of HEV would provide consistency with the Central West and Orana Regional Plan 2041 ('the Plan').

Further avoidance will assist in providing consistency with the Regional Plan

Local Planning Direction 1.1 (Implementation of Regional Plans) requires planning proposals to be consistent with the relevant regional plan. Objective 5 and Strategy 5.1 of the Plan identifies that areas of HEV should be protected in strategic and local planning.

The HEV criteria applies to land that includes one or more of the following:

- Sensitive biodiversity values
- Native vegetation of high conservation value, including vegetation types that have been over-cleared or occur within over-cleared landscapes, threatened ecological communities, old growth forest and rainforest
- Key habitat of threatened species
- Important wetlands
- Areas of geological significance

BCS has identified additional areas of HEV within the proposal that could be avoided by applying minor amendments to the lot layout. These areas are:

- Over-cleared vegetation types PCT 82 and PCT 201.
- TECs PCT 82, PCT 201 and some parts of PCT 250.
- Habitat for known populations of species-credit-species *Dichanthium setosum*.
- Habitat for known populations of SAI candidate entities large bent-winged bat and TEC *Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions* ('Fuzzy Box Woodland').

Figure 5-2 in the ESSA shows the location of the PCTs. The location of PCT 82 and PCT 201 occur along the edge of the northern and eastern boundaries as well as within the eastern portion of the future expansion area. Minor amendments to the lot layout could exclude these areas.

Figure 5-3 in the ESSA shows the location of the TECs. The only additional area not already identified above for exclusion is part of PCT 250. This area is located within the south-eastern corner and the eastern portion of the future expansion areas. Again, minor amendments to the lot layout could exclude these additional areas.

Figure 6-1 in the ESSA identifies the known location of *Dichanthium setosum*. This is two small additional areas, one near the northern boundary and one within the future expansion area. Again, only minor amendments are required to exclude these areas from the lot layout.

The location associated with both SAI candidate entities, the large bent-winged bat and Fuzzy Box Woodland is PCT 201, is already recommended above for exclusion.

Avoidance will assist in reducing biodiversity credit obligations at DA stage

The Executive Summary of the ESSA states that 118.04ha of native vegetation occurs within the subject site. Clearing of an area 1ha or more of native vegetation for the proposal will trigger entry into the Biodiversity Offsets Scheme (the scheme), via an exceedance of the area clearing threshold.

The preparation of a Biodiversity Development Assessment Report (BDAR) is required to assess the impacts of the proposed development and quantify any biodiversity offset obligations. The BDAR must be prepared in accordance with the Biodiversity Assessment Method (BAM).

Development applications that trigger the scheme are required to adhere to the "avoid, minimise and offset" framework of the NSW *Biodiversity Conservation Act 2016* (BC Act). To demonstrate avoidance, the proponent must design and locate the proposal to avoid or minimise direct and indirect impacts on native vegetation, threatened species, threatened ecological communities and their habitats. This process must be clearly documented in the BDAR.

The large bent-winged bat and Fuzzy Box Woodland are both SAI candidate entities confirmed onsite. The consent authority must refuse to grant development consent if the proposed development is likely to have serious and irreversible impacts on biodiversity values under Part 7.16 of the BC Act. The BDAR should demonstrate avoidance and minimisation measures undertaken to reduce impacts to these SAI entities.

To protect areas of HEV and to demonstrate avoidance in accordance with the BAM, we recommend the proposal avoid the key biodiversity constraints identified in Figure 6-1 of the ESSA. This includes the areas identified as:

- TECs located along the northern and eastern boundary, the south-eastern corner and within the future expansion area,
- known areas of *Dichanthium setosum*, and

- hollows, nests and stags.

Additional ecological surveys will provide the full extent of environmental constraints for the proposal

The ESSA identified the need for further surveys. The lot layout should be finalised in response to the final locations of all HEV located on site. Prior to finalising the lot layout:

- Confirm all TECs by surveying during the appropriate survey timing to determine if the condition and composition thresholds for associated PCTs are met.
- Refine the location of *Dichanthium setosum* by surveying during the recommended survey period (November to May, 3-4 weeks after rain).
- Confirm presence or absence of any threatened species that have not already been assessed in accordance with section 5.3 of the BAM.

The ESSA identifies that some ecosystem and species credit species will likely be impacted by the proposal. Credit obligations generated for these entities will need to be offset in accordance with the scheme. Additional amendments to the draft lot layout could be considered to further reduce the credit obligations for these entities once their full extent is known.

Options to reduce the credit obligation for the proposal

As outlined above, we recommend the areas containing over-cleared vegetation types, TECs, threatened species and their habitats, and SAIL candidate entities be avoided where possible. We recommend protection at the DA stage, noting that building envelopes could be sited to avoid clearing the most sensitive biodiversity values. Mechanisms to achieve ongoing protection of the most sensitive biodiversity values include a vegetation management plan to secure these areas on title by way of consent conditions for the proposed lots adjoining Craigie Lea Lane and Tomingley Road. Alternatively, the draft lot layout could be amended to remove these areas from the proposed lots onto a separate allotment. This would achieve greater environmental protection by retaining these areas of vegetation under single ownership rather than across multiple lots. A rezoning of these areas to C2 Environmental Conservation would be most appropriate to provide ongoing environmental protection.

We remain available to provide further advice and guidance upon request. If you have any questions about this advice, please do not hesitate to contact Kate Tierney, Senior Conservation Planning Officer, via kate.tierney@environment.nsw.gov.au or (02) 4904 2782.

Yours sincerely



Samantha Wynn

Senior Team Leader Planning North West

Biodiversity, Conservation and Science Group

31 January 2024

22 December 2023

Our Ref: WST22/00007/05

Narromine Shire Council

BY EMAIL: mail@narromine.nsw.gov.au

CC: pjohnston@narromine.nsw.gov.au

Attention: Phil Johnston

SCOPING REPORT CONSULTATION - PROPOSED REZONING OF RU1 PRIMARY PRODUCTION ZONED LAND FOR THE PURPOSES OF E5 HEAVY INDUSTRIAL LAND – PART LOT: 232 AND 233 DP: 755131 CRAIGIE LEA LANE, NARROMINE

Dear Phil,

Transport for NSW (TfNSW) is responding to the Council email dated 23 November 2023 concerning the above Scoping Proposal (SP)/request for pre-lodgement advice.

TfNSW has reviewed the information that has been made available and provides the comments in **Attachment 1**. In summary, TfNSW believes that the 'comments' in Attachment 1 should be adequately addressed before the PP proceeds to public exhibition and assessment.

TfNSW staff would be happy to be involved in an MS Teams meeting with Narromine Shire Council staff and your traffic consultant to further discuss and clarify the comments provided in Attachment 1.

If you have any questions, please contact Andrew Lissenden, Development Services Case Officer, on 0418 962 703.

Yours sincerely



Andrew Lissenden

A/Team Leader Development Services (West)
Community & Place
Regional and Outer Metropolitan

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SCOPING REPORT CONSULTATION - PROPOSED REZONING OF RU1 PRIMARY PRODUCTION ZONED LAND FOR THE PURPOSES OF E5 HEAVY INDUSTRIAL LAND – PART LOT: 232 AND 233 DP: 755131 CRAIGIE LEA LANE, NARROMINE

Context

TfNSW notes:

- Council is undertaking a period of agency consultation to coincide with the preparation of a Planning Proposal (PP). The SP seeks to amend the *Narromine Local Environmental Plan 2011* (WLEP 2009) by amending the zoning from zone RU1 (Primary Production) to zone E5 (Heavy Industry) and the minimum lot size map for approximately 100 hectares of land (refer to **Attachment 2**). This will enable the subdivision of the land that the PP relates to into approximately 28 individual lots ranging in size from 4,000m² to 20ha.
- The nearest state classified road is the Mitchell Highway (MW7) to the north. It is important to note that Tomingley Road (MR89) and The McGrane Way (MR354) are regional classified roads managed by the Council. Craigie Lea Road is a local road managed by the Council.
- The PP as a result of changing the use of the land and enabling an increase in the lot yield would generate additional traffic. The impact of this traffic needs to be considered and adequately mitigated.
- Concurrence in accordance with Section 138(2) of the *Roads Act 1993* will be required from TfNSW for any works within the Mitchell Highway, Tomingley Road and The McGrane Way.
- This pre-lodgement advice is based on the information provided (i.e. letter from Narromine Shire Council dated 22 November 2023, Narromine Shire Council Scoping Proposal dated November 2023 V3 with reference SC1324 and letter from Barson dated 5.9.23 with reference 40038-PR01_A.docx). The TfNSW position is subject to change depending on the information submitted with any future enquiry/PP.

Comments

1. **Traffic Impact Study (TIS):** To enable an understanding of the impacts that this future PP and its future development will have on the classified road network, the local road connections with classified roads and how the PP will support public transport a TIS should be provided. This will need to examine any potential transport related implications of the future development of the land and:
 - a) Be prepared by a suitably qualified consultant.
 - b) Address the applicable criteria/key issues in Table 2.1 of the RTA's *Guide to Traffic Generating Developments*.

- c) Have regard for the Austroads publications, particularly the *Austroads Guide to Traffic Management Part 12: Integrated Transport Assessments for Developments* and *Part 3: Traffic Studies and Analysis Methods*.
- d) Provide an assessment of the suitability of local road connections to the classified road network and determine if any upgrades are necessary (noting the requirements in Point 2 below). This assessment should be based on current traffic counts during the AM and PM peaks and be calibrated with on-site observations. The trip distributions used in this assessment must be supported by valid justifications. This would include an explanation of the assumed travel patterns to access services and facilities as well as a turn warrant assessment based on maximum vehicle numbers generated. The assessment/identification of appropriate turn treatments is to be carried out in accordance with *Austroads Guide to Traffic Management - Part 6 Intersections, Interchanges and Crossings Management* (ARDG Part 6) and shall:
 - o include volume plots on Figure 3.25 (a) in ARDG Part 6;
 - o be based on the AM and PM peak period; and
 - o be supported with current traffic count data. Dates and times for the collected data shall be provided along with the traffic counts.
- e) Provide details on all vehicles that will be accessing the site (e.g. type, size, etc) and routes that will be taken (i.e. from the north, south, east and west).
- f) Provide trip generation rates for the future development including details on how the rates used have been determined.
- g) Provide an assessment/explanation of assumed travel patterns (i.e. trip distributions) to access services.
- h) Ensure that the estimated traffic generated by the future development of the land (broken down into estimated light and heavy vehicles) considers the range of permissible types of development within the new zoning.
- i) Include an assessment of the cumulative traffic impacts (e.g. from adjacent and future developments).
- j) Identify appropriate measures to mitigate any adverse impacts as a result of the PP and the future development the PP will facilitate on the classified road network.
- k) Detail appropriate arrangements to support public transport. It is important to ensure that future occupants will have access to bus infrastructure for their transportation needs.
- l) Detail on if and how other sustainable modes of travel are to be incorporated into the future PP/development of the land.

2. **Strategic/concept designs:** Strategic designs for any identified road upgrades/all works required within a classified road are to be provided as part of the TIA that is submitted in support of a future PP. The design provided shall demonstrate compliance with the TfNSW [Strategic design requirements for DAs fact sheet](#). This will, in part, clarify the scope of works, demonstrate a compliant design can be constructed, allow TfNSW to assess and provide informed comments on the PP's impacts on classified roads, and allow the consent authority to consider any environmental impacts that will need to be considered/addressed as part of the PP.

3. **Funding:** Council needs to be satisfied that appropriate planning mechanisms are in place to ensure that any upgrades to road infrastructure required are adequately funded and provided in a timely manner. Consideration must be given as part of a future PP as to how these upgrades will be delivered.

TfNSW believes that appropriate contributions need to be made for required local and state infrastructure. Generally, any upgrades and/or additional infrastructure required, are to be implemented at no cost to TfNSW and be agreed upon at the PP stage.

4. **Other general comments:**

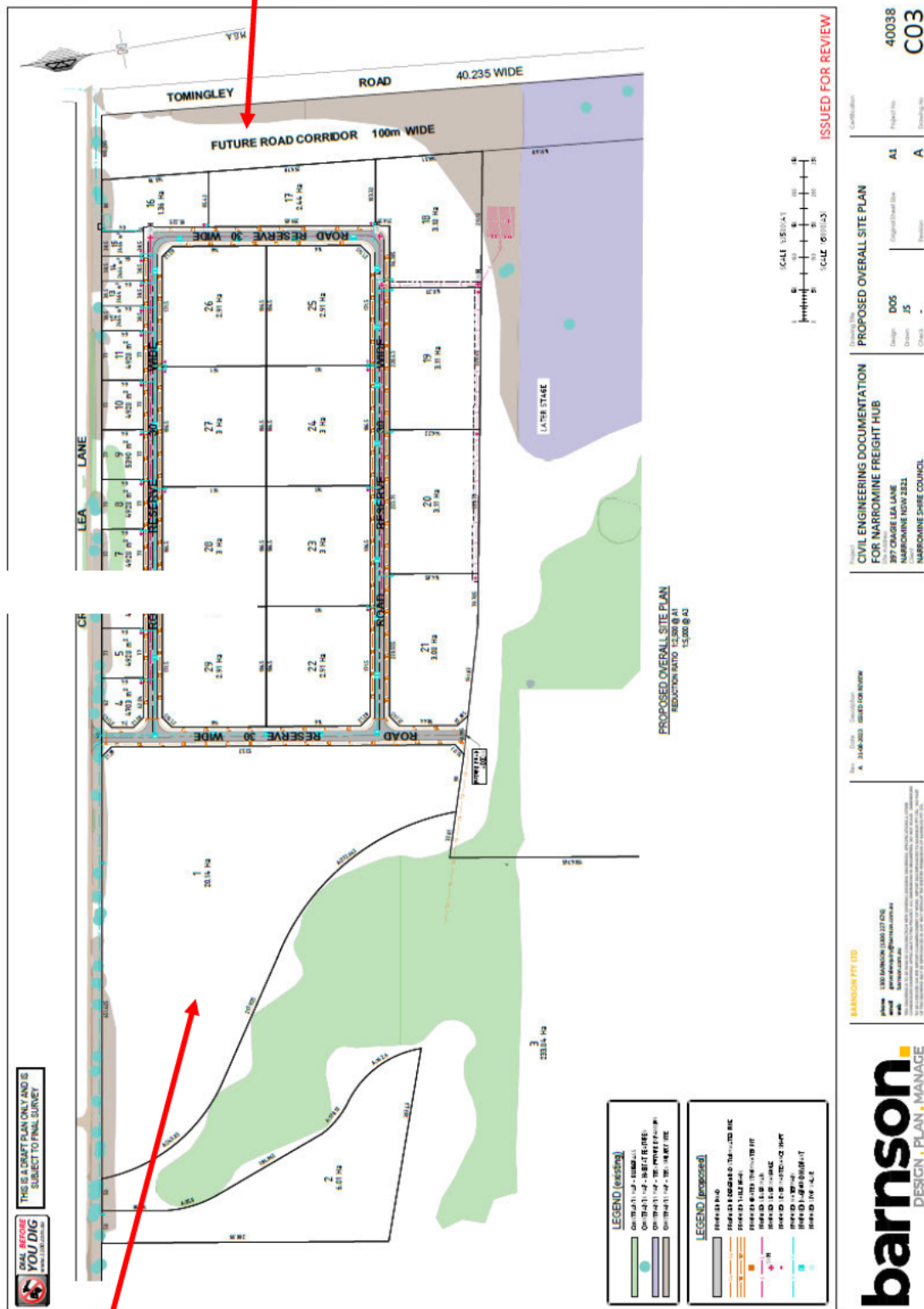
- a) Approval/concurrence under Section 138 of the *Roads Act 1993* will be required from TfNSW for any works that are identified as required within a classified road.
- b) Further discussions should occur with TfNSW about plans it may have that could impact the eastern portion of the future PP site. It is noted that the concept subdivision plan (with reference Project No. 40038, Drawing No. C03, Revision A dated 31.08.2023 – refer to **Attachment 3**) shows a future road corridor being preserved that is 100m wide.

The map displays the study area with various roads and water bodies. Key features include:

- State classified road:** Indicated by a red arrow pointing to a road labeled "STATE CLASSIFIED ROAD".
- Regional classified road:** Indicated by a red arrow pointing to a road labeled "REGIONAL CLASSIFIED ROAD".
- Site location:** A red box labeled "Site location" is positioned near the intersection of "CRATCHE" and "PINEDEAN" roads.
- Scoping report site:** A red arrow points to the "Site location" box, labeled "Scoping report site".
- Other roads:** Labeled roads include "DANDALOO ROAD", "BACKWATER ROAD", "WEBBS SIDING ROAD", "CRATCHE", "PINEDEAN ROAD", and "LANE".
- Water bodies:** "RACQUET CREEK" is shown flowing through the area.
- Land use:** The map shows various land parcels, some colored in yellow, pink, and green, representing different land uses or ownership.

5 of 6

Identified road corridor on concept subdivision plan



Scoping report site

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