



PLANNING PROPOSAL

CITY OF COFFS HARBOUR

**PP-2023-2086 – Lindsays Road, Boambee
Lot 4 DP 1049350, Lot 15 DP 861057 and Lots 101 and 102 DP 732172**

**December 2024
VERSION 2 – Exhibition**

PLANNING PROPOSAL STATUS

Stage	Version / Date <i>(blank until achieved)</i>
Reported to Council – Initiate s3.33 Version 1 - Pre_Exhibition	Version 1 – Pre-Exhibition, 25 July 2024
Referred to DPIE s3.34(1) Version 1 - Pre_Exhibition	Version 1 – Pre-Exhibition, 1 August 2024
Gateway Determination s3.34(2) Version 1 - Pre_Exhibition	Version 1 – Pre-Exhibition, 23 August 2024
Amendments Required:	Yes.
Public Exhibition – Schedule 1 Clause 4 Version 2 - Exhibition	Version 2 – Exhibition
Reported to Council – Initiate Revised PP s3.33 Version x - Re_Exhibition	
Revised PP Sent to the Minister - s3.35(1) Version x - Re_Exhibition	
Altered Gateway Determination s3.34(2) Version x - Re_Exhibition	
Public Exhibition – Schedule 1 Clause 4 Version x - Re_Exhibition	
Reported to Council – Endorsement (or Making of LEP if delegated) s3.36 Version x - Post Exhibition	
Endorsed by Council for Submission to Minister for Notification (or Making where not delegated) s3.36(2) Version x – Post Exhibition	

CONTENTS

Executive Summary & Exhibition Information.....	4
What is a Planning Proposal?.....	4
What is the Intent of this Planning Proposal?	4
Public Exhibition	4
Background.....	5
The Site.....	5
Part 1 – Objectives or Intended Outcomes.....	7
Part 2 – Explanation of Provisions	7
Part 3 – Justification & Site-Specific Merit.....	7
Section A – Need for the Planning Proposal.....	8
Section B – Relationship to Strategic Planning Framework	10
Section C – Environmental, Social and Economic Impact.....	17
Section D – State and Commonwealth Interests.....	19
Part 4 – Maps	20
Part 5 – Community Consultation.....	27
Part 6 – Project Timeline.....	28

APPENDICES

1	Consideration of State Environmental Planning Policies
2	Consideration of Ministerial Planning Directions
3	Ecological Assessment
4	Review of impacts of proposed modification of C2 Zone at Lot 101 DP 732172 on Square-stemmed spike-rush <i>Eleocharis tetraquetra</i>
5	Land Capability Assessment
6	Bushfire Subdivision & Infill Assessment Report
7	Acoustic Report
8	Aboriginal Cultural Heritage (Due Dilligence) Assessment
9	Preliminary Environmental Site Assessment & Remedial Action Plan
10	Vegetation Management Plan Review
11	Memorandum Burial Site
12	NSW Coastal Design Guidelines 2023 Appendix 1: checklist for planning proposals
13	Gateway Determination

EXECUTIVE SUMMARY & EXHIBITION INFORMATION

What is a Planning Proposal?

A planning proposal is a document that explains the intended effect of a proposed local environmental plan (LEP) and sets out the justification for making that plan. Essentially, the preparation of a planning proposal is the first step in making an amendment to Coffs Harbour LEP 2013.

A planning proposal assists those who are responsible for deciding whether an LEP amendment should proceed and is required to be prepared by a relevant planning authority. Council, as a relevant planning authority, is responsible for ensuring that the information contained within a planning proposal is accurate and accords with the *Environmental Planning and Assessment Act 1979* and the NSW Department of Planning, Housing and Infrastructure's *Local Environmental Plan Making Guideline 2022*.

What is the Intent of this Planning Proposal?

The intent of this Planning Proposal is to amend Lot Size Map Sheet LSZ_006B, Land Zoning Map and the Terrestrial Biodiversity, Drinking Water Catchment, Riparian Lands and Watercourses Map CL2_006B of Coffs Harbour LEP 2013.

The amendment will reduce the minimum lot size from 1 hectare to 5,000m²; adjust the existing R5 Large Lot Residential and C2 Environmental Conservation zones; and, adjust the area identified as "Biodiversity" on the Terrestrial Biodiversity Map.

Public Exhibition

This planning proposal is placed on public exhibition in accordance with the Gateway Determination issued by NSW Department of Planning, Housing and Infrastructure. Copies of the planning proposal and supportive information can be viewed on the City of Coffs Harbour's Have Your Say Page <https://haveyoursay.coffsharbour.nsw.gov.au/> for the duration of the exhibition period.

All interested persons will be invited to view and make a submission on the planning proposal during the exhibition period. Issues raised by submissions will be reported to Council for a final decision. Submissions can be made online, or in writing by email or post to:

The General Manager
City of Coffs Harbour
Locked Bag 155
COFFS HARBOUR NSW 2450
Email: coffs.council@chcc.nsw.gov.au

Any questions, contact:
Jackson Pfister on (66484662)
or email jackson.pfister@chcc.nsw.gov.au

Note: The City is committed to openness and transparency in its decision making processes. The Government Information (Public Access) Act 2009 requires the City to provide public access to information held unless there are overriding public interest considerations against disclosure. Any submissions received will be made publicly available unless the writer can demonstrate that the release of part or all of the information would not be in the public interest. However, the City would be obliged to release information as required by court order or other specific law.

Written submissions must be accompanied, where relevant, by a "Disclosure Statement of Political Donations and Gifts" in accordance with the provisions of the Local Government and Planning Legislation Amendment (Political Donations) Act 2008 No. 44 Disclosure forms are available from the City's Customer Service Section or on the City's website www.coffsharbour.nsw.gov.au/disclosurestatement.

BACKGROUND

Proposal	Lindsays Road
Property Details	Lot 4 DP 1049350, Lot 15 DP 861057, Lots 101 and 102 DP 732172, Lindsays Road and Pacific Highway, Boambee
Current Land Use Zone(s)	R5 Large Lot Residential and C2 Environmental Conservation
Proponent	Keiley Hunter Town Planning
Landowner	JS Rai
Location	Figure 1: location map is included below.

This planning proposal has been prepared in accordance with the Environmental Planning and Assessment Act 1979 and *Local Environmental Plan Making Guideline* (NSW Department of Planning and Environment 2022).

This planning proposal explains the intended effects of a proposed amendment to Coffs Harbour LEP 2013 to enable amendment of the Lot Size Map Sheet LSZ_006B, Land Zoning Map and the Terrestrial Biodiversity, Drinking Water Catchment, Riparian Lands and Watercourses Map CL2_006B of Coffs Harbour LEP 2013. The planning proposal will reduce the minimum lot size from 1 hectare to 5,000m²; adjust the location of zones on the property; and, adjust the extent of area identified as “Biodiversity”.

The Site

The site is located along the western edge of the Pacific Highway, and has frontage to Lindsays Road at its southern extent, as well as along its western edge. Boambee Creek adjoins the site along its northern boundary.

The site is located in an area developed for large lot residential purposes, as shown in Figure 1 below.

The site contains a low ridgeline through its centre, extending east-west. The majority of the site is cleared (grassed), with a vegetated riparian zone associated with Boambee Creek present in its northern portion. A further vegetated low-lying area exists in the southern portion of the site; this area is a flood channel associated with Cordwells Creek, and is fed by a culvert under the Pacific Highway.

The cleared central portion (body) of the site is connected to Lindsays Road to the west via a long, narrow portion of land.

The site has an area of 19.75 hectares and is zoned R5 Large Lot Residential and C2 Environmental Conservation under Coffs Harbour LEP 2013, as shown in Part 4 Maps - Figure 3.

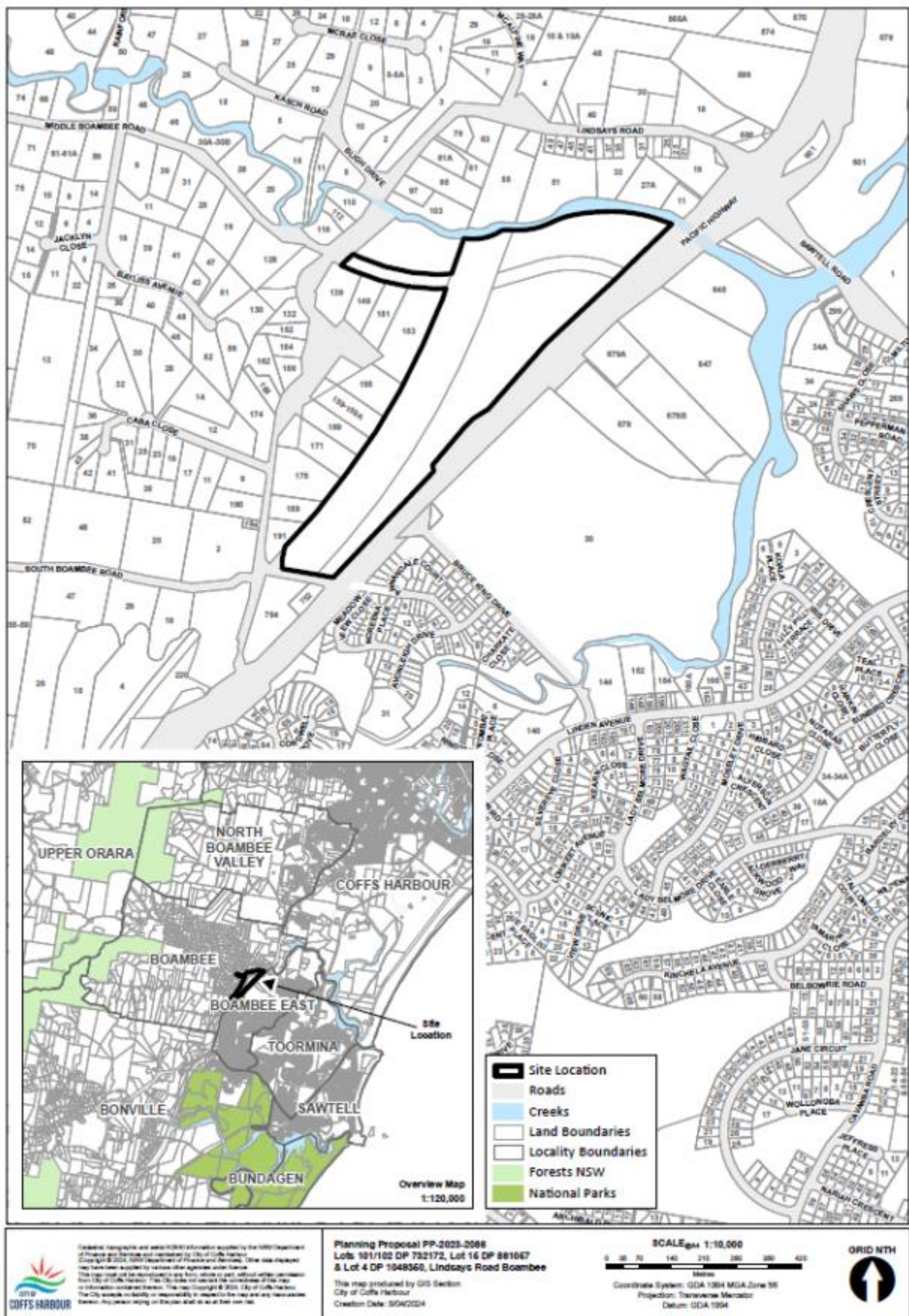


Figure 1: Location map.

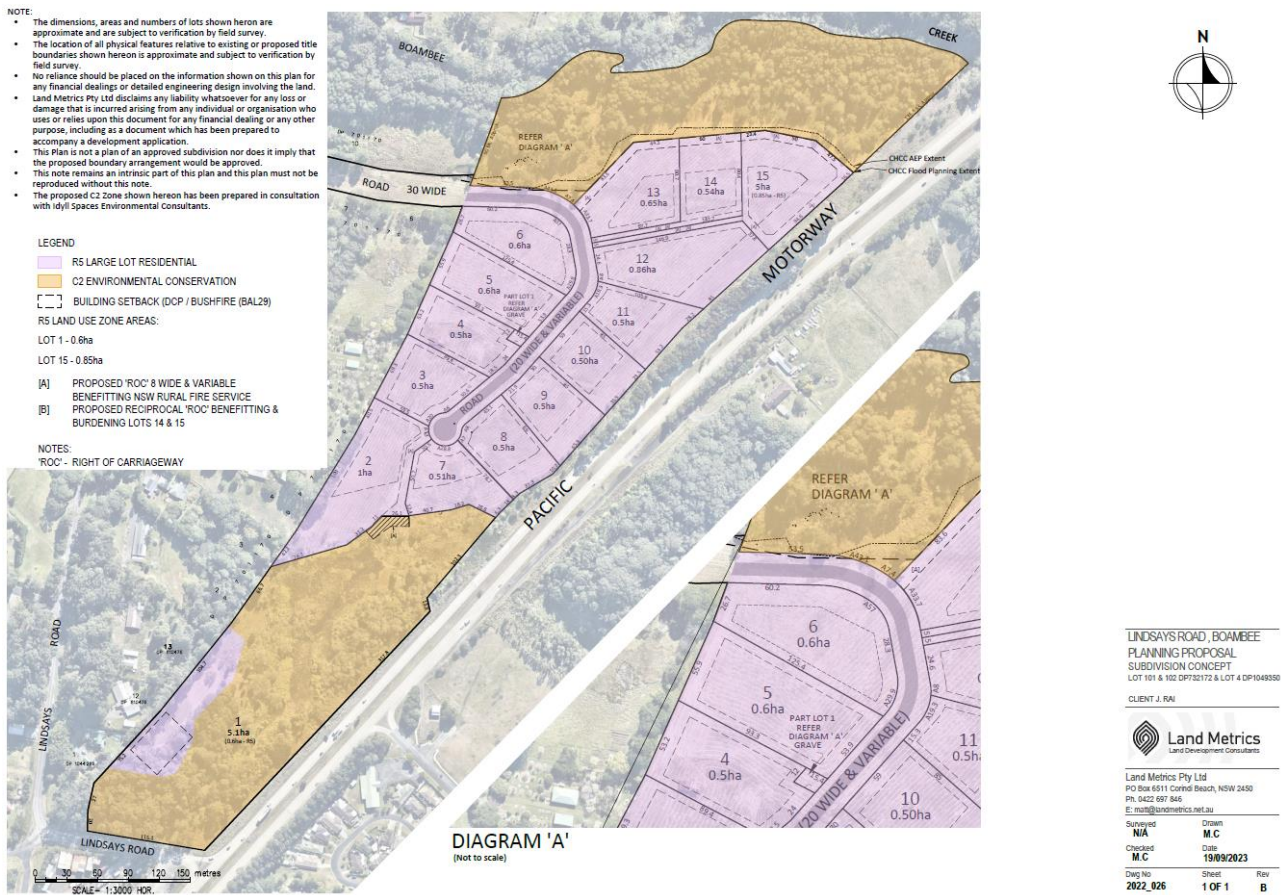


Figure 2: Concept Subdivision Layout*

*Note: In preparing this planning proposal, Council has not endorsed the proposed plan of subdivision as this is subject to the development application process.

PART 1 – OBJECTIVES OR INTENDED OUTCOMES

The objective of this planning proposal is to amend Coffs Harbour LEP 2013 to reduce the minimum lot size from 1 hectare to 5,000m²; adjust the existing R5 Large Lot Residential and C2 Environmental Conservation zones; and, adjust the area identified as “Biodiversity” on the Terrestrial Biodiversity Map.

PART 2 – EXPLANATION OF PROVISIONS

The intended outcomes of the proposed LEP amendment will be achieved by amending Coffs Harbour LEP 2013 as follows:

- Amending Lot Size Map LSZ_006B
- Amending Land Zoning Map
- Amending Terrestrial Biodiversity, Drinking Water Catchment, Riparian Lands and Watercourses Map CL2_006B.

PART 3 – JUSTIFICATION & SITE-SPECIFIC MERIT

This part provides a response to the following matters in accordance with the *Local Environmental Plan Making Guideline 2022* (NSW Department of Planning and Environment 2022):

- Section A: Need for the planning proposal

- Section B: Relationship to strategic planning framework
- Section C: Environmental, social and economic impact

Section A – Need for the planning proposal

1. Is the planning proposal a result of an endorsed local strategic planning statement, strategic study or report?

Yes.

The site is included in an existing R5 Large Lot Residential zone and Council's Local Growth Management Strategy (LGMS) 2020, Chapter 5 – Large Lot Residential addresses the potential reduction of minimum lot size in the R5 zone, where sufficiently justified. Section 6.7 within Chapter 5 of the LGMS states the following:

“It is also reasonable that if undeveloped land within zone R5 can justify a reduced lot size, then it should be considered through an applicant-initiated planning proposal. This would allow a merit case for a revised minimum lot size LEP amendment request to be submitted to Council, bearing in mind the underlying reasons for the standard in the first place and the objectives of zone R5.”

The planning proposal has been prepared in response to a landowner's request and is accompanied by a number of detailed environmental studies, which are included in the Appendices. Notably, and in relation to wastewater treatment and disposal, the proposal is accompanied by a Wastewater Capability Assessment prepared by Whitehead & Associates (Appendix 5), which provides:

“A minimum lot size of 5,000 m² could be acceptable for the Site subject to consideration of secondary treatment and the block having no battle axe alignment (ie maximise the area to perimeter ratio) as these narrow strips of land tend to reduce the available EMA on a lot;

A minimum lot size of 6,000 m² would be acceptable for the Site with no restrictions.”

Coffs Harbour has a range of lots sizes in its large lot (rural residential) areas, which reflect varying minimum lot size standards that have changed over time. These varied lot sizes are apparent within the Boambee large lot area, and in close proximity to the site.

In relation to the objectives of clause 4.1 Minimum subdivision lot size of LEP 2013, and the objectives of the R5 Large Lot Residential zone:

- The proposed minimum lot size of 5000m² will be sufficient to ensure that future lots might achieve a practical and efficient layout to meet their intended (rural residential) use. In this regard, the indicative layout in Figure 2 is demonstrative of this; and, Table 1 below shows that lot sizes within the locality are variable, with many below 5000m² in area, with these achieving a practical and efficient layout in a rural residential context.
- Table 1 also provides examples of lots that achieve residential housing in a rural setting while preserving, and minimising impacts on, environmentally sensitive locations and scenic quality.
- The planning proposal will not hinder the proper and orderly development of urban areas in the future, it will provide for the site to be subdivided consistent with properties in the locality (and consistent with its R5 Large Lot Residential zoning); and, it will not unreasonably increase the demand for public services or public facilities.
- Areas surrounding the site are developed for rural residential purposes, and the site is distant from other zones. As a result, the planning proposal is consistent with minimising conflict between land uses within the R5 Large Lot Residential zone and land uses within adjoining zones.

Address	Area (m ²)
95 Lindsays Road	8,489
97 Lindsays Road	3,214
103 Lindsays Road	11,440
139 Lindsays Road	8,489
149 Lindsays Road	6,000
151 Lindsays Road	6,837
153 Lindsays Road	16,760
155 Lindsays Road	11,025
159-159A Lindsays Road	8,748
169 Lindsays Road	7,446
171 Lindsays Road	10,236
110 Lindsays Road	2,574
112 Lindsays Road	2,076
116 Lindsays Road	3,810
128 Lindsays Road	18,035
132 Lindsays Road	3,015
152 Lindsays Road	3,000
154 Lindsays Road	3,000
156 Lindsays Road	3,000

Table 1: Lot sizes within close proximity to the site.

The planning proposal also seeks to alter the existing R5 Large Lot Residential and C2 Environmental Conservation zones, as well as the area identified as “Biodiversity” on the Terrestrial Biodiversity Map of LEP 2013. The alteration seeks to more accurately reflect the location of high conservation land across the site and is supported by the findings of the Ecological Assessment by Ecosure that accompanies the planning proposal (included in Appendix 3) and the subsequent *Review of impacts of proposed modification of C2 Zone at Lot 101 DP 732172 on Square-stemmed spike-rush Eleocharis tetraquetra* by Idyll Spaces Environmental Consultants (Appendix 4). The Assessment concludes that areas are presently inappropriately mapped as C2 Environmental Conservation, with such areas containing invasive exotic and pasture grasses; and, that the alteration will still provide adequate protection (in the form of buffers) to adjacent threatened species (Square-stemmed spike-rush) in the northern and southern portions the site. In this regard, the alteration will essentially involve a reduction in the area mapped as C2 Environmental Conservation and identified as “Biodiversity” (on the Terrestrial Biodiversity Map of LEP 2013); Figures 7 and 8 below respectively show the extent of change involved.

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

Yes.

The planning proposal is considered the best way to achieve the intended outcome, and is consistent with the approach set out in the LGMS, which is set out above. It is also consistent with the manner in which Council has dealt with similar planning proposals.

2. Is there a net community benefit?

The Net Community Benefit Criteria is identified in the NSW Government's publication *The Right Place for Business and Services*. This policy document has a focus on ensuring growth within existing centres and minimising dispersed trip generating development. It applies most appropriately to planning proposals that promote significant increased residential areas or densities, or significant increased employment areas or the like. This planning proposal does not relate to ensuring growth within existing centres and minimising dispersed trip generating development; nor does it relate to promoting significant increased residential areas or densities, or significant increased employment areas or the like. The criteria in the Net Community Benefit test cannot be properly applied to this planning proposal

Section B – Relationship to strategic planning framework

3. Will the planning proposal give effect to the objectives and actions contained within the North Coast Regional Plan 2041?

The proposed LEP amendment is considered to be consistent with the relevant goals, objectives, activities and actions within the North Coast Regional Plan 2041 as follows:

GOAL 1 – LIVEABLE, SUSTAINABLE AND RESILIENT

- **Objective 1 – Provide well located homes to meet demand**

Strategy 1.1 A 10 year supply of zoned and developable residential land is to be provided and maintained in Local Council Plans endorsed by the Department of Planning and Environment.

The proposed LEP amendment is not inconsistent with this action, it will add to the supply of R5 Large Lot Residential land in the locality via the slight increase in land zoned R5 Large Lot Residential and the reduction in the minimum lot size that applies to the site, from 1 hectare to 5,000m².

Action 1 Establish the North Coast urban housing monitoring program.

The proposed LEP amendment is not inconsistent with this action; it does not relate to the housing monitoring program.

Strategy 1.2 Local Council plans are to encourage and facilitate a range of housing options in well located areas.

The proposed LEP amendment is not inconsistent with this strategy; it will provide the potential for an increase in potential (rural residential) lots to be achieved on the site by increasing the minimum lot size from 1 hectare to 5,000m².

Strategy 1.3 Undertake infrastructure service planning to establish land can be feasibly serviced prior to rezoning

The proposed LEP amendment is not inconsistent with this strategy; adequate services are available to the site in relation to future rural residential development (as set out in the Engineering Review of Subdivision Infrastructure Matters for a Planning Proposal – Pre

Gateway Determination dated February 2024 from SDS Civil Enterprises). Of note too, is that consent was issued on 9 December 2016 (Development Consent 288/16) to subdivide the site into 6 rural residential lots.

Strategy 1.5 New rural residential housing is to be located on land which has been approved in a strategy endorsed by the Department of Planning and Environment and is to be directed away from the coastal strip.

The proposed LEP amendment is not inconsistent with this strategy given that it relates to land already zoned for rural residential housing; the amendment too is consistent with the Coffs Harbour Local Growth Management Strategy 2020, which provides that:

“Applying the Compact City approach to large lot residential development might be characterised by smaller lot sizes, infill development in existing zoned areas ...”

- **Objective 3 – Protect regional biodiversity and areas of high environmental value**

Strategy 3.1 Strategic planning and local plans must consider opportunities to protect biodiversity values by:

- focusing land-use intensification away from HEV assets and implementing the ‘avoid, minimise and offset’ hierarchy in strategic plans, LEPs and planning proposals;
- ensuring any impacts from proposed land use intensification on adjoining reserved lands or land that is subject to a conservation agreement are assessed and avoided;
- encouraging and facilitating biodiversity certification by Councils at the precinct scale for high growth areas and by individual land holders at the site scale, where appropriate;
- updating existing biodiversity mapping with new mapping in LEPs where appropriate;
- identifying HEV assets within the planning area at planning proposal stage through site investigations;
- applying appropriate mechanisms such as conservation zones and Biodiversity Stewardship Agreements to protect HEV land within a planning area and considering climate change risks to HEV assets;
- developing or updating koala habitat maps to strategically conserve koala habitat to help protect, maintain and enhance koala habitat; and
- considering marine environments, water catchment areas and groundwater sources to avoid potential development impacts.

The proposed LEP amendment is not inconsistent with this strategy; while it seeks to reduce the area zoned C2 Environmental Conservation and the area identified as “biodiversity” (on the Terrestrial Biodiversity, Drinking Water Catchment, Riparian Lands and Watercourses Map) the reduction is justified having regard to the findings set out in the Ecological Assessment (Appendix 3).

The Ecological Assessment by Ecosure assesses the capability of the site to accommodate an increased lot yield, and considers the conservation values of the site having regard to the current extent of the C2 Environmental Conservation zone. The Assessment includes a desktop literature review of vegetation communities and threatened species; draws on the findings of a site visit and opportunistic fauna surveys; and, a targeted search for threatened flora species.

The Ecological Assessment identified two threatened ecological communities at the northern and southern extents of the site, with the northern containing Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions and the southern containing River-Flat Eucalypt on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions. Two threatened flora species are also found on the site, and include the Square-

stemmed spike-rush (SSSR) and Hairy joint grass (HJG). The former is found in both the northern and southern vegetated areas on the site, and the HJG found in the southern portion.

The Ecological Assessment identifies that areas of the site are presently inappropriately mapped as C2 Environmental Conservation, with such areas containing invasive exotic and pasture grasses; it is intended to rezone these areas to R5 Large Lot Residential. In conjunction, it is proposed to also amend the area mapped as “biodiversity” on the Terrestrial Lands Map so that it is consistent with the extent of land zoned C2 Environmental Conservation.

The Ecological Assessment also provides that the transition of the site from vacant, essentially rural land, to large lot residential development will not be incompatible with maintaining the conservation values of the site, and that better management (mowing) might minimize seed production from exotic grasses which adversely impact the northern and southern vegetated areas.

The Ecological Assessment also identifies that further development (including subdivision) of the site provides opportunity for improvement/rehabilitation of parts of the site, for instance via implementation of a vegetation management plan.

The Ecological Assessment (and planning proposal) are further supported by an assessment of the impacts of the planning proposal on the SSSR; the assessment (Review of impacts on proposed modification of C2 Zone at Lot 101 DP 732172 on Square-stemmed spike-rush *Eleocharis tetraquetra*, dated October 2022 and prepared by Idyll Spaces Environmental Consultants) concludes that further development of the site in the manner proposed (shown in Figure 2 & 5) will benefit the SSSR as it will provide a physical barrier between the SSSR and rural residential development and existing exotic grassland; and, rural residential development is likely to reduce or prevent exotic (grass) seed production, which are invading areas of ecological significance. This Review is included in Appendix 4.

Strategy 3.2 In preparing local and strategic plans Councils should:

- embed climate change knowledge and adaptation actions; and
- consider the needs of climate refugia for threatened species and other key species.

The proposed LEP amendment is not inconsistent with this strategy; it has no implications for embedding climate change knowledge and adaptation; and, will maintain the inclusion of ecologically significant land within the C2 Environmental Conservation zone.

• **Objective 5 – Manage and improve resilience to shocks and stresses, natural hazards and climate change**

Strategy 5.1 When preparing local strategic plans, councils should be consistent with and adopt the principles outlined in the Strategic Guide to Planning for Natural Hazards.

The proposed LEP amendment is not inconsistent with this strategy; it involves a minor change to the extent of land zoned C2 Environmental Protection and R5 Large Lot Residential on the site; a reduction in the minimum lot size from 1 hectare to 5,000m²; and a minor change to the area identified as “biodiversity” on the Terrestrial Biodiversity Map.

Strategy 5.2 Where significant risk from natural hazard is known or presumed, updated hazard strategies are to inform new land use strategies and be prepared in consultation with emergency service providers and Local Emergency Management Committees (LEMCs). Hazard strategies should investigate options to minimise risk such as voluntary housing buy back schemes.

The proposed LEP amendment is not inconsistent with this strategy; while a portion of the site is identified as prone to flooding; and, the site is identified as bushfire prone land, the necessity for flood evacuation plans and bushfire evacuation plans may be considered at the development application stage.

Strategy 5.3 Use local strategic planning and local plans to adapt to climate change and reduce exposure to natural hazards by:

- identifying and assessing the impacts of place-based shocks and stresses;
- taking a risk-based-approach that uses the best available science in consultation with the NSW Government, emergency service providers, local emergency management committees and bush fire risk management committees;
- locating development (including urban release areas and critical infrastructure) away from areas of known high bushfire risk, flood and coastal hazard areas to reduce the community's exposure to natural hazards;
- identifying vulnerable infrastructure assets and considering how they can be protected or adapted;
- building resilience of transport networks in regard to evacuation routes, access for emergencies and, maintaining freight connections;
- identifying industries and locations that would be negatively impacted by climate change and natural hazards and preparing strategies to mitigate negative impacts and identify new paths for growth;
- preparing, reviewing and implementing updated natural hazard management plans and Coastal Management Programs to improve community and environmental resilience which can be incorporated into planning processes early for future development;
- identifying any coastal vulnerability areas;
- updating flood studies and flood risk management plans after a major flood event incorporating new data and lessons learnt; and
- communicating natural hazard risk through updated flood studies and strategic plans.

The proposed LEP amendment is not inconsistent with this strategy.

The site is prone to flooding; however, it does not involve rezoning (to R5 Large Lot Residential) any land included in the flood planning area. In addition, the Engineering Review of Subdivision Infrastructure Matters for a Planning Proposal – Pre Gateway Determination acknowledges that vehicular access to the site (via Lindsays Road) was previously considered for access purposes (Development Consent 0288/16) – with this part of the site identified as flood prone, but that any future road in this location should be constructed to the same height as nearby Lindsays Road so as to provide for the same level of flood accessibility.

The site is identified as bushfire prone land. The Bush Fire Assessment Report dated August 2021, prepared by Midcoast Building and Environmental (included in Appendix 6) provides that the concept layout can be achieved consistent with Planning for Bushfire protection 2021, in relation to the inclusion of satisfactory asset protection zones.

Strategy 5.4 Resilience and adaptation plans should consider opportunities to:

- encourage sustainable and resilient building design and materials (such as forest products) including the use of renewable energy to displace carbon intensive or fossil fuel intensive options
- promote sustainable land management including Ecologically Sustainable Forest Management (ESFM)
- address urban heat through building and street design at precinct scale that considers climate change and future climatic conditions to ensure that buildings and public spaces are designed to protect occupants in the event of heatwaves and extreme heat events
- integrate emergency management and recovery needs into new and existing urban areas including evacuation planning, safe access and egress for emergency services

personnel, buffer areas, building back better, whole-of-life cycle maintenance and operation costs for critical infrastructure for emergency management

- adopt coastal vulnerability area mapping for areas subject to coastal hazards to inform the community of current and emerging risks
- promote economic diversity, improved environmental, health and well-being outcomes and opportunities for cultural and social connections to build more resilient places and communities.

The proposed LEP amendment is not inconsistent with this strategy; the necessity for evacuation planning (associated with flooding or bushfire) can be appropriately considered at the development application stage. Notably the site has been approved for rural residential subdivision previously (Development Consent 0288/16).

- **Objective 9 – Sustainably manage and conserve water resources**

Strategy 9.1 Strategic planning and local plans should consider:

- opportunities to encourage riparian and coastal floodplain restoration works;
- impacts to water quality, freshwater flows and ecological function from land use change;
- water supply availability and issues, constraints and opportunities early in the planning process;
- partnering with local Aboriginal communities to care for Country and waterways;
- locating, designing, constructing and managing new developments to minimise impacts on water catchments, including downstream waterways and groundwater resources;
- possible future diversification of town water sources, including groundwater, stormwater harvesting and recycling;
- promoting an integrated water cycle management approach to development;
- encouraging the reuse of water in new developments for urban greening and for irrigation purposes;
- improving stormwater management and water sensitive urban design;
- ensuring sustainable development of higher water use industries by considering water availability and constraints, supporting more efficient water use and reuse, and locating development where water can be accessed without significantly impacting on other water users or the environment;
- identifying and protecting drinking water catchments and storages in strategic planning and local plans; and
- opportunities to align local plans with any certified Coastal Management Programs.

The proposed LEP amendment is not inconsistent with this strategy, it primarily seeks to increase the potential yield of rural residential lots on the site by decreasing the minimum lot size (1 hectare to 5,000m²). Notwithstanding, impacts to waterways and groundwater have been considered in the Wastewater Capability Assessment (Appendix 5).

Strategy 9.2 Protect marine parks, coastal lakes and estuaries by implementing the NSW Government's Risk-Based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions, with sensitive marine parks, coastal lakes and estuaries prioritised.

The proposed LEP amendment is not inconsistent with this strategy, waterways on the site in the northern and southern portions are to remain included in the C2 Environmental Protection zone.

GOAL 3 – GROWTH CHANGE AND OPPORTUNITY

Coffs Harbour Narrative

Livable and Resilient

- Provide mitigation measures in response to climate change.
- Support environmentally sustainable development that is responsive to natural hazards.
- Retain and protect local biodiversity through effective management of environmental assets and ecological communities.

The proposed LEP amendment is not inconsistent with this narrative, it does not involve rezoning (to R5 Large Lot Residential) any land included in the flood planning area, while the threat of bushfire can be adequately addressed at the development application stage (see the Bush Fire Assessment Report included in Appendix 6).

4. Is the planning proposal consistent with Council's endorsed local strategic planning statement, or another endorsed local strategy or strategic plan?

Council adopted its Local Strategic Planning Statement (LSPS) on 25 June 2020 for the whole of the Coffs Harbour LGA. The proposed LEP amendment accords with the vision and Planning Priority 1 within the Coffs Harbour LSPS which focuses growth in the existing urban footprint; and, to a lesser extent, it accords with Planning Priority 5 insofar as it will provide for the delivery of greater housing supply, choice and diversity through a reduction in the minimum lot size from 1 hectare to 5,000m².

MyCoffs Community Strategic Plan 2032

The City's Community Strategic Plan is based on four overarching themes: Community Wellbeing; Community Prosperity; A Place for Community; and Sustainable Community Leadership. Within each theme there are a number of sustainable development objectives and outcomes.

The planning proposal supports the vision of the MyCoffs Community Strategic Plan 'connected, sustainable, thriving' and will assist in achieving the following relevant objectives of the Plan by: attracting people to work, live and visit; and by undertaking development that is environmentally, socially and economically responsible.

Theme	Objective	Outcome
A Place for Community: <i>Liveable neighbourhoods with a defined identity</i>	We undertake development that is environmentally, socially and economically responsible	• Land use planning and development protects the value and benefits provided by our natural environment
A Place for Community: <i>Liveable neighbourhoods with a defined identity</i>	We undertake development that is environmentally, socially and economically responsible	• Population growth is focused within the existing developed footprint

Coffs Harbour Local Growth Management Strategy

The planning proposal is consistent with the LGMS.

The site is included in an existing R5 Large Lot Residential zone and the LGMS (Chapter 6 – Large Lot Residential) addresses the potential reduction of minimum lot size in the R5 Large Lot Residential zone, where sufficiently justified. Section 6.7 within Chapter 6 of the LGMS states the following:

“The Standard Instrument LEP allows lot sizes to be different for land within the same zone. For the sake of determining the potential large lot residential yield of any greenfield land, a minimum lot size of one-hectare has been assumed unless there is more detailed information that indicates a different minimum lot size.

However, this LGMS is not rigid on this and a planning proposal to rezone land should apply a minimum lot size relevant to the characteristics of the land. This will need to be based on a site-specific and detailed land capability assessment. Given that this may result in lot sizes both smaller and greater than one-hectare, it is unlikely to alter lot yields overall.

It is also reasonable that if undeveloped land within zone R5 can justify a reduced lot size, then it should be considered through an applicant-initiated planning proposal. This would allow a merit case for a revised minimum lot size LEP amendment request to be submitted to Council, bearing in mind the underlying reasons for the standard in the first place and the objectives of zone R5.”

The planning proposal has been prepared in response to a landowner’s request and is accompanied by a number of detailed environmental studies, which are included in the Appendices.

5. Is the planning proposal consistent with any other applicable State and Regional Study or Strategies?

Coffs Harbour Regional City Action Plan 2036

The NSW Government developed the Coffs Harbour Regional City Action Plan (the Plan) to provide a framework to manage and shape the city’s future growth. The Plan was finalised in March 2021 and it identifies 5 overarching goals which incorporate objectives and related actions. This planning proposal is consistent with the following relevant goals, objectives and associated actions within the Plan:

Goal	Objective	Actions	
Live	17. Deliver a city that responds to Coffs Harbour’s unique green cradle setting and offer housing choice.	17.1	Promote a sustainable growth footprint and enhance place-specific character and design outcomes.
		17.4	Support a greater variety and supply of affordable housing.

6. Is the planning proposal consistent with applicable state environmental planning policies (SEPP)?

Yes. The table provided in Appendix 1 provides an assessment of consistency against each SEPP relevant to the planning proposal.

7. Is the planning proposal consistent with applicable Ministerial Directions (s9.1 directions)?

Yes; the table provided in Appendix 2 provides an assessment of consistency against Ministerial Planning Directions relevant to the planning proposal.

Section C – Environmental, social and economic impact

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

No; there is little likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the planning proposal.

The majority of the site is cleared (grassed), with native vegetation located in its northern and southern portions.

The Ecological Assessment (Appendix 3) by Ecosure assesses the capability of the site to accommodate an increased lot yield, and considers the conservation values of the site having regard to the current extent of the C2 Environmental Conservation zone. The Assessment includes a desktop literature review of vegetation communities and threatened species; draws on the findings of a site visit and opportunistic fauna surveys; and, a targeted search for threatened flora species.

The Ecological Assessment identified two threatened ecological communities at the northern and southern extents of the site, with the northern containing Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions and the southern containing River-Flat Eucalypt on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions. Two threatened flora species are also found on the site, and include the Square-stemmed spike-rush (SSSR) and Hairy joint grass (HJG). The former is found in both the northern and southern vegetated areas on the site, and the HJG found in the southern portion.

The Ecological Assessment identifies that areas of the site are presently inappropriately mapped as C2 Environmental Conservation, with such areas containing invasive exotic and pasture grasses; it is intended to rezone these areas to R5 Large Lot Residential. In conjunction, it is proposed to also amend the area mapped as “Biodiversity” on the Terrestrial Biodiversity Map so that it is consistent with the extent of land zoned C2 Environmental Conservation.

The Ecological Assessment also provides that the transition of the site from vacant, essentially rural land, to large lot residential development will not be incompatible with maintaining the conservation values of the site, and that better management (mowing) might minimize seed production from exotic grasses which adversely impact the northern and southern vegetated areas.

The Ecological Assessment also identifies that further development (including subdivision) of the site provides opportunity for improvement/rehabilitation of parts of the site, for instance via implementation of a vegetation management plan.

The Ecological Assessment (and planning proposal) are also supported by a further assessment of the impacts of the planning proposal on the SSSR; the assessment (Review of impacts on proposed modification of C2 Zone at Lot 101 DP 732172 on Square-stemmed spike-rush *Eleocharis tetraquetra*, dated October 2022 by Idyll Spaces Environmental Consultants – included in Appendix 4) concludes that further development of the site in the manner shown in Figure 2 and 4 will benefit the SSSR as it will provide a physical barrier between the SSSR and rural residential development and existing exotic grassland; and, rural residential development is likely to reduce or prevent exotic (grass) seed production, which are invading areas of ecological significance.

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

No.

- Bushfire Risk

The site is mapped as bushfire prone land.

The Bush Fire Assessment Report (Appendix 6) that accompanies the planning proposal demonstrates that the site can be developed for rural residential purposes, while complying with the relevant objectives and performance criteria of Planning for Bushfire Protection 2019 (most notably the provision of asset protection zones).

The Assessment is based around the concept layout (Figure 2) which shows the site being developed by way of 15 Zone R5 Large Lot Residential lots.

- Wastewater Capability Assessment

A Wastewater Capability Assessment (Appendix 5) accompanies the planning proposal and demonstrates that a minimum lot size of 5,000m² is suitable to accommodate the sustainable application of wastewater (on-site) from future rural residential development.

- Acoustic

The site adjoins the Pacific Highway along its eastern edge.

A noise assessment (Appendix 7) has been prepared to assess traffic noise impacts from the Pacific Highway on the concept subdivision plan. The report finds that that noise mitigation, such as architectural treatment can but used to achieve noise goals, but the treatments depend on the lot, siting of the dwelling, house orientation and materials – all of which are subject to future development applications. At some lots, the report find that noise levels will be low enough to meet the acoustic requirements with the provision of mechanical ventilation or building siting, while dwellings on other lots will require acoustic design.

- Contaminated Land

A Detailed Environmental Site Assessment (DESA) was completed by Earth Water Consulting in 2024 (Appendix 9). The investigation reviewed the site history, developed a Conceptual Site Model and Contaminants of Concern, prepared a sampling plan and data quality objectives, and characterised the contamination status of the Site. The DESA identified potential contamination from several sources, including two stockpiles of wood and wire left over from fence removal (aesthetic), a ~6m³ stockpile of imported roadbase gravel and bitumen, and a farm shed with stored chemical and petroleum drums at the time of assessment.

The investigation concluded that, except for the small shed hotspot the Site was considered suitable for the proposed residential landuse, and that a Remedial Action Plan would be required to manage the remedial works as a consideration in the assessment of any future development applications (Appendix 9).

- Burial (grave):

The site contains a grave (private burial); however, little is known about the grave other than its location (shown on DP258697).

Disturbance of the grave may require approval under the *Public Health Regulation 2022* and the *Heritage Act 1977*.

The existence of the grave is not an impediment to the planning proposal proceeding; it will likely require further consideration in the design, and assessment of, any future development on the site.

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

Yes; the planning proposal is not likely to result in any adverse social or economic effects. Social benefits include a likely minor increase in housing stock in the Boambee locality which may have flow on benefits to the public school and local community activities. Economic benefits include the likely construction of further dwellings on the site, and minor flow on benefits to local businesses.

Section D – State and Commonwealth interests

12. Is there adequate public infrastructure for the planning proposal?

Yes; the planning proposal is unlikely to create significant additional demand on existing public infrastructure. The planning proposal will potentially allow for a maximum 15 Zone R5 Large Lot Residential lots on the site; having regard to the site's existing R5 Large Lot Residential zoning and its existing 1-hectare minimum lot size, the proposal is not likely to significantly impact public infrastructure.

Development of the site for R5 Large Lot Residential purposes will likely result in a road being constructed to provide access to and from the site via Lindsays Road in the site's north-western portion; the scope of road works in this location will be determined at the development application stage.

Reticulated power and telecommunications are also available to the site.

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

The NSW Department of Planning, Housing and Infrastructure issued a Gateway Determination for the planning proposal on 23 August 2024 (Appendix 13). The Gateway Determination requires consultation on the planning proposal with the following Government Agencies:

- NSW Rural Fire Service);
- NSW Biodiversity Conservation and Science; and
- NSW Department of Primary Industries and Regional Development – Fisheries.

Each public authority is to be provided with a copy of the planning proposal and any relevant supporting material via the NSW Planning Portal and given at least 30 working days to comment on the proposal.

PART 4 – MAPS

Proposed maps amendments to Coffs Harbour LEP 2013, as described in Part 2 of this Planning Proposal, are shown below.

Note: The Land Zoning Maps are based on the State cadastre, while the Lot Size Maps and Natural Resource Sensitivity (Biodiversity) Maps are based on the City of Coffs Harbour cadastre. Any discrepancies between the mapping layers from each cadastre can be attributed to the different cadastres relied upon.

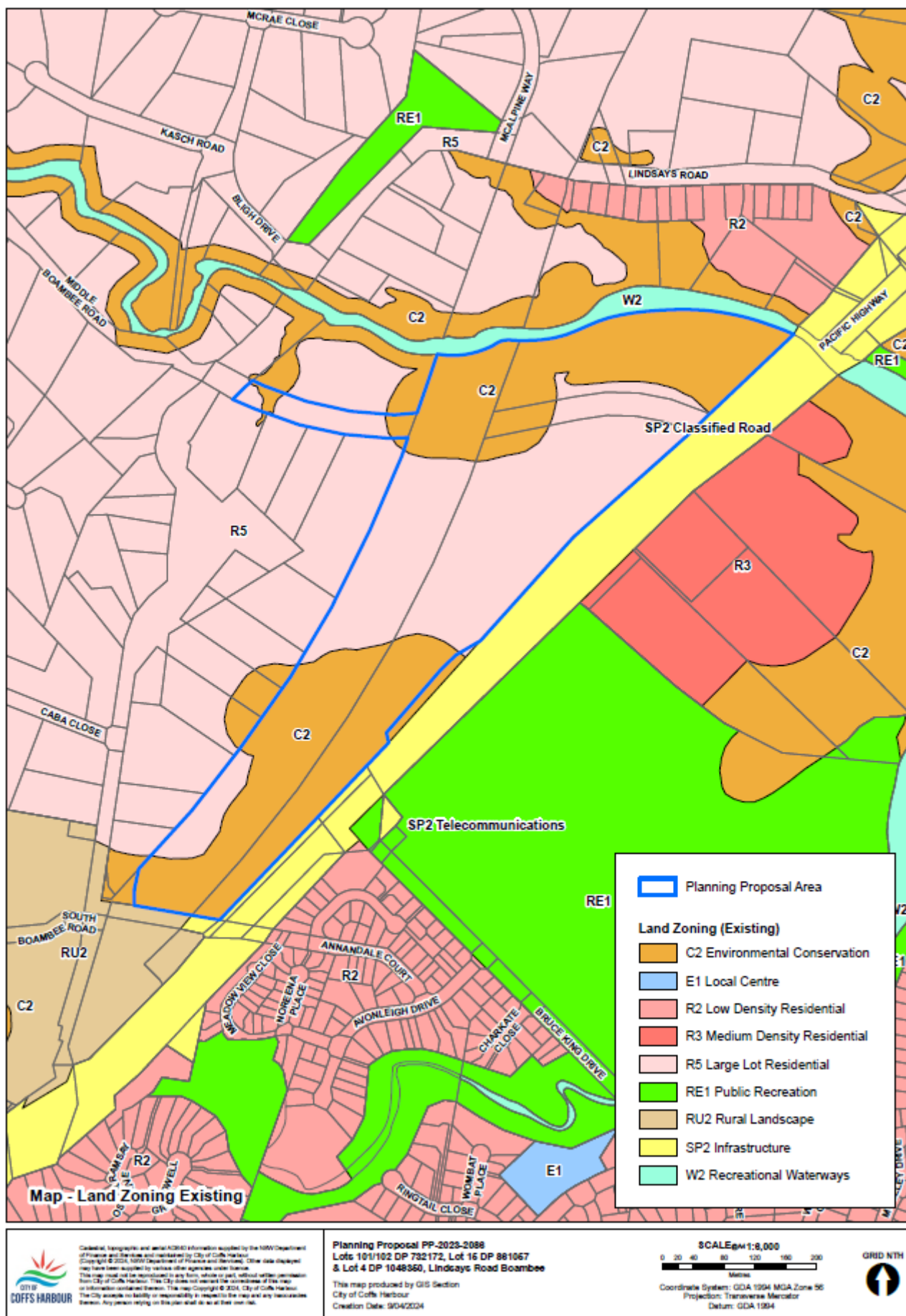


Figure 3: Existing Land Zoning Map

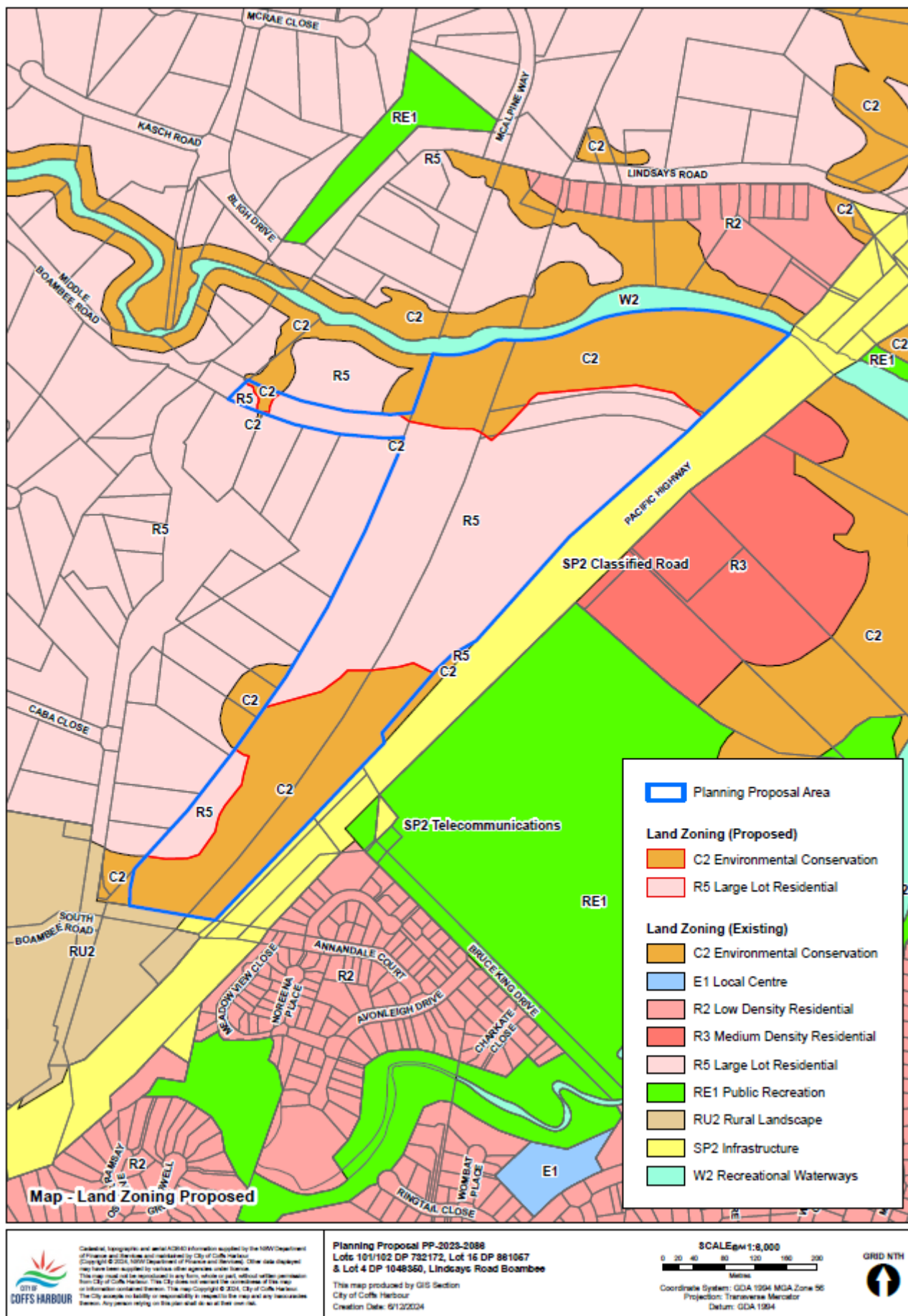


Figure 4: Proposed Land Zoning Map (LEP 2013).

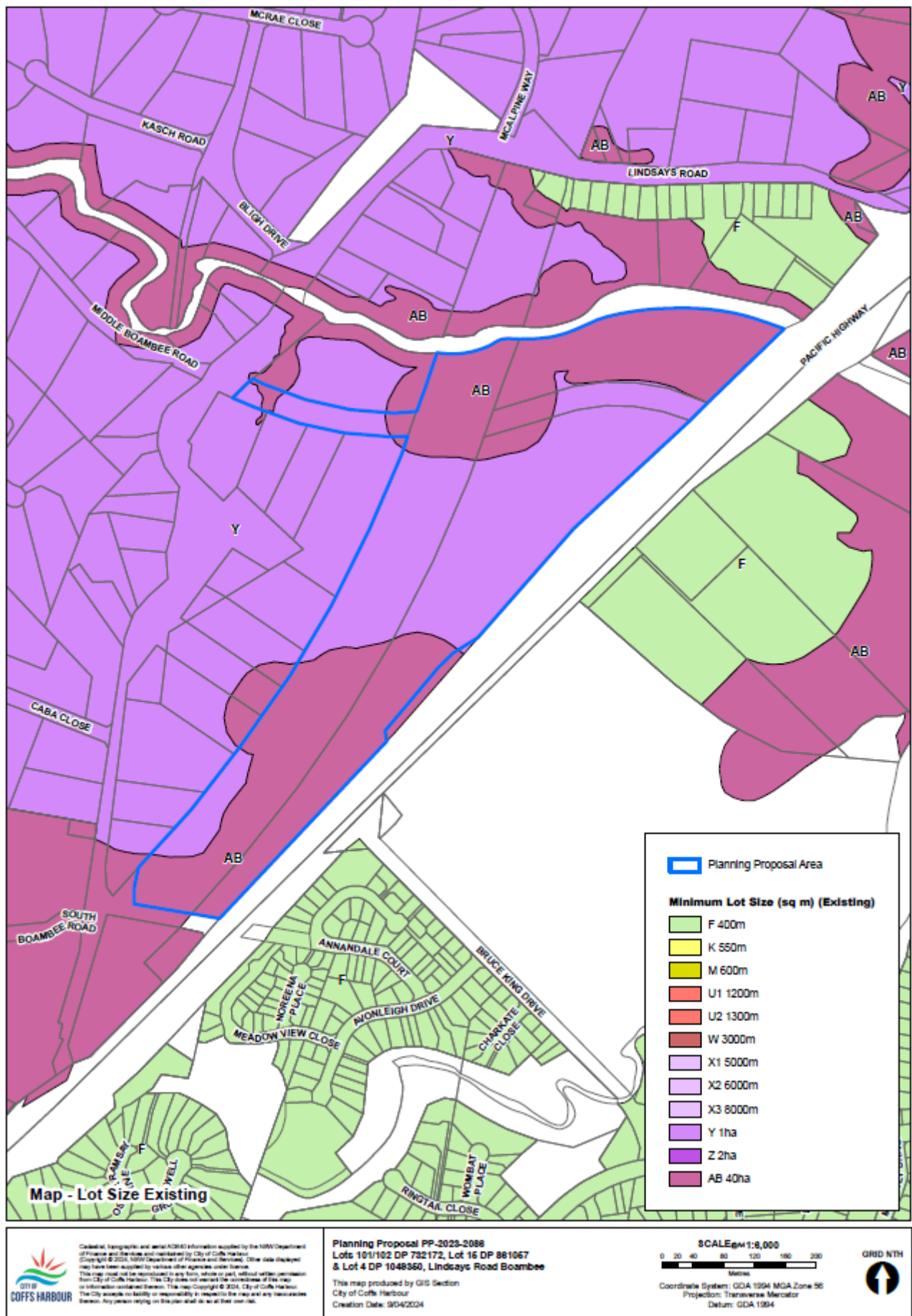


Figure 5: Existing Minimum Lot Size Map (LEP 2013)

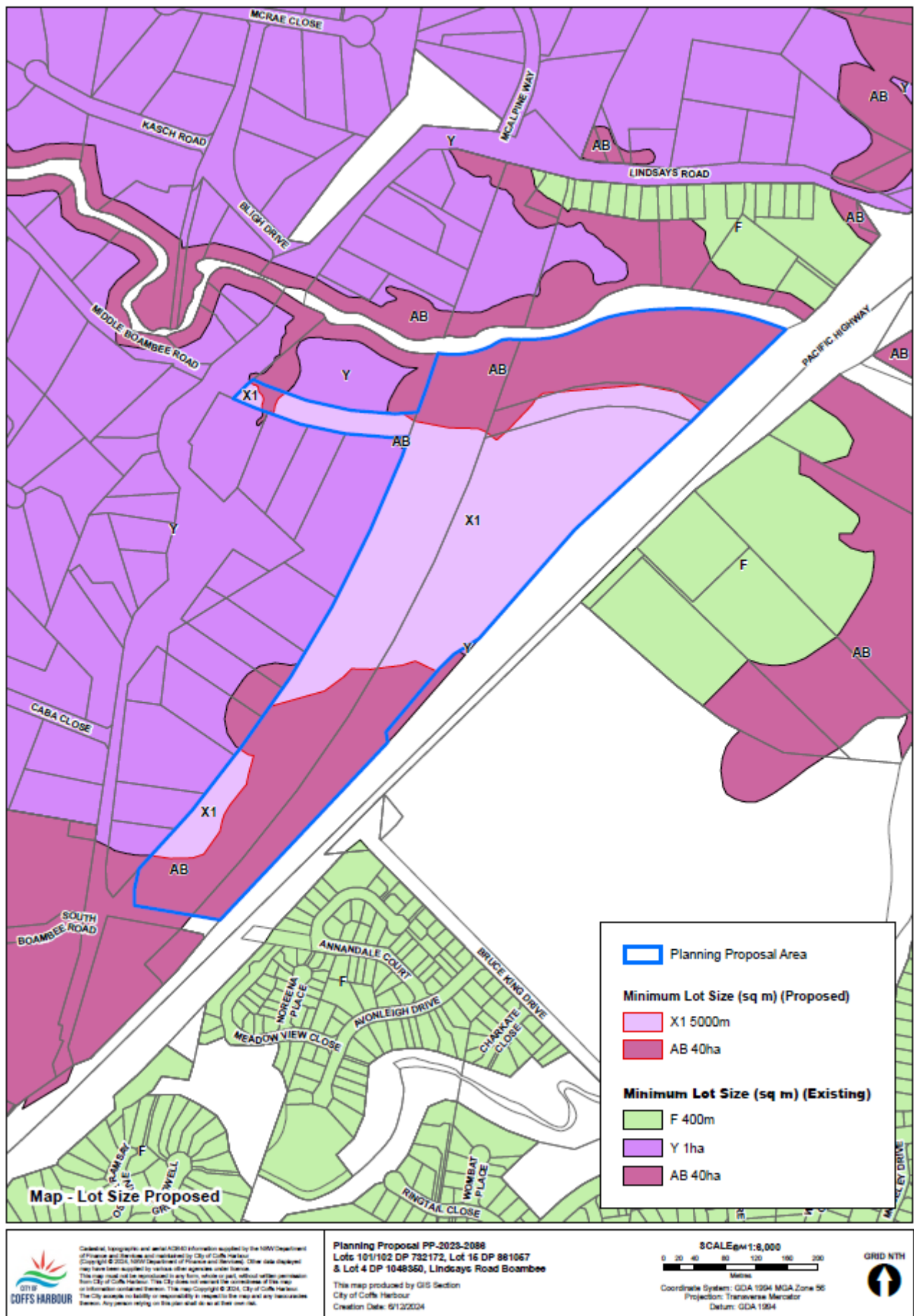


Figure 6: Proposed Minimum Lot Size Map (LEP 2013)

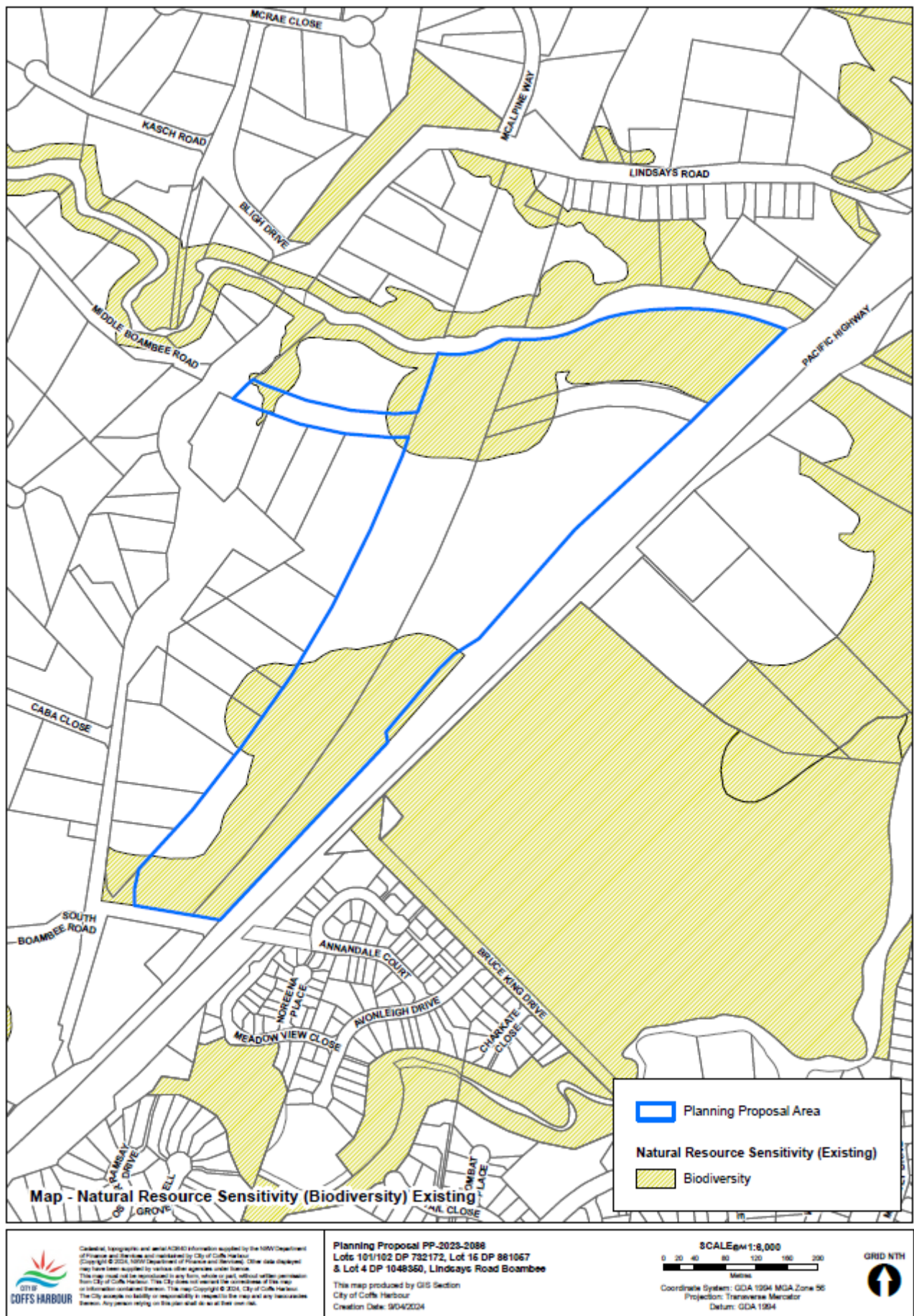


Figure 7: Existing Natural Resource Sensitivity (Biodiversity) Map (LEP 2013)

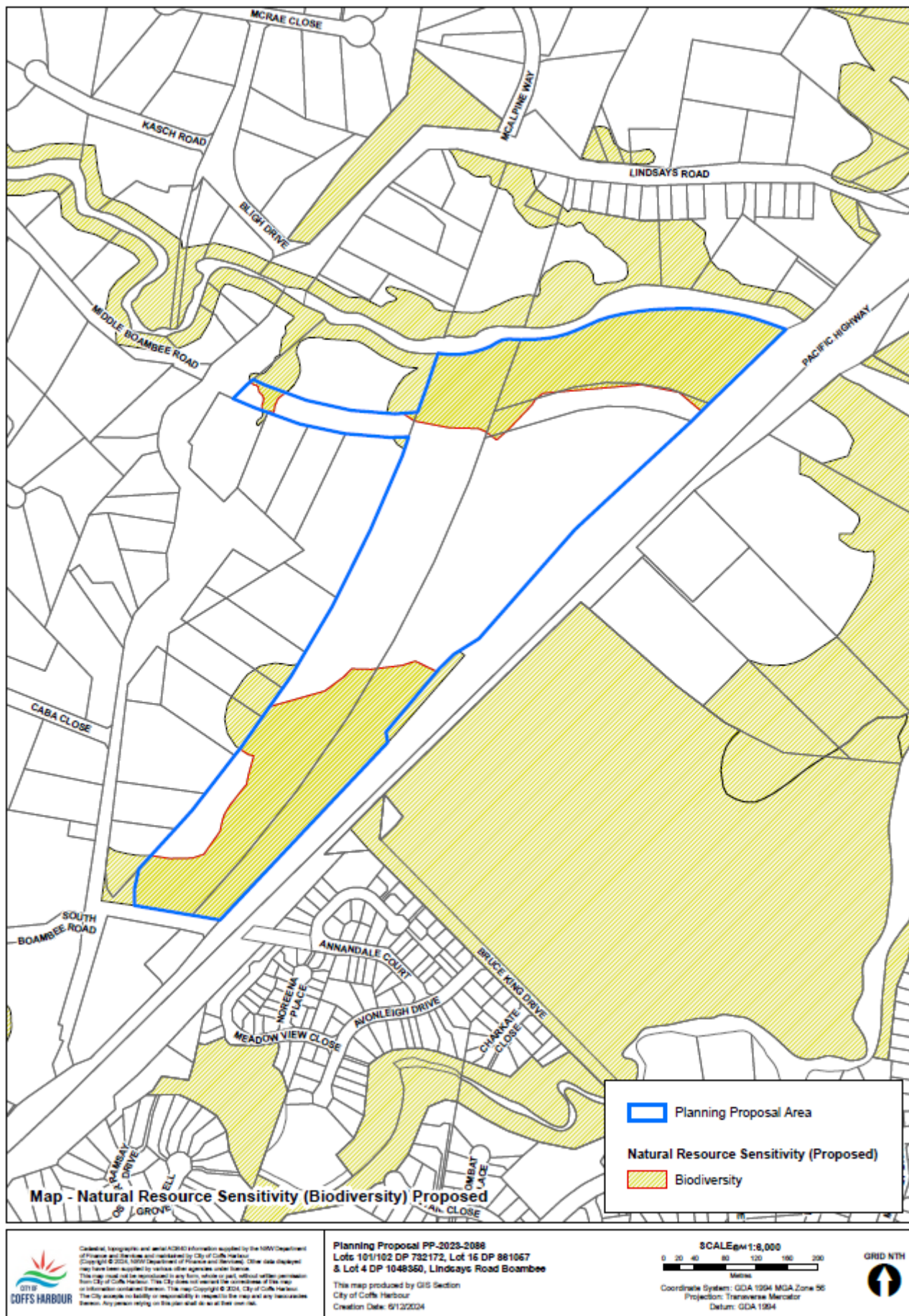


Figure 8: Proposed Natural Resource Sensitivity (Biodiversity) Map (LEP 2013)

PART 5 – COMMUNITY CONSULTATION

The Gateway determination issued by the NSW Department of Planning, Housing and Infrastructure on the 22 August 2024, specified that the planning proposal should be made available for community consultation for a minimum of 20 working days. The City considers that the planning proposal should be exhibited for calendar 28 days, given that it is not a principal LEP and does not seek to reclassify public land.

Public Exhibition of the planning proposal will include the following:

Advertisement

Placement of an online advertisement in the Coffs Newsroom.

Consultation with affected owners and adjoining landowners

Written notification of the public exhibition to the proponent, the landowner and adjoining/adjacent landowners.

Website

The planning proposal will be made publicly available on the City's Have Your Say Website at: <https://haveyoursay.coffsharbour.nsw.gov.au/>

Note: Following public exhibition, this section of the planning proposal will be updated to include details of the community consultation.

PART 6 –PROJECT TIMELINE

A project timeline is yet to be determined however the anticipated timeframes are provided below in Table 2, noting that the Gateway Determination issued by the NSW Department of Planning, Housing and Infrastructure will specify the date that the planning proposal is to be completed.

Table 2: Anticipated Timeline

Milestone	Anticipated Timeframe
Consideration by Council	July 2024
Commencement (date of Gateway determination)	August 2024
Pre-exhibition & agency consultation	December 2024 – February 2025
Consideration of submissions	February 2025
Post-Exhibition review and additional studies	February – March 2025
Reporting to Council for consideration	March – April 2025
Submission to Minister to make the plan (if not delegated) Submission to Minister for notification of the plan (if delegated)	May 2025
Gazettal of LEP Amendment	May 2025

APPENDIX 1 - CONSIDERATION OF STATE ENVIRONMENTAL PLANNING POLICIES

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
State Environmental Planning Policy (Biodiversity and Conservation) 2021	Chapter 2 - Vegetation in Non-Rural Areas	No	N/A	The aims of this chapter of the Policy are: a) to protect the biodiversity values of trees and other vegetation in non-rural areas of the State, and b) to preserve the amenity of non-rural areas of the State through the preservation of trees and other vegetation. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 3 - Koala Habitat Protection 2020	No	N/A	The aims of this chapter of the Policy are 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: a) by requiring the preparation of plans of management before development consent can be granted in relation to areas of core koala habitat, and b) by encouraging the identification of areas of core koala habitat, and c) by encouraging the inclusion of areas of core koala habitat in environment protection zones. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 4 - Koala Habitat Protection 2021	Yes	Yes	The aims of this chapter of the Policy are to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline. The site contains Primary Secondary Koala Habitat identified by Coffs Harbour City Koala Plan of Management 1999. The Primary and Secondary Koala Habitat at the north of the site is fully contained within the C2 Environmental Conservation Zoned area along the northern boundary and Primary Koala Habitat along the

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				southern boundaries of the site is predominantly within the C2 Environmental Conservation Zone and partially within the southern portion of R5 Large Lot Residential Zone land. Neither the Primary nor Secondary Koala Habitat areas are proposed to be reduced in area by the proposed LEP amendment. Any tree removal proposed for future development shall be assessed in accordance with the Coffs Harbour Development Control Plan 2015. As such, the proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 6 – Bushland in Urban Areas	N/A	N/A	The City of Coffs Harbour is not listed in Schedule 1 of this policy and thus the policy does not apply to the Coffs Harbour LGA at this point in time.
	Chapter 7 – Canal Estate Development	No	N/A	The aims of this chapter of the Policy are to prohibit canal estate development as described in this Policy in order to ensure that the environment is not adversely affected by the creation of new developments of this kind. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
SEPP (Exempt and Complying Development Codes) 2008	N/A – this is a standalone State Environmental Planning Policy	No	N/A	This Policy aims to provide streamlined assessment processes for development that complies with specified development standards by: a) providing exempt and complying development codes that have State-wide application, and b) identifying, in the exempt development codes, types of development that are of minimal environmental impact that may be carried out without the need for development consent, and c) identifying, in the complying development codes, types of complying development that may be carried out in accordance with a complying development certificate as defined in the Act, and d) enabling the progressive extension of the types of development in this Policy, and

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				e) providing transitional arrangements for the introduction of the State-wide codes, including the amendment of other environmental planning instruments. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this SEPP.
State Environmental Planning Policy (Housing) 2021	N/A – this is a standalone State Environmental Planning Policy	No	N/A	The principles of this Policy are: a) enabling the development of diverse housing types, including purpose-built rental housing, b) encouraging the development of housing that will meet the needs of more vulnerable members of the community, including very low to moderate income households, seniors and people with a disability, c) ensuring new housing development provides residents with a reasonable level of amenity, promoting the planning and delivery of housing in locations where it will make good use of existing and planned infrastructure and services, d) minimising adverse climate and environmental impacts of new housing development, e) reinforcing the importance of designing housing in a way that reflects and enhances its locality, f) supporting short-term rental accommodation as a home-sharing activity and contributor to local economies, while managing the social and environmental impacts from this use, g) mitigating the loss of existing affordable rental housing. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this SEPP.
State Environmental Planning Policy (Industry and Employment) 2021	Chapter 3 - Advertising and Signage	No	N/A	This aims of this chapter of the Policy are: a) to ensure that signage (including advertising): (i) is compatible with the desired amenity and visual character of an area, and (ii) provides effective communication in suitable locations, and (iii) is of high quality design and finish, and b) to regulate signage (but not content) under Part 4 of the Act, and

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				c) to provide time-limited consents for the display of certain advertisements, and d) to regulate the display of advertisements in transport corridors, and e) to ensure that public benefits may be derived from advertising in and adjacent to transport corridors. This Policy does not regulate the content of signage and does not require consent for a change in the content of signage. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
State Environmental Planning Policy (Planning Systems) 2021.	Chapter 2 -State and Regional Development	No	N/A	The aims of this chapter of the Policy are: a) to identify development that is State significant development, b) to identify development that is State significant infrastructure and critical State significant infrastructure, c) to identify development that is regionally significant development. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 3 - Aboriginal Land	N/A	N/A	This chapter of the SEPP only applies to the Central Coast LGA at this point in time.
	Chapter 4 - Concurrences and Consents	No	N/A	The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
State Environmental Planning Policy (Precincts—Central River City) 2021	Chapter 6 -Urban Renewal	No	N/A	The aims of this chapter of the Policy are to: a) to establish the process for assessing and identifying sites as urban renewal precincts, b) to facilitate the orderly and economic development and redevelopment of sites in and around urban renewal precincts, c) to facilitate delivery of the objectives of any applicable government State, regional or metropolitan strategies connected with the renewal of urban areas that are accessible by public transport. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
State Environmental Planning Policy (Precincts—Eastern Harbour City) 2021	Chapter 2 -State Significant Precincts	No	N/A	The aims of this chapter of the Policy are to: a) to facilitate the development, redevelopment or protection of important urban, coastal and regional sites of economic, environmental or social significance to the State so as to facilitate the orderly use, development or conservation of those State significant precincts for the benefit of the State, b) to facilitate service delivery outcomes for a range of public services and to provide for the development of major sites for a public purpose or redevelopment of major sites no longer appropriate or suitable for public purposes The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
State Environmental Planning Policy (Primary Production) 2021	Chapter 2 - Primary Production and Rural Development	No	N/A	The aims of this chapter of the Policy are to: a) to facilitate the orderly economic use and development of lands for primary production, b) to reduce land use conflict and sterilisation of rural land by balancing primary production, residential development and the protection of native vegetation, biodiversity and water resources, c) to identify State significant agricultural land for the purpose of ensuring the ongoing viability of agriculture on that land, having regard to social, economic and environmental considerations, d) to simplify the regulatory process for smaller-scale low risk artificial waterbodies, and routine maintenance of artificial water supply or drainage, in irrigation areas and districts, and for routine and emergency work in irrigation areas and districts, e) to encourage sustainable agriculture, including sustainable aquaculture, f) to require consideration of the effects of all proposed development in the State on oyster aquaculture, g) to identify aquaculture that is to be treated as designated development

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				using a well-defined and concise development assessment regime based on environment risks associated with site and operational factors. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
State Environmental Planning Policy (Resilience and Hazards) 2021	Chapter 2 - Coastal Management	No	N/A	The aim of this chapter of the Policy is to promote an integrated and co-ordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the Coastal Management Act 2016, including the management objectives for each coastal management area, by: a) managing development in the coastal zone and protecting the environmental assets of the coast, and b) establishing a framework for land use planning to guide decision-making in the coastal zone, and c) mapping the 4 coastal management areas that comprise the NSW coastal zone for the purpose of the definitions in the Coastal Management Act 2016. Appendix 12 provides an assessment against NSW Coastal Design Guidelines 2023 Appendix 1: Assessment checklist for planning proposals. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 3 – Hazardous and Offensive Development	No	N/A	The aims of this chapter of the Policy are: a) to amend the definitions of hazardous and offensive industries where used in environmental planning instruments, and b) to render ineffective a provision of any environmental planning instrument that prohibits development for the purpose of a storage facility on the ground that the facility is hazardous or offensive if it is not a hazardous or offensive storage establishment as defined in this Policy, and c) to require development consent for hazardous or offensive development proposed to be carried out in the Western Division, and

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				d) to ensure that in determining whether a development is a hazardous or offensive industry, any measures proposed to be employed to reduce the impact of the development are taken into account, and e) to ensure that in considering any application to carry out potentially hazardous or offensive development, the consent authority has sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise any adverse impact, and f) to require the advertising of applications to carry out any such development. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 4 – Remediation of Land	No	N/A	The aims of this chapter of the Policy are to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment— a) by specifying when consent is required, and when it is not required, for a remediation work, and b) by specifying certain considerations that are relevant in rezoning land and in determining development applications in general and development applications for consent to carry out a remediation work in particular, and c) by requiring that a remediation work meet certain standards and notification requirements. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
State Environmental Planning Policy (Resources and Energy) 2021	Chapter 2 - Mining, Petroleum Production and Extractive Industries	No	N/A	The aims of this chapter of the Policy are, in recognition of the importance to New South Wales of mining, petroleum production and extractive industries: a) to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				promoting the social and economic welfare of the State, and b) to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and b1) to promote the development of significant mineral resources, and c) to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources, and d) to establish a gateway assessment process for certain mining and petroleum (oil and gas) development: (i) to recognise the importance of agricultural resources, and (ii) to ensure protection of strategic agricultural land and water resources, and (iii) to ensure a balanced use of land by potentially competing industries, and (iv) to provide for the sustainable growth of mining, petroleum and agricultural industries. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
State Environmental Planning Policy (Sustainable Buildings) 2022	Chapter 2 - Standards for residential development - BASIX	No	N/A	The aims of this SEPP are to encourage the design and delivery of sustainable buildings that minimise energy and water use. The proposed LEP amendment does not contain provisions that contradict or hinder the application of Chapter 2 of the SEPP.
	Chapter 3 - Standards for non-residential development	No	N/A	The aims of this SEPP are to encourage the design and delivery of sustainable buildings that minimise energy and water use. The proposed LEP amendment does not contain provisions that contradict or hinder the application of Chapter 3 of the SEPP.

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
State Environmental Planning Policy (Transport and Infrastructure) 2021	Chapter 2 - Infrastructure	No	N/A	The aim of this chapter of the Policy is to facilitate the effective delivery of infrastructure across the State by: a) improving regulatory certainty and efficiency through a consistent planning regime for infrastructure and the provision of services, and b) providing greater flexibility in the location of infrastructure and service facilities, and c) allowing for the efficient development, redevelopment or disposal of surplus government owned land, and d) identifying the environmental assessment category into which different types of infrastructure and services development fall (including identifying certain development of minimal environmental impact as exempt development), and e) identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure development, and f) providing for consultation with relevant public authorities about certain development during the assessment process or prior to development commencing, and g) providing opportunities for infrastructure to demonstrate good design outcomes. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 3 - Educational Establishments and Child Care Facilities	No	N/A	The aim of this chapter of the Policy is to facilitate the effective delivery of educational establishments and early education and care facilities across the State by: a) improving regulatory certainty and efficiency through a consistent planning regime for educational establishments and early education and care facilities, and b) simplifying and standardising planning approval pathways for educational establishments and early education and care facilities (including identifying certain development of

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				minimal environmental impact as exempt development), and c) establishing consistent State-wide assessment requirements and design considerations for educational establishments and early education and care facilities to improve the quality of infrastructure delivered and to minimise impacts on surrounding areas, and d) allowing for the efficient development, redevelopment or use of surplus government-owned land (including providing for consultation with communities regarding educational establishments in their local area), and e) providing for consultation with relevant public authorities about certain development during the assessment process or prior to development commencing, and f) aligning the NSW planning framework with the National Quality Framework that regulates early education and care services, and g) ensuring that proponents of new developments or modified premises meet the applicable requirements of the National Quality Framework for early education and care services, and of the corresponding regime for State regulated education and care services, as part of the planning approval and development process, and h) encouraging proponents of new developments or modified premises and consent authorities to facilitate the joint and shared use of the facilities of educational establishments with the community through appropriate design. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 4 – Major Infrastructure Corridors	No	N/A	The aims of this chapter of the Policy are: a) to identify land that is intended to be used in the future as an infrastructure corridor, b) to establish appropriate planning controls for the land for the following purposes— (i) to allow the ongoing use and development of the land until it is

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				needed for the future infrastructure corridor, (ii) to protect the land from development that would adversely impact on or prevent the land from being used as an infrastructure corridor in the future. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.

APPENDIX 2 – CONSIDERATION OF MINISTERIAL PLANNING DIRECTIONS

S9.1 Direction	Applicable	Consistent	Comment
Focus area 1: Planning Systems			
1.1 Implementation of Regional Plans	This direction applies to a relevant planning authority when preparing a planning proposal for land to which a Regional Plan has been released by the Minister for Planning and Public Spaces. Planning proposals must be consistent with a Regional Plan released by the Minister for Planning and Public Spaces. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary), that: (a) the extent of inconsistency with the Regional Plan is of minor significance, and (b) the planning proposal achieves the overall intent of the Regional Plan and does not undermine the achievement of the Regional Plan’s vision, land use strategy, goals, directions or actions.	Yes	
1.2 Development of Aboriginal Land Council land	This direction does not currently apply to the Coffs Harbour LGA.	N/A	
1.3 Approval and Referral Requirements	This direction applies to all relevant planning authorities when preparing a planning proposal. A planning proposal to which this direction applies must: (a) minimise the inclusion of provisions that require the concurrence, consultation or referral of development applications to a Minister or public authority, and (b) not contain provisions requiring concurrence, consultation or referral of a Minister or public authority unless the relevant planning authority has obtained the approval of: i. the appropriate Minister or public authority, and ii. the Planning Secretary (or an officer of the Department nominated by the Secretary), prior to undertaking community consultation in satisfaction of Schedule 1 to the EP&A Act, and	Yes	The planning proposal does not include provisions that: - require the concurrence, consultation or referral of development applications to a Minister or public authority; - require concurrence, consultation or referral of a Minister or public authority; - identify development as designated development.

Sg.1 Direction	Applicable	Consistent	Comment
	(c) not identify development as designated development unless the relevant planning authority: i. can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the class of development is likely to have a significant impact on the environment, and ii. has obtained the approval of the Planning Secretary (or an officer of the Department nominated by the Secretary) prior to undertaking community consultation in satisfaction of Schedule 1 to the EP&A Act. A planning proposal must be substantially consistent with the terms of this direction.		
1.4 Site Specific Provisions	This direction applies to all relevant planning authorities when preparing a planning proposal that will allow a particular development to be carried out. (1) A planning proposal that will amend another environmental planning instrument in order to allow particular development to be carried out must either: (a) allow that land use to be carried out in the zone the land is situated on, or (b) rezone the site to an existing zone already in the environmental planning instrument that allows that land use without imposing any development standards or requirements in addition to those already contained in that zone, or (c) allow that land use on the relevant land without imposing any development standards or requirements in addition to those already contained in the principal environmental planning instrument being amended. (2) A planning proposal must not contain or refer to drawings that show details of the proposed development. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are of minor significance.	Yes	The planning proposal does not introduce site specific provisions.
Focus area 1: Planning Systems – Place Based			
Directions 1.5 – 1.22 do not apply to the Coffs Harbour LGA.			

Sg.1 Direction	Applicable	Consistent	Comment
Focus area 2: Design and Place			
Directions yet to be included.			
Focus area 3: Biodiversity and Conservation			
3.1 Conservation Zones	This direction applies to all relevant planning authorities when preparing a planning proposal. (1) A planning proposal must include provisions that facilitate the protection and conservation of environmentally sensitive areas. (2) A planning proposal that applies to land within a conservation zone or land otherwise identified for environment conservation/protection purposes in a LEP must not reduce the conservation standards that apply to the land (including by modifying development standards that apply to the land). This requirement does not apply to a change to a development standard for minimum lot size for a dwelling in accordance with Direction 9.3 (2) of “Rural Lands”. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary which: i. gives consideration to the objectives of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study prepared in support of the planning proposal which gives consideration to the objectives of this direction, or (c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan prepared by the Department of Planning, Industry and Environment which gives consideration to the objective of this direction, or (d) is of minor significance.	Yes	The planning proposal will not impact existing provisions in LEP 2013 that protect and conserve environmentally sensitive areas. The planning proposal will reduce the conservation standards that apply to site insofar as it will reduce the area zoned C2 Environmental Conservation and identified as “Biodiversity” on the Terrestrial Biodiversity Map as detailed in Figure 8. The Ecological Assessment (Appendix 3) and Review of impacts on proposed modification of C2 Zone at Lot 101 DP 732172 on Square-stemmed spike-rush <i>Eleocharis tetraquetra</i> (Appendix 4) identifies that the areas to instead be zoned R5 Large Lot Residential are not ecologically significant, and that the reduction in the C2 Environmental Conservation zone will not result in adverse impacts on adjoining areas that are to remain zoned C2 Environmental Conservation. The change to the C2 Environmental Conservation zone and area identified as “Biodiversity” are considered of minor significance.

Sg.1 Direction	Applicable	Consistent	Comment
3.2 Heritage Conservation	This direction applies to all relevant planning authorities when preparing a planning proposal. A planning proposal must contain provisions that facilitate the conservation of: (a) items, places, buildings, works, relics, moveable objects or precincts of environmental heritage significance to an area, in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item, area, object or place, identified in a study of the environmental heritage of the area, (b) Aboriginal objects or Aboriginal places that are protected under the <i>National Parks and Wildlife Act 1974</i>, and (c) Aboriginal areas, Aboriginal objects, Aboriginal places or landscapes identified by an Aboriginal heritage survey prepared by or on behalf of an Aboriginal Land Council, Aboriginal body or public authority and provided to the relevant planning authority, which identifies the area, object, place or landscape as being of heritage significance to Aboriginal culture and people. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that: (a) the environmental or indigenous heritage significance of the item, area, object or place is conserved by existing or draft environmental planning instruments, legislation, or regulations that apply to the land, or (b) the provisions of the planning proposal that are inconsistent are of minor significance.	Yes	The planning proposal will not impact heritage conservation provisions in LEP 2013. The Aboriginal Cultural Heritage (Due Diligence) Assessment (Appendix 8) concluded that that the likelihood that Aboriginal objects are located within the residential development area is restricted to the ridge crest. Specifically portions of the ridge crest which retain original topsoils and have not been subject to stockpiling of fill. As any future ground disturbance arising from the large lot residential subdivision is conditional upon a future Development Application. additional archaeological excavation should be a condition of any future development application. For the purposes of the Planning Proposal, the current assessment has demonstrated that Aboriginal objects/ archaeological sites would not be a significant constraint to the future development of the Study Area as a residential area. Specifically, the known Aboriginal site, inclusive of the historical 'camp', are located on the creek bank and will be set aside as part of the conservation area (C2 Environmental Conservation). The Planning Proposal provides sufficient space to retain and permanently store artefacts and topsoils that contain artefacts, within the Study Area but away from the main residential development. An assessment in accordance with the CoPAI is a technical investigation that requires additional design and engineering studies that would typically be commissioned as part of a Development Application. This includes the comprehensive geotechnical investigations to inform the

Sg.1 Direction	Applicable	Consistent	Comment
			bulk earthworks on the ridge crest, the requirement for and layout of stormwater detention infrastructure and any land management requirements along Middle Boambee Creek, including conservation works in the vicinity of the Middle Boambee 1 archaeological site.
3.3 Sydney Drinking Water Catchments	This direction does not currently apply to the Coffs Harbour LGA.	N/A	
3.4 Application of C2 and C3 Zones and Environmental Overlays in Far North Coast LEPs	This direction does not currently apply to the Coffs Harbour LGA.	N/A	
3.5 Recreation Vehicle Areas	A planning proposal must not enable land to be developed for the purpose of a recreation vehicle area (within the meaning of the <i>Recreation Vehicles Act 1983</i>): (a) where the land is within a conservation zone, (b) where the land comprises a beach or a dune adjacent to or adjoining a beach, (c) where the land is not within an area or zone referred to in paragraphs (a) or (b) unless the relevant planning authority has taken into consideration: i. the provisions of the guidelines entitled <i>Guidelines for the Selection, Establishment and Maintenance of Recreation Vehicle Areas, Soil Conservation Service of NSW, September 1985</i>, and ii. the provisions of the guidelines entitled <i>Recreation Vehicles Act 1983, Guidelines for Selection, Design and Operation of Recreation Vehicle Areas, State Pollution Control Commission, September 1985</i>. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the	Yes	The planning proposal does not involve enabling the site to be used for the purpose of a recreation vehicle area.

S9.1 Direction	Applicable	Consistent	Comment
	provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary which: i. gives consideration to the objective of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study prepared in support of the planning proposal which gives consideration to the objective of this direction, or (c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan prepared by the Department of Planning, Industry and Environment which gives consideration to the objective of this direction, or (d) of minor significance.		
3.6 Strategic Conservation Planning	This direction applies to all relevant planning authorities when preparing a planning proposal that relates to land that, under the State Environmental Planning Policy (Biodiversity and Conservation) 2021, is identified as avoided land or a strategic conservation area.	Yes	The planning proposal does not relate to land identified as avoided land or a strategic conservation area.
3.7 Public Bushland	This direction does not currently apply to the Coffs Harbour LGA.	N/A	
3.8 Willandra Lakes Region	This direction does not currently apply to the Coffs Harbour LGA.	N/A	
3.9 Sydney Harbour Foreshores and Waterways Area	This direction does not currently apply to the Coffs Harbour LGA.	N/A	
3.10 Water Catchment Protection	This direction does not currently apply to the Coffs Harbour LGA.	N/A	
Focus Area 4: Resilience and Hazards			
4.1 Flooding	This direction applies to all relevant planning authorities that are responsible for flood prone land when preparing a planning proposal that	Yes	The planning proposal will not impact existing flood-related provisions in LEP 2013, that give

Sg.1 Direction	Applicable	Consistent	Comment
	creates, removes or alters a zone or a provision that affects flood prone land. (1) A planning proposal must include provisions that give effect to and are consistent with: (a) the NSW Flood Prone Land Policy, (b) the principles of the Floodplain Development Manual 2005, (c) the Considering flooding in land use planning guideline 2021, and (d) any adopted flood study and/or floodplain risk management plan prepared in accordance with the principles of the Floodplain Development Manual 2005 and adopted by the relevant council. (2) A planning proposal must not rezone land within the flood planning area from Recreation, Rural, Special Purpose or Conservation Zones to a Residential, Business, Industrial or Special Purpose Zones. (3) A planning proposal must not contain provisions that apply to the flood planning area which: (a) permit development in floodway areas, (b) permit development that will result in significant flood impacts to other properties, (c) permit development for the purposes of residential accommodation in high hazard areas, (d) permit a significant increase in the development and/or dwelling density of that land, (e) permit development for the purpose of centre-based childcare facilities, hostels, boarding houses, group homes, hospitals, residential care facilities, respite day care centres and seniors housing in areas where the occupants of the development cannot effectively evacuate, (f) permit development to be carried out without development consent except for the purposes of exempt development or agriculture. Dams, drainage canals, levees, still require development consent, (g) are likely to result in a significantly increased requirement for government spending on emergency management services, flood mitigation and emergency response measures, which can include		effect to and are consistent with: - the NSW Flood Prone Land Policy, - the principles of the Floodplain Development Manual 2005, - the Considering flooding in land use planning guideline 2021, and - an adopted flood study and/or floodplain risk management plan or the like. The planning proposal does not rezone land within the flood planning area from a Conservation Zone to a Residential Zone. The planning proposal does not contain provisions that apply to the flood planning area.

Sg.1 Direction	Applicable	Consistent	Comment
	but are not limited to the provision of road infrastructure, flood mitigation infrastructure and utilities, or (h) permit hazardous industries or hazardous storage establishments where hazardous materials cannot be effectively contained during the occurrence of a flood event. (4) A planning proposal must not contain provisions that apply to areas between the flood planning area and probable maximum flood to which Special Flood Considerations apply which: (a) permit development in floodway areas, (b) permit development that will result in significant flood impacts to other properties, (c) permit a significant increase in the dwelling density of that land, (d) permit the development of centre-based childcare facilities, hostels, boarding houses, group homes, hospitals, residential care facilities, respite day care centres and seniors housing in areas where the occupants of the development cannot effectively evacuate, (e) are likely to affect the safe occupation of and efficient evacuation of the lot, or (f) are likely to result in a significantly increased requirement for government spending on emergency management services, and flood mitigation and emergency response measures, which can include but not limited to road infrastructure, flood mitigation infrastructure and utilities. (5) For the purposes of preparing a planning proposal, the flood planning area must be consistent with the principles of the Floodplain Development Manual 2005 or as otherwise determined by a Floodplain Risk Management Study or Plan adopted by the relevant council. A planning proposal may be inconsistent with this direction only if the planning proposal authority can satisfy the Planning Secretary (or their nominee) that: (a) the planning proposal is in accordance with a floodplain risk management study or plan adopted by the relevant council in accordance with the principles and guidelines of the <i>Floodplain Development Manual 2005</i>, or		

Sg.1 Direction	Applicable	Consistent	Comment
	(b) where there is no council adopted floodplain risk management study or plan, the planning proposal is consistent with the flood study adopted by the council prepared in accordance with the principles of the <i>Floodplain Development Manual 2005</i> or (c) the planning proposal is supported by a flood and risk impact assessment accepted by the relevant planning authority and is prepared in accordance with the principles of the <i>Floodplain Development Manual 2005</i> and consistent with the relevant planning authorities' requirements, or (d) the provisions of the planning proposal that are inconsistent are of minor significance as determined by the relevant planning authority.		
4.2 Coastal Management	This direction applies when a planning proposal authority prepares a planning proposal that applies to land that is within the coastal zone, as defined under the <i>Coastal Management Act 2016</i> -comprising the coastal wetlands and littoral rainforests area, coastal vulnerability area, coastal environment area and coastal use area -and as identified by chapter 3 of the <i>State Environmental Planning Policy (Biodiversity and Conservation) 2021</i>. (1) A planning proposal must include provisions that give effect to and are consistent with: (a) the objects of the <i>Coastal Management Act 2016</i> and the objectives of the relevant coastal management areas; (b) the NSW Coastal Management Manual and associated Toolkit; (c) NSW Coastal Design Guidelines 2003; and (d) any relevant Coastal Management Program that has been certified by the Minister, or any Coastal Zone Management Plan under the <i>Coastal Protection Act 1979</i> that continues to have effect under clause 4 of Schedule 3 to the <i>Coastal Management Act 2016</i>, that applies to the land. (2) A planning proposal must not rezone land which would enable increased development or more intensive land-use on land: (a) within a coastal vulnerability area identified by the <i>State Environmental Planning Policy (Resilience and Hazards) 2021</i>; or (b) that has been identified as land affected by a current or future coastal hazard in a local environmental plan or development	Yes	The planning proposal is consistent with: - the objects of the <i>Coastal Management Act 2016</i>; - the NSW Coastal Management Manual and associated Toolkit; section 3.2 of the NSW Coastal Design Guidelines 2023. The planning proposal will not rezone land which would enable increased development or more intensive land-use on land: (a) within a coastal vulnerability area; or (b) that has been identified as land affected by a current or future coastal hazard. The planning proposal will rezone land which would enable increased development or more intensive land-use on land within a coastal wetland. In this regard it seeks to rezone areas identified as "proximity area for coastal wetlands" under the Policy from c2 Environmental Conservation to R5 Large Lot Residential. This is proposed in the in the northern and central parts of the site, where these areas are identified as having limited ecological significance. Additionally, in

Sg.1 Direction	Applicable	Consistent	Comment
	control plan, or a study or assessment undertaken: i. by or on behalf of the relevant planning authority and the planning proposal authority, or ii. by or on behalf of a public authority and provided to the relevant planning authority and the planning proposal authority. (3) A planning proposal must not rezone land which would enable increased development or more intensive land-use on land within a coastal wetlands and littoral rainforests area identified by chapter 3 of the <i>State Environmental Planning Policy (Biodiversity and Conservation) 2021</i>. (4) A planning proposal for a local environmental plan may propose to amend the following maps, including increasing or decreasing the land within these maps, under the <i>State Environmental Planning Policy (Resilience and Hazards) 2021</i>: (a) Coastal wetlands and littoral rainforests area map; (b) Coastal vulnerability area map; (c) Coastal environment area map; and (d) Coastal use area map. Such a planning proposal must be supported by evidence in a relevant Coastal Management Program that has been certified by the Minister, or by a <i>Coastal Zone Management Plan</i> under the <i>Coastal Protection Act 1979</i> that continues to have effect under clause 4 of Schedule 3 to the <i>Coastal Management Act 2016</i>. A planning proposal may be inconsistent with the terms of this direction only if the planning proposal authority can satisfy the Planning Secretary (or their nominee) that the provisions of the planning proposal that are inconsistent are: (a) justified by a study or strategy prepared in support of the planning proposal which gives consideration to the objective of this direction, or (b) in accordance with any relevant Regional Strategic Plan or District Strategic Plan, prepared under Division 3.1 of the EP&A Act by the relevant strategic planning authority, which gives consideration to the objective of this direction, or (c) of minor significance.		both cases, sufficient area (buffer) is present to protect adjacent areas of ecological significance; this has been addressed in the Ecological Assessment (Appendix 3) and Review of impacts on proposed modification of C2 Zone at Lot 101 DP 732172 on Square-stemmed spike-rush <i>Eleocharis tetraquetra</i> (Appendix 4). In both instances, the inconsistency is considered minor. Appendix 12 provides an assessment against NSW Coastal Design Guidelines 2023 Appendix 1: Assessment checklist for planning proposals. The planning proposal does not seek to amend <i>State Environmental Planning Policy (Resilience and Hazards) 2021</i>.

S9.1 Direction	Applicable	Consistent	Comment
4.3 Planning for Bushfire Protection	This direction applies to all local government areas when a relevant planning authority prepares a planning proposal that will affect, or is in proximity to land mapped as bushfire prone land. 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 56 of the Act, and prior to undertaking community consultation in satisfaction of section 57 of the Act, and take into account any comments so made. A planning proposal must: (a) have regard to <i>Planning for Bushfire Protection 2019</i>, (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). 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 <i>Rural Fires Act 1997</i>), the APZ provisions must be complied with, (c) contain provisions for two-way access roads which link to perimeter roads and/or to fire trail networks, (d) contain provisions for adequate water supply for firefighting purposes,	Yes	The Bush Fire Assessment Report demonstrates that: • the planning proposal (and concept layout) have been prepared having regard to <i>Planning for Bushfire Protection 2019</i> and that they do not result in the placement of inappropriate developments in a hazardous area or limit bushfire hazard reduction. • appropriate asset protection zones, access and water supply can be accommodated.

Sg.1 Direction	Applicable	Consistent	Comment
	(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. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the council has obtained written advice from the Commissioner of the NSW Rural Fire Service to the effect that, notwithstanding the non-compliance, the NSW Rural Fire Service does not object to the progression of the planning proposal.		
4.4 Remediation of Contaminated Land	This direction applies when a planning proposal authority prepares a planning proposal that applies to: (a) land that is within an investigation area within the meaning of the <i>Contaminated Land Management Act 1997</i>, (b) land on which development for a purpose referred to in Table 1 to the contaminated land planning guidelines is being, or is known to have been, carried out, (c) the extent to which it is proposed to carry out development on it for residential, educational, recreational or childcare purposes, or for the purposes of a hospital – land: i. in relation to which there is no knowledge (or incomplete knowledge) as to whether development for a purpose referred to in Table 1 to the contaminated land planning guidelines has been carried out, and ii. on which it would have been lawful to carry out such development during any period in respect of which there is no knowledge (or incomplete knowledge). (1) A planning proposal authority must not include in a particular zone (within the meaning of the local environmental plan) any land to which this direction applies if the inclusion of the land in that zone would permit a change of use of the land, unless: (a) the planning proposal authority has considered whether the land is contaminated, and (b) if the land is contaminated, the planning proposal authority is satisfied that the land is suitable in its contaminated state	Yes	A development application to subdivide the site for rural residential purposes has previously considered potential contamination of the site. The document titled The Preliminary Stockpile Contamination Assessment for Lindsays Road, Boambee prepared by Whitehead & Associates Environmental Consultants Pty Ltd, dated May 2016 that accompanied the application identified a stockpile of material deposited on the site from works (dual lane construction) on the adjacent Pacific Highway as containing potentially contaminated material, but ultimately concluded that the stockpile was benign from a chemical contamination perspective and that it might be suitably reused on the site. The Preliminary Stockpile Contamination Assessment for Lindsays Road, Boambee was prepared in accordance with the contaminated land planning guideline, and is included in Appendix 9.

S9.1 Direction	Applicable	Consistent	Comment
	(or will be suitable, after remediation) for all the purposes for which land in the zone concerned is permitted to be used, and (c) if the land requires remediation to be made suitable for any purpose for which land in that zone is permitted to be used, the planning proposal authority is satisfied that the land will be so remediated before the land is used for that purpose. In order to satisfy itself as to paragraph 1(c), the planning proposal authority may need to include certain provisions in the local environmental plan. (2) Before including any land to which this direction applies in a particular zone, the planning proposal authority is to obtain and have regard to a report specifying the findings of a preliminary investigation of the land carried out in accordance with the contaminated land planning guidelines.		
4.5 Acid Sulfate Soils	This direction applies to all relevant planning authorities that are responsible for land having a probability of containing acid sulfate soils when preparing a planning proposal that will apply to land having a probability of containing acid sulfate soils as shown on the Acid Sulfate Soils Planning Maps held by the Department of Planning, Industry and Environment. (1) The relevant planning authority must consider the Acid Sulfate Soils Planning Guidelines adopted by the Planning Secretary when preparing a planning proposal that applies to any land identified on the Acid Sulfate Soils Planning Maps as having a probability of acid sulfate soils being present. (2) When a relevant planning authority is preparing a planning proposal to introduce provisions to regulate works in acid sulfate soils, those provisions must be consistent with: (a) the Acid Sulfate Soils Model LEP in the Acid Sulfate Soils Planning Guidelines adopted by the Planning Secretary, or (b) other such provisions provided by the Planning Secretary that are consistent with the Acid Sulfate Soils Planning Guidelines. (3) A relevant planning authority must not prepare a planning proposal that proposes an intensification of land uses on land identified as having a probability of containing acid sulfate soils on the Acid	Yes	The majority of the site is mapped as Classes 3-5 on the Acid Sulfate Soils Map of LEP 2013. The low-lying area along Boambee Creek is mapped as Class 1. While the planning proposal involves an intensification of use by virtue of a reduction in the minimum lot size (and a slight increase in land zoned R5 Large Lot Residential), it does not involve any notable change to permitted land use (the majority of the site already zoned R5 Large Lot Residential). The potential disturbance and treatment of acid sulfate soils can be considered further at the development application stage, when specific works are proposed; notably the site has been approved for further (rural residential) subdivision.

Sg.1 Direction	Applicable	Consistent	Comment
	Sulfate Soils Planning Maps unless the relevant planning authority has considered an acid sulfate soils study assessing the appropriateness of the change of land use given the presence of acid sulfate soils. The relevant planning authority must provide a copy of any such study to the Planning Secretary prior to undertaking community consultation in satisfaction of clause 4 of Schedule 1 to the Act. (4) Where provisions referred to under 2(a) and 2(b) above of this direction have not been introduced and the relevant planning authority is preparing a planning proposal that proposes an intensification of land uses on land identified as having a probability of acid sulfate soils on the Acid Sulfate Soils Planning Maps, the planning proposal must contain provisions consistent with 2(a) and 2(b). A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are: (a) justified by a study prepared in support of the planning proposal which gives consideration to the objective of this direction, or (b) of minor significance.		
4.6 Mine Subsidence and Unstable Land	This direction applies when a relevant planning authority prepares a planning proposal that permits development on land that is within a declared mine subsidence district in the Coal Mine Subsidence Compensation Regulation 2017 pursuant to section 20 of the Coal Mine Subsidence Compensation Act 2017, or has been identified as unstable in a study, strategy or other assessment undertaken by or on behalf of the relevant planning authority or by or on behalf of a public authority and provided to the relevant planning authority. (1) When preparing a planning proposal that would permit development on land that is within a declared mine subsidence district, a relevant planning authority must: (a) consult Subsidence Advisory NSW to ascertain: i. if Subsidence Advisory NSW has any objection to the draft local environmental plan, and the reason for such an objection, and	Yes	The site is not identified as being within a declared mine subsidence district.

S9.1 Direction	Applicable	Consistent	Comment
	ii. the scale, density and type of development that is appropriate for the potential level of subsidence, and (b) incorporate provisions into the draft Local Environmental Plan that are consistent with the recommended scale, density and type of development recommended under 1(a)(ii), and (c) include a copy of any information received from Subsidence Advisory NSW with the statement to the Planning Secretary (or an officer of the Department nominated by the Secretary prior to undertaking community consultation in satisfaction of Schedule 1 to the Act. (2) A planning proposal must not permit development on land that has been identified as unstable as referred to in the application section of this direction. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary which: i. gives consideration to the objective of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study prepared in support of the planning proposal which gives consideration to the objective of this direction, or (c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan prepared by the Department of Planning, Industry and Environment which gives consideration to the objective of this direction, or (d) of minor significance.		
Focus Area 5: Transport and Infrastructure			
5.1 Integrating Land Use and Transport	This direction applies to all relevant planning authorities when preparing a planning proposal that will create, alter or remove a zone or a provision relating to urban land,	Yes	The planning proposal shall alter a provision relating to land zoned for residential purposes by reducing the applicable minimum lot size (and slightly

Sg.1 Direction	Applicable	Consistent	Comment
	including land zoned for residential, business, industrial, village or tourist purposes. (1) A planning proposal must locate zones for urban purposes and include provisions that give effect to and are consistent with the aims, objectives and principles of: (a) Improving Transport Choice – Guidelines for planning and development (DUAP 2001), and (b) The Right Place for Business and Services – Planning Policy (DUAP 2001). A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary which: i. gives consideration to the objective of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study prepared in support of the planning proposal which gives consideration to the objective of this direction, or (c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan prepared by the Department of Planning, Industry and Environment which gives consideration to the objective of this direction, or (d) of minor significance.		increasing the extent of the R5 Large Lot Residential zone). The planning proposal is consistent with the Improving Transport Choice – Guidelines for planning and development (DUAP 2001), and The Right Place for Business and Services – Planning Policy (DUAP 2001). The planning proposal is deemed to be of minor significance as it accords with the City's Local Growth Management Strategy, and will not result in a substantial increase of movement due to the potential for a modest increase in lots on the site.
5.2 Reserving Land for Public Purposes	This direction applies to all relevant planning authorities when preparing a planning proposal. (1) A planning proposal must not create, alter or reduce existing zonings or reservations of land for public purposes without the approval of the relevant public authority and the Planning Secretary (or an officer of the Department nominated by the Secretary). (2) When a Minister or public authority requests a relevant planning authority to reserve land for a public purpose in a planning proposal and the land would be required to be acquired under Division 3 of Part 2 of the Land Acquisition (Just Terms	Yes	The planning proposal does not create, alter or reduce existing zonings or reservations of land for public purposes.

Sg.1 Direction	Applicable	Consistent	Comment
	Compensation) Act 1991, the relevant planning authority must: (a) reserve the land in accordance with the request, and (b) include the land in a zone appropriate to its intended future use or a zone advised by the Planning Secretary (or an officer of the Department nominated by the Secretary), and (c) identify the relevant acquiring authority for the land. (3) When a Minister or public authority requests a relevant planning authority to include provisions in a planning proposal relating to the use of any land reserved for a public purpose before that land is acquired, the relevant planning authority must: (a) include the requested provisions, or (b) take such other action as advised by the Planning Secretary (or an officer of the Department nominated by the Secretary) with respect to the use of the land before it is acquired. (4) When a Minister or public authority requests a relevant planning authority to include provisions in a planning proposal to rezone and/or remove a reservation of any land that is reserved for public purposes because the land is no longer designated by that public authority for acquisition, the relevant planning authority must rezone and/or remove the relevant reservation in accordance with the request. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that: (a) with respect to a request referred to in paragraph (4), further information is required before appropriate planning controls for the land can be determined, or (b) the provisions of the planning proposal that are inconsistent with the terms of this direction are of minor significance.		
5.3 Development Near Regulated Airports and Defence Airfields	This direction applies to all relevant planning authorities when preparing a planning proposal that will create, alter or remove a zone or a provision relating to land near a regulated airport which includes a defence airfield. (1) In the preparation of a planning proposal that sets controls for development of land	Yes	The site is not located near a regulated airport which includes a defence airfield.

Sg.1 Direction	Applicable	Consistent	Comment
	near a regulated airport, the relevant planning authority must: (a) consult with the lessee/operator of that airport; (b) take into consideration the operational airspace and any advice from the lessee/operator of that airport; (c) for land affected by the operational airspace, prepare appropriate development standards, such as height controls. (d) not allow development types that are incompatible with the current and future operation of that airport. (2) In the preparation of a planning proposal that sets controls for development of land near a core regulated airport, the relevant planning authority must: (a) consult with the Department of the Commonwealth responsible for airports and the lessee/operator of that airport; (b) for land affected by the prescribed airspace (as defined in clause 6(1) of the <i>Airports (Protection of Airspace) Regulation 1996</i>, prepare appropriate development standards, such as height controls. (c) not allow development types that are incompatible with the current and future operation of that airport. (d) obtain permission from that Department of the Commonwealth, or their delegate, where a planning proposal seeks to allow, as permissible with consent, development that would constitute a controlled activity as defined in section 182 of the <i>Airports Act 1996</i>. This permission must be obtained prior to undertaking community consultation in satisfaction of Schedule 1 to the EP&A Act. (3) In the preparation of a planning proposal that sets controls for the development of land near a defence airfield, the relevant planning authority must: (a) consult with the Department of Defence if: i. the planning proposal seeks to exceed the height provisions contained in the <i>Defence Regulations 2016 – Defence Aviation Areas</i> for that airfield; or ii. no height provisions exist in the <i>Defence Regulations 2016 – Defence</i>		

S9.1 Direction	Applicable	Consistent	Comment
	<i>Aviation Areas</i> for the airfield and the proposal is within 15km of the airfield. (b) for land affected by the operational airspace, prepare appropriate development standards, such as height controls. (c) not allow development types that are incompatible with the current and future operation of that airfield. (4) A planning proposal must include a provision to ensure that development meets <i>Australian Standard 2021 – 2015, Acoustic-Aircraft Noise Intrusion – Building siting and construction</i> with respect to interior noise levels, if the proposal seeks to rezone land: (a) for residential purposes or to increase residential densities in areas where the Australian Noise Exposure Forecast (ANEF) is between 20 and 25; or (b) for hotels, motels, offices or public buildings where the ANEF is between 25 and 30; or (c) for commercial or industrial purposes where the ANEF is above 30. (5) A planning proposal must not contain provisions for residential development or to increase residential densities within the 20 Australian Noise Exposure Concept (ANEC)/ANEF contour for Western Sydney Airport. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary, which: - gives consideration to the objectives of this direction; and - identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study prepared in support of the planning proposal which gives consideration to the objectives of this direction; or (c) in accordance with the relevant Regional Plan prepared by the Department of Planning, Industry and Environment and		

S9.1 Direction	Applicable	Consistent	Comment
	Environment which gives consideration to the objectives of this direction.		
5.4 Shooting Ranges	This direction applies to all relevant planning authorities when preparing a planning proposal that will affect, create, alter or remove a zone or a provision relating to land adjacent to and/ or adjoining an existing shooting range. (1) A planning proposal must not seek to rezone land adjacent to and/ or adjoining an existing shooting range that has the effect of: (a) permitting more intensive land uses than those which are permitted under the existing zone; or (b) permitting land uses that are incompatible with the noise emitted by the existing shooting range. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary, which: i. gives consideration to the objectives of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study prepared in support of the planning proposal which gives consideration to the objective of this direction, or (c) is of minor significance.	Yes	The site is not adjacent to or near an existing shooting range.
Focus area 6: Housing			
6.1 Residential Zones	This direction applies to all relevant planning authorities when preparing a planning proposal that will affect land within an existing or proposed residential zone (including the alteration of any existing residential zone boundary), or any other zone in which significant residential development is permitted or proposed to be permitted. (1) A planning proposal must include provisions that encourage the provision of housing that will:		The planning proposal will: • broaden the choice of building types and locations available in the housing market by increasing the potential number of rural residential lots in the locality. • make more efficient use of existing infrastructure and

Sg.1 Direction	Applicable	Consistent	Comment
	(a) broaden the choice of building types and locations available in the housing market, and (b) make more efficient use of existing infrastructure and services, and (c) reduce the consumption of land for housing and associated urban development on the urban fringe, and (d) be of good design. (2) A planning proposal must, in relation to land to which this direction applies: (a) contain a requirement that residential development is not permitted until land is adequately serviced (or arrangements satisfactory to the council, or other appropriate authority, have been made to service it), and (b) not contain provisions which will reduce the permissible residential density of land. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary which: i. gives consideration to the objective of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study prepared in support of the planning proposal which gives consideration to the objective of this direction, or (c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan prepared by the Department of Planning, Industry and Environment which gives consideration to the objective of this direction, or (d) of minor significance.	Yes	services, namely Lindsays Road for access purposes reduce the consumption of land for housing by increasing the potential yield of (rural residential) lots on the site. LEP 2013 includes provisions that will ensure that the site cannot be further developed until land is adequately serviced.
6.2 Caravan Parks and Manufactured Home Estates	This direction applies to all relevant planning authorities when preparing a planning proposal. This direction does not apply to Crown land reserved or dedicated for any purposes under the <i>Crown Land Management Act 2016</i>, except	Yes	The planning proposal does not seek to change the fact that caravan parks and manufactured home estates are not permitted in the R5 Large Lot Residential zone.

Sg.1 Direction	Applicable	Consistent	Comment
	Crown land reserved for accommodation purposes, or land dedicated or reserved under the <i>National Parks and Wildlife Act 1974</i>. (1) In identifying suitable zones, locations and provisions for caravan parks in a planning proposal, the relevant planning authority must: (a) retain provisions that permit development for the purposes of a caravan park to be carried out on land, and (b) retain the zonings of existing caravan parks, or in the case of a new principal LEP zone the land in accordance with an appropriate zone under the <i>Standard Instrument (Local Environmental Plans) Order 2006</i> that would facilitate the retention of the existing caravan park. (2) In identifying suitable zones, locations and provisions for manufactured home estates (MHEs) in a planning proposal, the relevant planning authority must: (a) take into account the categories of land set out in Schedule 6 of <i>State Environmental Planning Policy (Housing)</i> as to where MHEs should not be located, (b) take into account the principles listed in clause 9 Schedule 5 of <i>State Environmental Planning Policy (Housing)</i> (which relevant planning authorities are required to consider when assessing and determining the development and subdivision proposals), and (c) include provisions that the subdivision of MHEs by long term lease of up to 20 years or under the <i>Community Land Development Act 1989</i> be permissible with consent. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary which: i. gives consideration to the objective of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or		

Sg.1 Direction	Applicable	Consistent	Comment
	(b) justified by a study prepared in support of the planning proposal which gives consideration to the objective of this direction, or (c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan prepared by the Department of Planning, Industry and Environment which gives consideration to the objective of this direction, or (d) of minor significance.		
Focus area 7: Industry and Employment			
7.1 Business and Industrial Zones	This direction applies to all relevant planning authorities when preparing a planning proposal that will affect land within an existing or proposed business or industrial zone (including the alteration of any existing business or industrial zone boundary). A planning proposal must: (a) give effect to the objectives of this direction, (b) retain the areas and locations of existing business and industrial zones, (c) not reduce the total potential floor space area for employment uses and related public services in business zones, (d) not reduce the total potential floor space area for industrial uses in industrial zones, and (e) ensure that proposed new employment areas are in accordance with a strategy that is approved by the Planning Secretary. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary, which: i. gives consideration to the objective of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study (prepared in support of the planning proposal) which gives consideration to the objective of this direction, or	Yes	The planning proposal will not affect land within an existing or proposed Employment zone.

S9.1 Direction	Applicable	Consistent	Comment
	(c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan prepared by the Department of Planning, Industry and Environment which gives consideration to the objective of this direction, or (d) of minor significance.		
7.2 Reduction in non-hosted short-term rental accommodation period	This direction does not currently apply to the Coffs Harbour LGA.	N/A	This Direction does not apply to the Coffs Harbour LGA.
7.3 Commercial and Retail Development along the Pacific Highway, North Coast	Applies when a relevant planning authority prepares a planning proposal for land in the vicinity of the existing and/or proposed alignment of the Pacific Highway. (1) A planning proposal that applies to land located on “within town” segments of the Pacific Highway must provide that: (a) new commercial or retail development must be concentrated within district centres rather than spread along the Highway; (b) development with frontage to the Pacific Highway must consider impacts that the development has on the safety and efficiency of the highway; and (c) for the purposes of this paragraph, “within town” means areas which prior to the draft LEP have an urban zone (e.g. Village, residential, tourist, commercial and industrial etc.) and where the Pacific Highway is less than 80km/hour. (2) A planning proposal that applies to land located on “out-of-town” segments of the Pacific Highway must provide that: (a) new commercial or retail development must not be established near the Pacific Highway if this proximity would be inconsistent with the objectives of this Direction. (b) development with frontage to the Pacific Highway must consider the impact the development has on the safety and efficiency of the highway. (c) For the purposes of this paragraph, “out-of-town” means areas which, prior to the draft local environmental plan, do not have an urban zone (e.g.: “village”, “residential”, “tourist”, “commercial”, “industrial”, etc.) or are	Yes	The planning proposal while located alongside the Pacific Highway is not considered to be “within town”; neither does it involve commercial or retail development or involve direct access to the Highway.

Sg.1 Direction	Applicable	Consistent	Comment
	in areas where the Pacific Highway speed limit is 80 km/hour or greater. (3) Notwithstanding the requirements of paragraphs (4) and (5), the establishment of highway service centres may be permitted at the localities listed in Table 1, provided that the Roads and Traffic Authority is satisfied that the highway service centre(s) can be safely and efficiently integrated into the highway interchange(s) at those localities. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are of minor significance.		
Focus area 8: Resources and Energy			
8.1 Mining, Petroleum Production and Extractive Industries	This direction applies to all relevant planning authorities when preparing a planning proposal that would have the effect of: (a) prohibiting the mining of coal or other minerals, production of petroleum, or winning or obtaining of extractive materials, or (b) restricting the potential development of resources of coal, other minerals, petroleum or extractive materials which are of State or regional significance by permitting a land use that is likely to be incompatible with such development. (1) In the preparation of a planning proposal affected by this direction, the relevant planning authority must: (a) consult the Secretary of the Department of Primary Industries (DPI) to identify any: i. resources of coal, other minerals, petroleum or extractive material that are of either State or regional significance, and ii. existing mines, petroleum production operations or extractive industries occurring in the area subject to the planning proposal, and (b) seek advice from the Secretary of DPI on the development potential of resources identified under (1)(a)(i), and (c) identify and take into consideration issues likely to lead to land use conflict between other land uses and:	Yes	The planning proposal does not involve: - prohibiting the mining of coal or other minerals, production of petroleum, or winning or - obtaining of extractive materials, or - restricting the potential development of resources of coal, other minerals, petroleum or - extractive materials which are of State or regional significance by permitting a land use that is likely to be incompatible with such development

S9.1 Direction	Applicable	Consistent	Comment
	i. development of resources identified under (1)(a)(i), or ii. existing development identified under (1)(a)(ii). (2) Where a planning proposal prohibits or restricts development of resources identified under (1)(a)(i), or proposes land uses that may create land use conflicts identified under (1)(c), the relevant planning authority must: (a) provide the Secretary of DPI with a copy of the planning proposal and notification of the relevant provisions, (b) allow the Secretary of DPI a period of 40 days from the date of notification to provide in writing any objections to the terms of the planning proposal, and (c) include a copy of any objection and supporting information received from the Secretary of DPI with the statement to the Planning Secretary (or an officer of the Department nominated by the Secretary before undertaking community consultation in satisfaction of Schedule 1 to the Act. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary), that the provisions of the planning proposal that are inconsistent are of minor significance.		
Focus area 9: Primary Production			
9.1 Rural Zones	This direction applies when a relevant planning authority prepares a planning proposal that will affect land within an existing or proposed rural zone (including the alteration of any existing rural zone boundary). A planning proposal must not rezone land from a rural zone to a residential, business, industrial, village or tourist zone. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary which:	Yes	The planning proposal does not involve rural zones.

S9.1 Direction	Applicable	Consistent	Comment
	i. gives consideration to the objectives of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study prepared in support of the planning proposal which gives consideration to the objectives of this direction, or (c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan prepared by the Department of Planning, Industry and Environment which gives consideration to the objective of this direction, or (d) is of minor significance.		
9.2 Rural Lands	This direction applies when a relevant planning authority prepares a planning proposal for land outside the local government areas of lake Macquarie, Newcastle, Wollongong and LGAs in the Greater Sydney Region (as defined in the <i>Greater Sydney Commission Act 2015</i>) other than Wollondilly and Hawkesbury, that: (a) will affect land within an existing or proposed rural or conservation zone (including the alteration of any existing rural or conservation zone boundary) or (b) changes the existing minimum lot size on land within a rural or conservation zone. (1) A planning proposal must: (a) be consistent with any applicable strategic plan, including regional and district plans endorsed by the Planning Secretary, and any applicable local strategic planning statement (b) consider the significance of agriculture and primary production to the State and rural communities (c) identify and protect environmental values, including but not limited to, maintaining biodiversity, the protection of native vegetation, cultural heritage, and the importance of water resources (d) consider the natural and physical constraints of the land, including but not limited to, topography, size, location, water availability and ground and soil conditions (e) promote opportunities for investment in productive, diversified, innovative and sustainable rural economic activities	Yes	The planning proposal is consistent with the objectives and actions of the North Coast Regional Plan 2041 (see section B above) and Council's LSPS. The planning proposal will protect environmental values on the site, as detailed in section B above. The planning proposal will not change the existing minimum lot size on land within a conservation zone, as it concurrently seeks to alter the extent of the C2 Environmental Conservation zone on the site. The result being the alteration to the minimum lot size will be confined to the area zoned R5 Large Lot Residential. Adequate human services and utility and transport infrastructure are available to the site; and, the site is in reasonable proximity to existing centres. The planning proposal is consistent with the LSPS insofar as it relates to the existing and future demand and supply of rural residential land (see section B above).

Sg.1 Direction	Applicable	Consistent	Comment
	(f) support farmers in exercising their right to farm (g) prioritise efforts and consider measures to minimise the fragmentation of rural land and reduce the risk of land use conflict, particularly between residential land uses and other rural land use (h) consider State significant agricultural land identified in chapter 2 of the <i>State Environmental Planning Policy (Primary Production) 2021</i> for the purpose of ensuring the ongoing viability of this land (i) consider the social, economic and environmental interests of the community. (2) A planning proposal that changes the existing minimum lot size on land within a rural or conservation zone must demonstrate that it: (a) is consistent with the priority of minimising rural land fragmentation and land use conflict, particularly between residential and other rural land uses (b) will not adversely affect the operation and viability of existing and future rural land uses and related enterprises, including supporting infrastructure and facilities that are essential to rural industries or supply chains (c) where it is for rural residential purposes: i. is appropriately located taking account of the availability of human services, utility infrastructure, transport and proximity to existing centres ii. is necessary taking account of existing and future demand and supply of rural residential land. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary and is in force which: i. gives consideration to the objectives of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) is of minor significance.		

Sg.1 Direction	Applicable	Consistent	Comment
9.3 Oyster Aquaculture	This direction applies to any relevant planning authority when preparing a planning proposal in ‘Priority Oyster Aquaculture Areas’ and oyster aquaculture outside such an area as identified in the <i>NSW Oyster Industry Sustainable Aquaculture Strategy</i> (2006) (“the Strategy”), when proposing a change in land use which could result in: (a) adverse impacts on a ‘Priority Oyster Aquaculture Area’ or a “current oyster aquaculture lease in the national parks estate”, or (b) incompatible use of land between oyster aquaculture in a ‘Priority Oyster Aquaculture Area’ or a “current oyster aquaculture lease in the national parks estate” and other land uses. (1) In the preparation of a planning proposal the relevant planning authority must: (a) identify any ‘Priority Oyster Aquaculture Areas’ and oyster aquaculture leases outside such an area, as shown the maps to the Strategy, to which the planning proposal would apply, (b) identify any proposed land uses which could result in any adverse impact on a ‘Priority Oyster Aquaculture Area’ or oyster aquaculture leases outside such an area, (c) identify and take into consideration any issues likely to lead to an incompatible use of land between oyster aquaculture and other land uses and identify and evaluate measures to avoid or minimise such land use in compatibility, (d) consult with the Secretary of the Department of Primary Industries (DPI) of the proposed changes in the preparation of the planning proposal, and (e) ensure the planning proposal is consistent with the Strategy. (2) Where a planning proposal proposes land uses that may result in adverse impacts identified under (1)(b) and (1)(c), relevant planning authority must: (a) provide the Secretary of DPI with a copy of the planning proposal and notification of the relevant provisions, (b) allow the Secretary of DPI a period of 40 days from the date of notification to provide in writing any objections to the terms of the planning proposal, and	Yes	The planning proposal does not relate to land identified as a ‘Priority Oyster Aquaculture Area’ nor does it relate to oyster aquaculture.

S9.1 Direction	Applicable	Consistent	Comment
	(c) include a copy of any objection and supporting information received from the Secretary of DPI with the statement to the Planning Secretary before undertaking community consultation in satisfaction of Schedule 1 to the EP&A Act. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are of minor significance.		
9.4 Farmland of State and Regional Significance on the NSW Far North Coast	This direction does not currently apply to the Coffs Harbour LGA.	N/A	



ecosure
improving ecosystems

**ENVIRONMENTAL
ASSESSMENT BOAMBEE**

August 2021

JINDERPAL SINGH RAI

Glossary, acronyms and abbreviations

BAM	Biodiversity Assessment Method
BC Act	<i>Biodiversity Conservation Act 2016</i>
BOS	Biodiversity Offset Scheme
BV	Biodiversity Values
Council	Coffs Harbour City Council
DA	Development Application
DPIE	Department of Planning, Industry and Environment
E zone	Environmental protection zone
E2	Environmental conservation zone
E3	Environmental management zone
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
HJG	Hairy Jointgrass
HTE	High Threat Exotic
LEP	Local Environmental Plan
PCT	Plant community type
R5	Large lot residential zone
SSSR	Square-stemmed spike-rush
TEC	Threatened Ecological Community
VI	Vegetation Integrity
VMP	Vegetation Management Plan

Contents

Glossary, acronyms and abbreviations	i
List of figures	iii
List of tables	iv
1 Introduction	1
1.1 Project scope	1
1.2 Site description	2
1.3 Legislation	5
2 Methods	6
2.1 Literature review	6
2.2 Flora assessment	6
2.3 Fauna assessment	7
3 Results	8
3.1 Desktop assessment	8
3.1.1 Literature review	8
3.1.2 Plant community types and threatened ecological communities	11
3.1.3 Threatened fauna and flora	13
3.1.3.1 Square-stemmed spike-rush (SSSR)	14
3.1.3.2 Hairy jointgrass (HJG)	15
3.2 Vegetation integrity assessment	18
3.2.1 Plot one (south)	18
3.2.2 Plot two (north)	19
3.3 Threatened flora searches	21
3.3.1 Square-stemmed spike rush (SSSR)	21
3.3.2 Hairy jointgrass	21
3.4 Fauna assessment	21
4 Discussion	22
5 Recommendations	26
References	27
Appendix 1 Approved concept design	28
Appendix 2 EPBC Act protected matters search results	29
Appendix 3 Vegetation integrity score results (plot one)	30
Appendix 4 BOSET report	31

List of figures

Figure 1 Site location and zoning.....	3
Figure 2 Extent of vegetation clearing at the site in 2017 (right), showing the site pre-vegetation removal in 2016 (left) © Google Imagery	4
Figure 3 Plant Community Types and Threatened Ecological Communities	12
Figure 4 Square-stemmed spike-rush taken at Boambee, 1997 © Nigel Cotseil.....	16
Figure 5 Hairy jointgrass © Greg Steenbeeke	16
Figure 6 Threatened species records, E2 zoning and vegetation plots	17
Figure 7 Plot one midline facing west at 0 m	18
Figure 8 Plot one midline facing east at 50 m.....	18
Figure 9 Plot one surrounds showing E2 zone to the south featuring dam associated with Cordswell Creek Flood Channel	18
Figure 10 Plot one surrounds showing the dam associated with Cordswell Creek Flood Channel.....	18
Figure 11 Plot 2 midline facing east at 0 m.....	20
Figure 12 Plot 2 midline facing west at 50 m	20
Figure 13 Plot 2 surrounds showing E2 zone to the north and existing boundary fence	20
Figure 14 Plot 2 surrounds showing Boambee Creek which borders the site in the north....	20
Figure 15 Proposed E2 zone boundary amendment	23

List of tables

Table 1 Descriptions of Environmental Protection Zones, E2 and E3, under Coffs Harbour LEP 2013	5
Table 2 Environmental constraints.....	9
Table 3 EPBC Act Protected Matters Search TEC results	11
Table 4 Plant community types' and associated TEC mapped on site	11
Table 5 Bionet 1.5 km search results for terrestrial threatened fauna species, likelihood of occurrence at the site.....	13
Table 6 Bionet 1.5km search results for terrestrial threatened flora species, likelihood of occurrence at the site.....	14
Table 7 Flora plot one details.....	18
Table 8 Plot one floristics results (N Native, HTE High threat exotic).....	19
Table 9 Flora plot two details	20
Table 10 Plot 2 floristics results	20
Table 11 Bird survey results	21

1 Introduction

Jinderpal Singh Rai engaged Ecosure Pty Ltd (Ecosure) to conduct an ecological assessment at Lot 15 DP 861057, Lots 101/102 DP 732172 & Lot 4 DP 1049350 (the site) in Boambee, New South Wales (NSW). The assessment was initiated to assess the potential lot yield capability under the current zoning against the ecological constraints of the site. An objective of the assessment was to ascertain the conservation values of the site and to see how they correlate with current extent of the mapped environmental protection zones (E zones).

This report has been prepared in support of a Development Application (DA) to Coffs Harbour City Council (Council) to seek a reduction in the prescribed minimum lot size of R5 zoning from 1 to 0.5 ha.

An approved concept design (DA 0288/16) for a six-lot subdivision at the site is provided in Appendix 1.

1.1 Project scope

The project scope included:

- A literature review including a desktop assessment to identify:
 - mapped vegetation communities
 - records of threatened species likely to occur on or in the vicinity of the site (i.e. NSW BioNet database search and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool)
 - relevant Council planning documents and policies
 - other relevant documents including the Northern Council's E2 Zone Review (NSW Government 2015)
 - NSW Biodiversity Values mapping.
- A desktop assessment for threatened fauna species likely to occur.
- Opportunistic fauna surveys for birds, reptiles, frogs and mammals during the site visit and an assessment of fauna habitat (including identification of landscape features such as dry slopes and wet areas, features that could provide habitat including dead wood and dead trees, identification of hollow bearing trees, scats and scratches on trees and identification of culverts and drainage lines).
- Flora assessments to assess the extent of Environmental Conservation (E2) zoning and ground truth vegetation communities in accordance with NSW Plant Community Types (PCT's) and councils fine scale vegetation mapping (OEH 2012a).
- A targeted search for threatened flora species and weed species likely to occur, based on the literature review.

1.2 Site description

The subject area falls within the North Coast Bioregion and the Coffs Coast and Escarpment Interim Biogeographic Regionalisation of Australia sub-region. The site is within Coffs Harbour Local Government Area and includes Lot 15 DP 861057, Lots 101/102 DP 732172 & Lot 4 DP 1049350. The subject area is approximately 20 ha and borders the Pacific Highway to the east and Boambee Creek to the north. Lindsay Road bounds the property to the south and provides access from the west (Figure 1). Surrounds include large residential lots to the west and a public recreation reserve which encompasses Cordswell Creek, parallel to the Pacific Highway to the east.

A low ridgeline intercepts the centre of the property from east-west dividing a riparian zone associated with Boambee Creek in the north and a flood channel, featuring a dam, associated with Cordswell Creek in the south. This flood channel, or back swamp, is supplied by a culvert which underpasses the Pacific Highway.

The site features Environmental Conservation (Zone E2) and Large Lot Residential (Zone R5) zoning (Figure 1). The centre of the property was cleared for the purpose of blueberry production in 2017 but this activity was never pursued and most of the Lot is now retained as open grassland. Following the withdrawal of the DA due to public opposition (Figure 2). Native vegetation has been retained within the E2 zone at the northern fringe and southern sections of the site.



Figure 1: Site location and current environmental conservation (E2) zoning

Jinderpal Rai
Environmental Assessment, Boambee

Subject site E2 zone



Job number: PR4965
Revision: 0
Author: ET
Date: 09/12/2019



0 100 200 m

GDA 1994 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 1994
Units: Meter



Figure 2 Extent of vegetation clearing at the site in 2017 (right), showing the site pre-vegetation removal in 2016 (left) © Google Imagery

1.3 Legislation

Coffs Harbour Local Environmental Plan (LEP) 2013 identifies three environment protection zones specifically for land where the primary focus is the conservation and/or management of environmental values. The zones provide for varying levels of environmental protection from zone E1 to E3. Zone E1 relates to National Parks and Nature Reserves and is not relevant to this study. Zones E2 and E3 are the two which are applicable to the site and potentially to a planning proposal. Each zone is differentiated by their objectives and permissible activities (Table 1).

Table 1 Descriptions of Environmental Protection Zones, E2 and E3, under Coffs Harbour LEP 2013

Zone	Objective
Zone E2 – Environmental Conservation	- To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values. - To prevent development that could destroy, damage or otherwise have an adverse effect on those values
Zone E3 – Environmental Management	- To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values. - To provide for a limited range of development that does not have an adverse effect on those values.

The Department of Planning and Environment NSW Northern Councils E Zone Review Final Recommendations Report (NSW Government 2015) establishes criteria for the application of E2 and E3 zones and the principle of zoning land consistent with its use. Although the review only initially applies to five Far North Coast Councils (Ballina, Byron, Kyogle, Lismore and Tweed) it states that, 'if other councils in the State are reviewing the application of E zones, then the principles contained in these recommendations can be used' (NSW Government 2015).

The *Biodiversity Conservation Act 2016* (BC Act) commenced on 25 August 2017. An offsets scheme and Biodiversity Assessment Method (BAM) were established under the BC Act for the purpose of assessing the impact of development on threatened species, threatened ecological communities (TECs), their habitats and other biodiversity values. The Biodiversity Values (BV) Map identifies land with high biodiversity value that is particularly sensitive to impacts from development and clearing. The map forms part of the Biodiversity Offsets Scheme Threshold, which is one of the triggers for determining whether the Biodiversity Offset Scheme (BOS) applies to a clearing or development proposal. The map is prepared by the Department of Planning, Industry and Environment (DPIE) under Part 7 of the BC Act (OEI 2017a).

2 Methods

2.1 Literature review

The following information was reviewed:

- previous reports prepared by Idyll Spaces Environmental Consultants including a vegetation management plan (March 2015), flora and fauna assessment report (March 2015) and recommendations relating to the amendment of E2 zoning extents (May 2019)
- the Northern Council's E2 Zone Review (NSW Government 2015)
- relevant biodiversity databases (i.e. NSW BioNet and the EPBC Act Protected Matters Search) for flora and fauna records
- plant community types (OEH 2017a) and fine-scale vegetation mapping (OEH 2012a)
- approved lot layout design plan (Blairlanskey Surveyors)
- review of relevant legislation, plans and policies including relevant sections of the Coffs Harbour LEP (Coffs Harbour City Council 2013) and associated mapping.

2.2 Flora assessment

Flora surveys were undertaken on the 21st of November 2019. Sampling of the site involved two plot-based vegetation surveys conducted in the north and south of the property, consistent with the BAM. This method was utilised to collect floristic and vegetation integrity data within E2 zones at the R5 zoning interface. Each plot involved:

- 20 m x 20 m floristics surveys to identify all native and invasive vegetation species
- 1 m x 1 m ground cover assessment at 5 intervals across the 50 m midline
- an assessment of large and hollow bearing trees which may provide habitat for arboreal species within the 20 m x 50 m plot
- an assessment of logs within the 20 m x 50 m plot
- an assessment of site disturbance particularly due to clearing and weed invasion.

The plot data was analysed using the BAM Calculator in order to generate a vegetation integrity score. Vegetation integrity (VI) scores represents three primary attributes of biodiversity, composition, structure and function and are valued between 0-100. The score characterises the degree to which the attributes of the vegetation at a site differs from the 'best-on-offer' condition for the same vegetation type in the contemporary landscape. Use of vegetation integrity score enables site-scaled comparison and inform natural resource management decisions (OEH 2017b).

No PCT was assigned to areas where the plots were established, given clearing was

undertaken in 2017. Accordingly, the VI score was calculated using the previously mapped PCT at the site. This was considered most representative of the community prior to the clearing event. The PCT used was 692 - *Tallowwood - Blackbutt moist shrubby tall open forest of the hinterland ranges of the Mid North Coast, NSW North Coast Bioregion and South Eastern Queensland Bioregion* (Figure 3).

The location of the vegetation plots in relation to the E2 zone and threatened species records is shown in Figure 6.

Targeted searches for two known threatened flora species which occur at the site were undertaken, including the square-stemmed spike-rush (SSSR) (*Eleocharis tetraquetra*) and hairy jointgrass (*Arthraxon hispidus*). A GPS enabled digital tablet was used to record the data and compare the location of existing mapped threatened species.

2.3 Fauna assessment

Opportunistic bird, mammal, reptile and frog surveys were undertaken within and adjacent to the site during the site visit. The fauna habitat assessment was addressed during flora survey within the assigned vegetation plots. No habitat assessment was conducted within the greater E2 zone given that there is no intended modification to the area based on proposed lot layout design. A GPS enabled digital tablet was used to record the data and compare the location of existing mapped threatened species.

3 Results

3.1 Desktop assessment

Various reports, databases and maps were reviewed to gain an understanding of the characteristics of the site as well as potential ecological values and constraints.

3.1.1 Literature review

Previous assessments conducted by Idyll Spaces Environmental Consultants reveal that:

- E2 zone boundary buffers were established within a 50 m extent of known occurrences of SSSR in the Local Environmental Plan 2000, following its rediscovery at the site in 1997.
- E2 buffers were likely established to minimise disturbance to the species habitat from activities associated with the Pacific Highway Upgrade (1997 - 2001). Deposition of soil and road construction waste on the property may have caused direct damage to SSSR habitat and a change in drainage patterns (Elks 2019).

Table 2 provides results of a review of Councils online map viewer in relation to environmental constraints for the subject area. Only those applicable to the site have been included.

Table 2 Environmental constraints

Operational Layer	Result		Details
Coffs Harbour LEP 2013	Land Zoning	R5	Large Lot Residential
		E2	Environmental Conservation
	Height of Buildings	Yes	Max. Height: 8.5m (RL) Symbol Code: I
	Heritage	N/A	Investigations necessary during earth removal upon ridgeline
	Acid Sulphate Soils	Class 4 Class 5 Class 3	South South North
	Natural Resource Waterways	Natural Resources Sensitivity	Biodiversity terrestrial mapped north and south
SEPP Coastal Management (2018)	Coastal Zone Footprint	Yes	
	Coastal Wetlands	Yes	Applies within north and south extent
	Coastal Environmental Area	Yes	Entire site
	Coastal Use Area	Yes	Northern area bordering Boambee Creek
Koala Habitat	Koala Habitat	Primary and secondary	Applies within north and south extent
Coffs Harbour Fine Scale (Class 5) Vegetation Mapping		Wet Sclerophyll Forest (CH_WSF09) Native Pioneers (CH_NP01) Freshwater Wetlands (CH_FW08) Plantation (CH_P03) Forested Wetland (CH_FrW01) Native Remnant Vegetation (CH_NRV01) Exotic Vegetation (CH_EX03)	

Operational Layer	Result		Details
	High Value Habitats (HVV)	Swamp Sclerophyll Forest	North and south
		Freshwater Wetlands	South
	Over Cleared Vegetation Types (OCVTs)	Forested Wetlands	Applies within north and south extent
	Landscape Corridors - Not Council Adopted, Restricted	Local	Applies to northern extent
Bush Fire Prone Mapping	Vegetation Class: 1 Buffer: 100m		North, south and eastern precinct
Flooding Information	Flood Planning Level – Area		Applies to northern extent
	100 – Year ARI Flood Depth		Applies to northern extent
	Indicative Flood Areas		Applies to southern fringe

3.1.2 Plant community types and threatened ecological communities

A 5 km EPBC Act Protected Matters search returned 4 TECs likely to occur within the area. The communities and their conservation status are detailed in (Table 3). These TECs do not occur at the site.

Table 3 EPBC Act Protected Matters Search TEC results

Community	Status
Coastal Swamp Oak (<i>Casuarina glauca</i>) Forest of New South Wales and South East Queensland ecological community	Endangered
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered
Lowlands Rainforest of Subtropical Australia	Critically Endangered
Subtropical and Temperate Coastal Saltmarsh	Vulnerable

According to Council's mapping, two Endangered Ecological Communities occur on site, classified as the Freshwater Wetlands and Swamp Sclerophyll Forest (Table 2). This vegetation mapping has now been superseded by DPIE PCT mapping.

The Council's vegetation community description was compared to the then NSW Office of Environment vegetation type database (OEH 2011) to determine the biometric equivalent PCT. PCTs identified as potentially occurring on the site are presented in Table 4. It should be noted that PCT numbers and descriptions were converted to updated parent PCTs using the OEH lineage table. These were then further identified for equivalency to listed TECs. The PCT's were not verified during the site visit, however mapped communities and their association with TEC is depicted in Figure 3.

Table 4 Plant community types' and associated TEC mapped on site

PCT ID	PCT Name	TEC
695	Turpentine - Blackbutt - Forest Oak shrubby open forest of the escarpment ranges of the Mid North Coast, NSW North Coast	No
780	Coastal floodplain sedgelands, rushlands, and forblands of the North Coast	Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions
1064	Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion	Yes – Wholly subset: Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions Partially subset of: River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions
692	Tallowwood - Blackbutt moist shrubby tall open forest of the hinterland ranges of the Mid North Coast, NSW North Coast Bioregion and South Eastern Queensland Bioregion	No

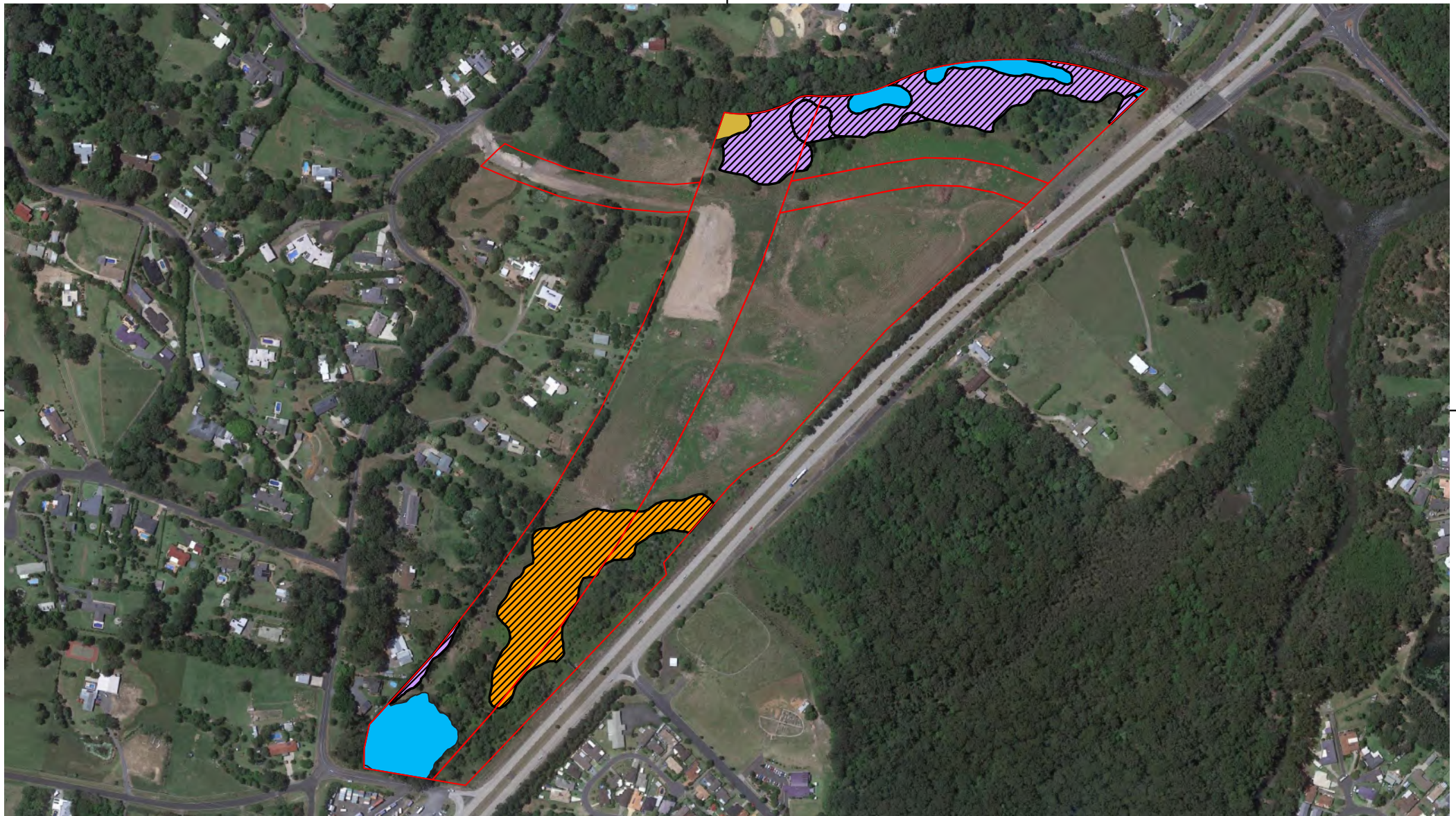
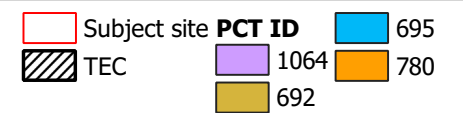
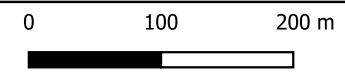


Figure 3: Plant Community Types (PCT) and associated Threatened Ecological Communities (TEC)

Jinderpal Rai
Environmental Assessment, Boambee



Job number: PR4965
Revision: 0
Author: ET
Date: 09/12/2019



GDA 1994 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 1994
Units: Meter

3.1.3 Threatened fauna and flora

A search of NSW BioNet records within 1.5 km of the site returned 14 birds , 1 insect, 9 mammalian species (Table 5) and 7 flora species (Table 6) listed as threatened under the BC Act, EPBC Act and international bilateral migratory bird agreements (Appendix 2). The 5 km EPBC Act Protected Matters search returned 80 threatened species and 56 migratory species (Appendix 2).

As the NSW BioNet search returns actual records of threatened species (while the EPBC Act Protected Matters Search returns all species possibly occurring), only the BioNet records have been included and discussed in relation to their likelihood of occurrence (Table 5 & 6). It should be noted that this analysis excludes marine species (e.g. whale, turtle, etc.) and marine dependent birds.

Threatened species known to occur at the site based on BioNet records are shown in Figure 6 .

Table 5 Bionet 1.5 km search results for terrestrial threatened fauna species, likelihood of occurrence at the site

Scientific	Common Name	EPBC Act Status	BC Act Status	Likelihood
Aves				
<i>Apus pacificus</i>	fork-tailed swift	C,J,K		Possible for rest
<i>Ardea ibis</i>	cattle egret	C,J		Known
<i>Ardenna pacificus</i>	wedge-tailed shearwater	J		Possible
<i>Ardenna tenuirostris</i>	short-tailed shearwater	J,K		Possible
<i>Ephippiorhynchus asiaticus</i>	black-necked stork		E1	Known
<i>Gallinago hardwickii</i>	latham's snipe	C,J,K		Possible
<i>Glossopsitta pusilla</i>	little lorikeet		V	Possible
<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle	C	V	Possible
<i>Hirundapus caudacutus</i>	white-throated needletail	C,J,K		Possible
<i>Ninox strenua</i>	powerful owl		V	Possible
<i>Pandion cristatus</i>	eastern osprey		V	Possible
<i>Ptilinopus regina</i>	rose-crowned fruit-dove		V	Possible
<i>Tyto longimembris</i>	eastern grass owl		V	Possible
<i>Tyto novaehollandiae</i>	masked owl		V	Possible
Insecta				
<i>Ocybadistes knightorum</i>	black grass-dart butterfly		E1	Unlikely
Mammalia				
<i>Dasyurus maculatus</i>	spotted-tailed quoll	E	V	Possible
<i>Miniopterus australis</i>	little bent-winged bat		V	Possible
<i>Miniopterus orianae oceanensis</i>	large bent-winged bat		V	Possible
<i>Myotis macropus</i>	southern myotis		V	Possible

Scientific	Common Name	EPBC Act Status	BC Act Status	Likelihood
<i>Nyctophilus bifax</i>	eastern long-eared bat		V	Possible
<i>Phascogale tapoatafa</i>	brush-tailed phascogale		V	Possible
<i>Phascogale cinereus</i>	koala	V	V	Possible
<i>Pteropus poliocephalus</i>	grey-headed flying-fox	V	V	Possible
<i>Scoteanax rueppellii</i>	greater broad-nosed bat		V	Possible

E endangered, V Vulnerable (EPBC Act)

C China-Australia Migratory Bird Agreement (CAMBA), J Japan-Australia Migratory Bird Agreement (JAMBA), K Republic of Korea-Australia Migratory Bird Agreement (KAMBA) Migratory Bird Agreements

E1 Endangered, Vulnerable (BC Act)

Table 6 BioNet 1.5km search results for terrestrial threatened flora species, likelihood of occurrence at the site

Scientific	Common Name	EPBC Act Status	BC Act Status	Likelihood
<i>Alexfloydia repens</i>	floyd's grass	-	E1	Not recorded
<i>Arthraxon hispidus</i>	hairy jointgrass	V	V	Known
<i>Eleocharis tetraquetra</i>	square-stemmed spike-rush	-	E1	Known
<i>Lindsaea incisa</i>	slender screw fern	-	E1	Possible
<i>Niemeyera whitei</i>	rusty plum, plum boxwood	-	V	Not recorded
<i>Rhodamnia rubescens</i>	scrub turpentine	-	E4A	Possible
<i>Rhodomyrtus psidioides</i>	native guava	-	E4A	Possible

V Vulnerable (EPBC Act)

E1 Endangered, V Vulnerable, E4A Critically Endangered (BC Act)

The two threatened flora species known to occur at the site are of key interest, these include; SSSR and HJG.

3.1.3.1 Square-stemmed spike-rush (SSSR)

SSSR is a tufted herbaceous perennial distinguished primarily by its slender four angled stem and broad spikelet (Figure 5). At the Boambee site, it is documented that spikelets are present in October and flowering is completed by the end of April (NSW Government 1999).

The species inhabits periodically wet margins of freshwater swamps. Following its rediscovery at Boambee in 1997, it has since been located in northern localities nearby Grafton, Murwillumbah and in South East Queensland. The site was once considered to support a significant proportion of the known population.

SSSR is believed to be a coloniser of disturbed ground and requires relatively high light conditions for germination. Disturbance may therefore be an important factor in the maintenance of habitat suitable for the survival of the species. Reduction of light intensity, and shading from large plants may be a threat to the species survival (NSW Government 1999).

Other key threats to the species include:

- clearing of habitat for development and agriculture
- invasion of habitat by weeds and pasture grasses
- changes to the natural disturbance patterns such as grazing, fire and flooding
- degradation of habitat by intensive grazing by stock.

The species is listed as endangered under the BC Act. The plant has a targeted strategy for managing the species under the Saving our Species program and has been assigned to the site-managed species management stream (OEH 2019a). A recovery plan was published in 1999 which the objective to maintain viable wild populations and their habitats in the long term (NSW Government 1999).

3.1.3.2 Hairy jointgrass (HJG)

HJG is a creeping grass with branching erect purplish stems. It has long white hairs which project around the edge of the leaf (Figure 6). It has an affinity for areas high in moisture and shade and is therefore often found near creeks or swamps on the edges of wet sclerophyll and rainforests. (NSW Government 2019). Key threats to the species include:

- clearing of habitat for agriculture and development
- inappropriate fire regimes
- over-grazing by domestic stock
- competition from introduced grasses such as *Paspalum* and *Kikuyu*
- slashing or mowing of habitat.

The plant is listed as vulnerable under the BC Act and EPBC Act. The plant is considered widespread and has many small populations across NSW. The species is therefore assigned under the keep-watch species management stream under the Saving our Species Program (OEH 2019b).



Figure 4 Square-stemmed spike-rush taken at Boambee, 1997 © Nigel Cotsell



Figure 5 Hairy jointgrass © Greg Steenbeeke

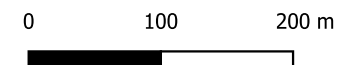


Figure 6: Bionet records and vegetation integrity plots within the environmental conservation (E2) zone on subject site

Jinderpal Rai
Environmental Assessment, Boambee



Job number: PR4965
Revision: 0
Author: ET
Date: 09/12/2019



GDA 1994 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 1994
Units: Meter

3.2 Vegetation integrity assessment

3.2.1 Plot one (south)

Details of the first plot-based vegetation assessment, located in the south of the site, are summarised in Table 7. Higher diversity was recorded in plot one compared to plot two. Plot one returned a vegetation integrity score of 14.3 (Appendix 3). A full floristics lists, of all species identified within the plot is available in Table 8. For images of the plot and neighbouring E2 zone see Figure 7 to Figure 10.

Table 7 Flora plot one details

Plot ID	Plot Size (m)	Datum	Zone	Coordinates	Plot Bearing (°)	TEC	Vegetation Integrity Score
1	20 x 50	GDA 94	56	-30.3406362 153.0715707	273 at 0 m	No	14.3

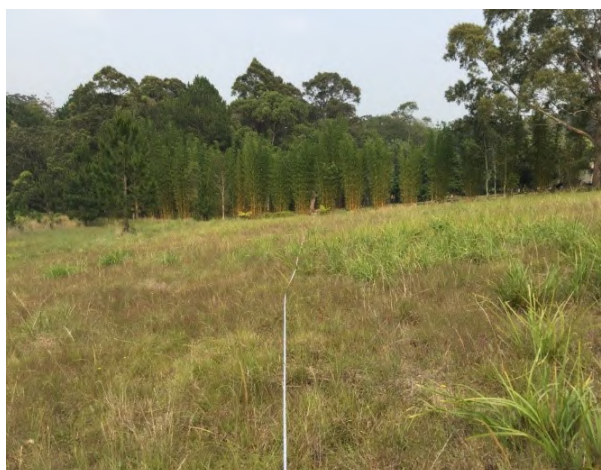


Figure 7 Plot one midline facing west at 0 m



Figure 8 Plot one midline facing east at 50 m



Figure 9 Plot one surrounds showing E2 zone to the south featuring dam associated with Cordswell Creek Flood Channel



Figure 10 Plot one surrounds showing the dam associated with Cordswell Creek Flood Channel

Table 8 Plot one floristics results (N Native, HTE High threat exotic)

Scientific Name	Common Name	Status	Cover (%)	Growth Form
<i>Sporobolus fertilis</i>	Giant Parramatta Grass	HTE	3	Grass
<i>Lomandra multiflora subsp. multiflora</i>	Many-flowered Mat-rush	N	20	Rush
<i>Hydrocotyle tripartita</i>	Pennywort	N	10	Forb
<i>Calochlaena dubia</i>	Rainbow Fern	N	2	Tree fern
<i>Dichelachne crinita</i>	Longhair Plumegrass	N	5	Tussock Grass
<i>Persoonia stradbokensis</i>		N	2	Shrub
<i>Plantago spp.</i>	Plantain	N	1	Forb
<i>Hibbertia scandens</i>	Climbing Guinea Flower	N	0.2	Vine
<i>Oplismenus aemulus</i>	Australian Basket Grass	N	2	Grass
<i>Drosera spp.</i>		N	0.5	Forb
<i>Hibbertia sp.</i>		N	1	Shrub
<i>Taraxacum spp.</i>	Dandelion	N	1	Forb
<i>Echinopogon nutans</i>		N	10	Tussock Grass
<i>Gleichenia rupestris</i>	Coral Fern	N	1	Fern
<i>Pratia purpurascens</i>	Whiteroot	N	1	Forb
<i>Imperata cylindrica</i>	Blady Grass	N	10	Tussock Grass
<i>Baccharis halimifolia</i>	Groundsel bush	HTE	2	Shrub
<i>Dianella caerulea</i>	Blue Flax-lily	N	1	Forb
<i>Pinus sp.</i>		HTE	1	Tree
<i>Cheilanthes sieberi</i>	Rock Fern	N	1	Fern
<i>Eragrostis leptostachya</i>	Paddock Lovegrass	N	2	Tussock Grass
<i>Pimelea linifolia</i>	Slender Rice Flower	N	1	Shrub

3.2.2 Plot two (north)

Details of the second plot-based vegetation assessment, located in the north of the site, are provided in Table 9. Plot two was located upon the stockpile of construction waste which has since revegetated with entirely exotic flora species. Given that no native species were recorded a vegetation integrity score was not calculated and is represented as 0. A full floristics lists of all species identified within the plot is available in Table 10. For images of the plot and neighbouring E2 zone see Figure 11 to Figure 14.

Table 9 Flora plot two details

Plot ID	Plot Size (m)	Datum	Zone	Coordinates	Plot Bearing (°)	TEC	Vegetation Integrity Score
2	20 x 50	GDA 94	56	-30.3379503 153.0727255	84 at 0 m	No	0

Table 10 Plot 2 floristics results

Scientific Name	Common Name	Status	Cover (%)	Growth Form
<i>Setaria paspalidioides</i>	Setaria	Exotic	90	Tussock Grass
<i>Sida rhombifolia</i>	Paddy's Lucerne	Exotic	2	Forb
<i>Ageratum houstonianum</i>	Blue Billy Goat Weed	Exotic	2	Forb
<i>Ipomoea cairica</i>	Mile a Minute	Exotic	2	Vine
<i>Bambusa sp.</i>	Bamboo	Exotic	2	Grass



Figure 11 Plot 2 midline facing east at 0 m



Figure 12 Plot 2 midline facing west at 50 m



Figure 13 Plot 2 surrounds showing E2 zone to the north and existing boundary fence



Figure 14 Plot 2 surrounds showing Boambee Creek which borders the site in the north

3.3 Threatened flora searches

3.3.1 Square-stemmed spike rush (SSSR)

SSSR was not recorded during targeted searches. The survey was conducted within known occurrences of the plant, concentrated around stakes which once identified the plants micro habitat with a high degree of accuracy. In the south, known habitat of the plant was heavily infested with soft bracken and coral fern, potentially outcompeting SSSR in that area. Despite no sightings of SSSR during the site visit, it's presence should not be discounted as searches at more appropriate seasonal times are likely to be more successful.

3.3.2 Hairy jointgrass

Targeted searches in and around the BioNet record at the site failed to locate HJG. Random meander searches for this threatened plant are recommended during autumn following the wet season, given this is typically their peak growth period.

3.4 Fauna assessment

Birds were the only wildlife observed during the site visit (Table 11). No threatened species were observed at the site.

Table 11 Bird survey results

Scientific Name	Common Name
<i>Richoglossus haematodus</i>	Rainbow Lorikeet
<i>Anas superciliosa</i>	Pacific Black Duck
<i>Meliphaga lewinii</i>	Lewin's Honeyeater
<i>Hirundo neoxena</i>	Welcome Swallow
<i>Threskiornis molucca</i>	Australian White Ibis
<i>Porphyrio porphyrio</i>	Purple Swamphen
<i>Ardea ibis</i>	Cattle Egret
<i>Scythrops novaehollandiae</i>	Channel-billed Cuckoo
<i>Elanus axillaris</i>	Black-shouldered Kite
<i>Eudynamys orientalis</i>	Eastern Koel
<i>Dacelo novaeguineae</i>	Laughing Kookaburra

4 Discussion

Based on the findings from the site assessment and historical use of the site we are of the view that the Environmental Conservation (E2) Zone has been applied inappropriately within the areas designated as buffers to SSSR habitat. We have proposed an amendment to E2 zone boundaries to ensure consistency with the Coffs Harbour LEP that more accurately reflects the high conservation values of the site and ensures mapping is consistent with the intent of the zoning.

The proposed E2 boundary amendment is depicted in Figure 15 and includes an amended E2 zoning boundary in the southern portion of the Lot. Here, we have included a 10 m buffer to SSSR habitat which was similarly applied to the adjacent TEC. In the north, the amendment aligns with current boundary fencing and topography, and provides a conservative 20 m buffer to the adjacent TEC. The proposed change will ensure known habitat of SSSR is maintained within the E2 zone with a buffer greater than 7 m. The proposed amendment generally aligns with the extent of vegetation removed in 2017 (Figure 2).



Figure 15: Proposed amendment to environmental conservation (E2) boundary in relation to Threatened Ecological Communities (TEC) and Bionet Records

Jinderpal Rai
Environmental Assessment, Boambee

Subject site
 - - - Proposed E2 Boundary
 TEC
 Current E2 Zone



Results of the vegetation integrity assessments highlight that due to historical disturbance, the E2 buffer zones now exhibit low vegetation integrity and ecological value. These areas are dominated by invasive exotics and pasture grasses, which are known threats to SSSR and HJG. The buffers infringe on areas cleared in 2017 (Figure 2) and in the northern part of the property, include a large area of road construction waste deposited by RMS in the early 2000's (Elks 2019). Plot two featured entirely exotic species with no native species recorded. Despite plot one demonstrating higher diversity, a variety of pasture grasses and three high threat weeds were recorded. Integrity scores of 0 and 14.3 in the north (Plot two) and south (Plot 1) respectively, do not represent areas of high-ecological value as defined and required by E2 zones. They are also not considered to meet the benchmark requirements representative enough to be considered a PCT.

Therefore, the application of E2 zone as buffers within these disturbed areas is inconsistent with the definition of E2 zones according to the Coffs Harbour LEP. The E2 buffer zones no longer serve as areas which 'protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.' Nor, is the current E2 zone extent necessary to 'prevent development that could destroy, damage or otherwise have an adverse effect on those values.' It is therefore recommended that the current buffers to areas of actual high conservation value are not assigned an E2 zone and the buffer is reduced.

For this reason, the development of small lots, to a minimum of 0.5 ha, will not be incompatible with maintaining the conservation values of the site. The transition from a rural landscape to large lot residential (R5) could improve some of the areas currently designated as E2. It is important to ensure habitat attributes of Boambee Creek and the flood channel are maintained and it is expected that approval of a planning proposal for additional lots would necessitate rehabilitation action under a VMP. For example, compensatory plantings which were mandated at the southern end of the site following the vegetation removal are now well established and are contributing to the vegetation integrity of the site.

Investigations into the ecology of SSSR reveal that exclusion of natural disturbance to its habitat may not be conducive to its survival. It is now understood that the plant requires high light conditions for germination and is a '*coloniser of disturbed ground*'. The species therefore relies upon some form of disturbance to create space within dense vegetation to enable recruitment (Bell et al 2000). As confirmed by the site visit, the most immediate threat to its survival is invasion of exotic pasture grasses and shading from larger plants. Accordingly, implementation of a vegetation management plan (VMP) to remove invasive species, within these high conservation areas will be an effective approach to mitigate threats to ensure this threatened plant can be protected in perpetuity.

Although not directly applicable to Coffs Harbour LGA, the Department of Planning and Environment (DPE) NSW Northern Councils E Zone Review Final Recommendations Report (2015), which established a criteria for the application of E2 and states that, 'E zones will not include buffers to the vegetation attributes that meet the E zone criteria', has been considered. This report also states that zoning should represent the primary use of the land defined as the, 'main use for which the land has been used for the last two years'. The portion of the site cleared in 2017, including the E2 buffer zones, for the past two years been managed as agricultural land and is periodically slashed. The zoning of the area should reflect this change

of land use. Accordingly, it may be appropriate for Council to consider the transition of these E2 buffer zones to E3 – Environmental Management zones. Elks (2019) recommended that the E2 buffer zones would be best managed as mowed pasture to minimise seed production of exotic grasses.

Areas of high conservation value should retain E2 zoning status. These areas include the TECs identified Figure 15 and BVs available in BOSET Report in Appendix 4. The occurrence of threatened species at the site contributes to the high biodiversity of the flora on the North Coast of NSW. Other threatened species are also likely to benefit from the conservation of these habitats.

5 Recommendations

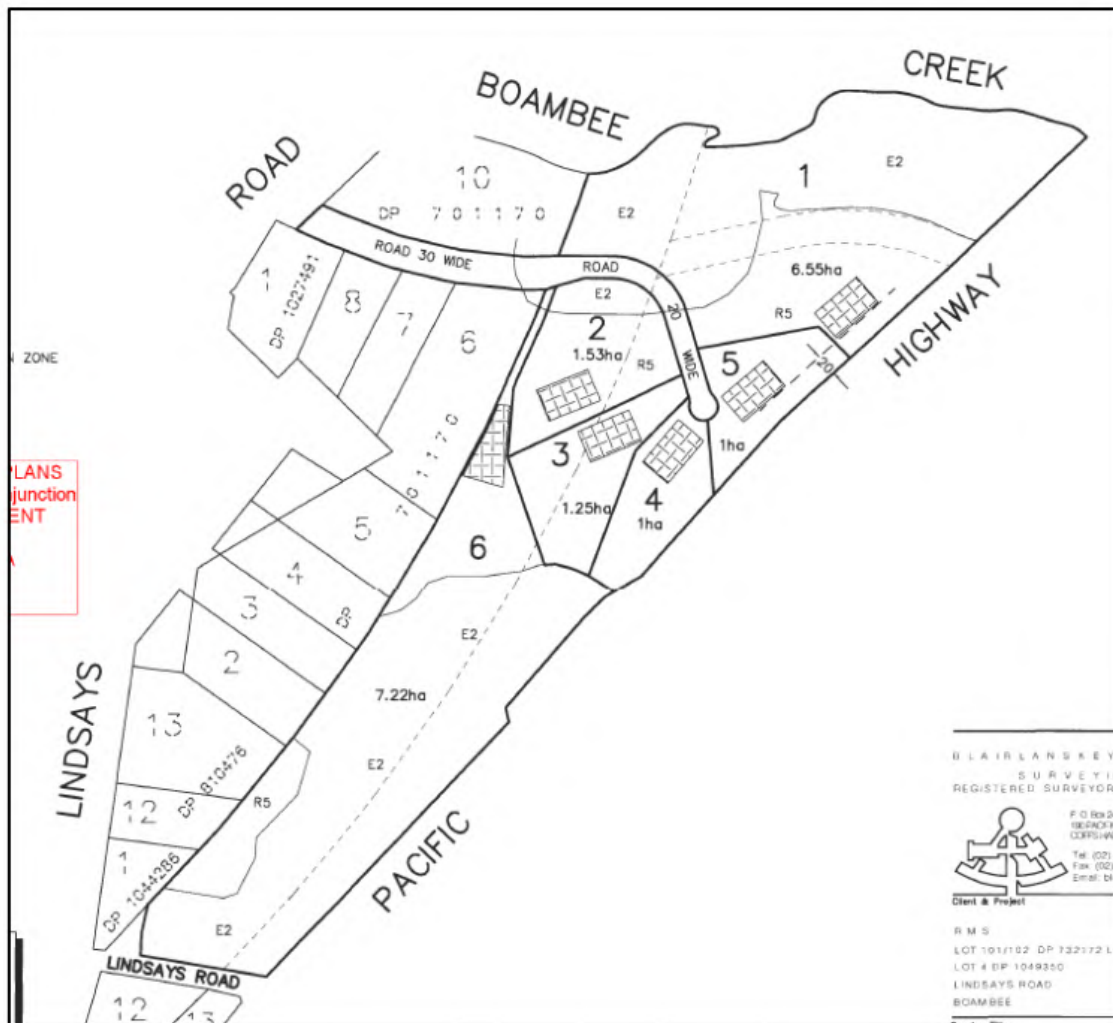
To manage the conservation values associated with the site, it is recommended that:

1. High conservation areas including TECs should retain E2 zoning status, however Council should consider removing E2 zoning in areas where extensive buffers have been applied over exotic grassland. E2 zoning should reflect the high conservation areas shown in Figure 3 in keeping with the E2 zoning definition.
2. E zoning amendments could be considered as part of this individual parcel of land or reviewed as part of a broader E zoning review of the LGA. There may be opportunities to incorporate E3 – Environmental Management zoning across relevant parts of the site.
3. Any future DA to increase lot yield should be accompanied by a VMP to protect the riparian zone along Boambee Creek and back swamp of Cordswell Creek. The VMP should be prepared in accordance with Council's preliminary VMP guidelines and the NSW Department of Industry Guidelines for controlled activities on waterfront land, riparian corridors and include:
 - specific protection measures to protect SSSR and HJG habitat including invasive weed removal around these two species
 - enhancement planting with koala food trees
 - removal of invading bamboo and slash pine.
4. Sediment and erosion control plan which considers the habitats and hydrological requirements of the two threatened plants during the construction phase.

References

- Bell DM, ML Campbell and JJ Bruhl 2000. Population Dynamics and Disturbance Regime of the Threatened Plant Square-stemmed Spike-rush *Eleocharis tetraquetra* Nees. Botany, School of Rural Science and Natural Resources UNE, Armidale
- Elks G, D Brown and N Cotsell 1999. *Eleocharis tetraquetra* Nees Recovery Plan. NSW NPWS Hurstville.
- Elks G 2015. Flora and Fauna Assessment, proposed tree removal at Boambee. Keiley Hunter Urban Planner Coffs Harbour
- Elks G 2015a. Vegetation Management Plan, Lindsays Road Boambee. Keiley Hunter Urban Planner Coffs Harbour
- Elks 2019. Amendments to E2 Zone, Lots 101 and 102 DP 732172, Lot 15 DP 861057 and Lot 4 DP 1049350 Lindsays Road, Boambee. Keiley Hunter Urban Planner Coffs Harbour.
- Office of Environment and Heritage, 2017a. Biodiversity Assessment Method Order 2017. Sydney NSW. <https://www.legislation.nsw.gov.au/regulations/2017-469.pdf>
- Office of Environment and Heritage, 2017b. Native Vegetation Integrity Benchmarks. Sydney NSW. <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/BioNet/native-vegetation-integrity-benchmarks-170440.pdf>
- Office of Environment and Heritage, 2019a. Threatened Species – Square-stemmed Spike-rush Profile. <https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10265>
- Office of Environment and Heritage, 2019b. Threatened Species – Hairy jointgrass Profile. <https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10066>
- NSW Government 1999. *Eleocharis tetraquetra* Nees Recovery Plan. NSW National Parks and Wildlife Service, Hurstville NSW. <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Recovery-plans/eleocharis-tetraquetra-nees-recovery-plan.pdf>
- NSW Government 2015. Northern Councils E Zone Review. Final Recommendations Report. Department of Planning and Environment. <https://www.planning.nsw.gov.au/Policy-and-Legislation/Environment-and-Heritage/Environmental-zones>
- NSW Government, 2017. NSW BioNet Vegetation Classification. Office of Environment and Heritage. <https://www.environment.nsw.gov.au/NSWVCA20PRapp>
- NSW Government, 2019. NSW BioNet Atlas Species Sightings. Office of Environment and Heritage. <https://www.environment.nsw.gov.au/wildlifeatlas/about.htm>

Appendix 1 Approved concept design



Appendix 2 EPBC Act protected matters search results



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.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 06/11/19 16:39:34

[Summary](#)

[Details](#)

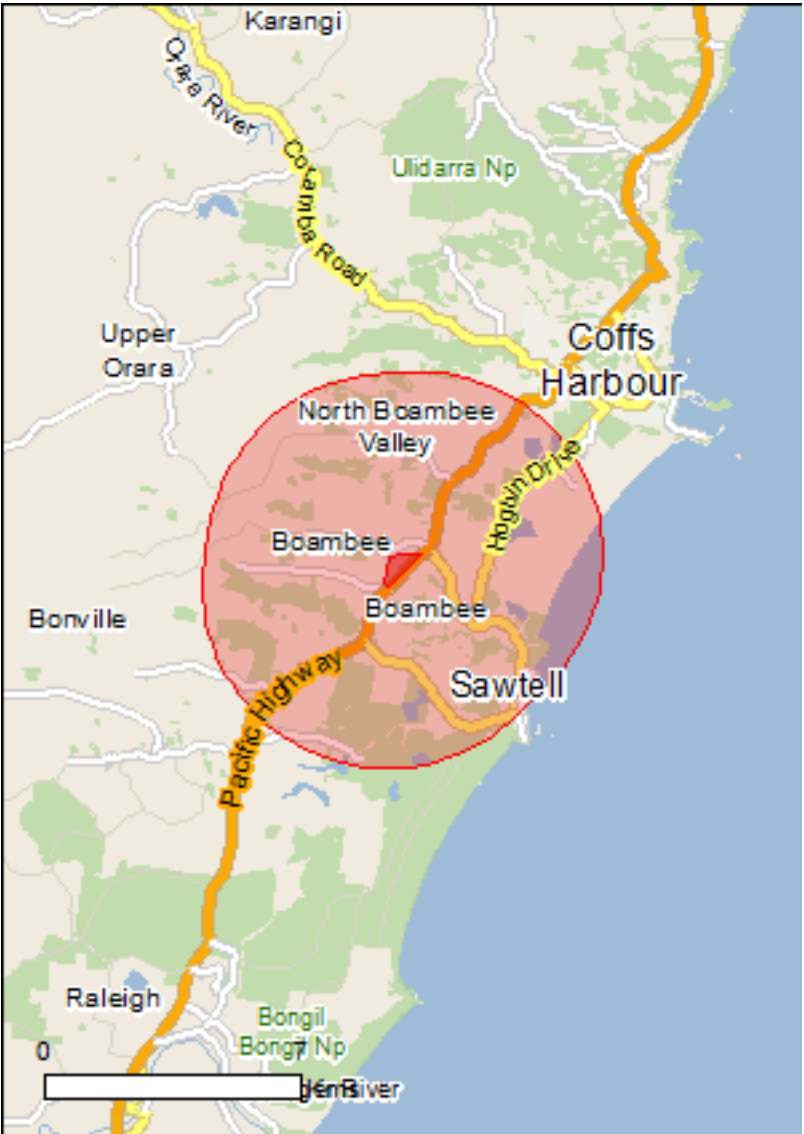
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are
©Commonwealth of Australia
(Geoscience Australia), ©PSMA 2010

[Coordinates](#)

[Buffer: 5.0Km](#)



Summary

Matters of National Environmental 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:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	80
Listed Migratory Species:	56

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 <http://www.environment.gov.au/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 Land:	4
Commonwealth Heritage Places:	None
Listed Marine Species:	88
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	2
Regional Forest Agreements:	1
Invasive Species:	40
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[Resource Information]

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

Name	Status	Type of Presence
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	Community likely to occur within area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species

[Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Name	Status	Type of Presence
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat likely to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat may occur within area
Fish		
Epinephelus daemeli Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat may occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Mixophyes iteratus Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat known to occur within area
Insects		
Argynnis hyperbius inconstans Australian Fritillary [88056]	Critically Endangered	Species or species habitat may occur within area
Phyllodes imperialis smithersi Pink Underwing Moth [86084]	Endangered	Species or species habitat may occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat known to occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area
Pseudomys oralis Hastings River Mouse, Koontoo [98]	Endangered	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Acronychia littoralis Scented Acronychia [8582]	Endangered	Species or species habitat likely to occur within area
Allocasuarina thalassoscopica [21927]	Endangered	Species or species habitat known to occur within area
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat known to occur within area
Corynocarpus rupestris subsp. rupestris Glenugie Karaka [19303]	Vulnerable	Species or species habitat known to occur within area
Cryptocarya foetida Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Endiandra hayesii Rusty Rose Walnut, Velvet Laurel [13866]	Vulnerable	Species or species habitat may occur within area
Haloragis exalata subsp. velutina Tall Velvet Sea-berry [16839]	Vulnerable	Species or species habitat may occur within area
Hicksbeachia pinnatifolia Monkey Nut, Bopple Nut, Red Bopple, Red Bopple Nut, Red Nut, Beef Nut, Red Apple Nut, Red Boppel Nut, Ivory Silky Oak [21189]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat may occur within area
Macadamia tetraphylla Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat likely to occur within area
Marsdenia longiloba Clear Milkvine [2794]	Vulnerable	Species or species habitat likely to occur within area
Parsonsia dorrigoensis Milky Silkpod [64684]	Endangered	Species or species habitat likely to occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat likely to occur within area
Samadera sp. Moonee Creek (J.King s.n. Nov. 1949) [86885]	Endangered	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat known to occur within area
Tylophora woollsii [20503]	Endangered	Species or species habitat likely to occur within area
Zieria prostrata Headland Zieria [56782]	Endangered	Species or species habitat known to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area
Sharks		
Carcharias taurus (east coast population) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat likely to occur within area
Ardenna pacifica Wedge-tailed Shearwater [84292]		Breeding known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Sternula albifrons Little Tern [82849]		Breeding likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Species or species habitat may occur within

Name	Threatened	Type of Presence
Thalassarche eremita Chatham Albatross [64457]	Endangered	area Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaena glacialis australis Southern Right Whale [75529]	Endangered*	Species or species habitat likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Dugong dugon Dugong [28]		Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land	[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.

Name
Commonwealth Land - Commonwealth Land - Australian Postal Commission Commonwealth Land - Australian Telecommunications Commission Commonwealth Land - Telstra Corporation Limited

Listed Marine Species	[Resource Information]
-----------------------	--

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		

Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Breeding likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Larus novaehollandiae Silver Gull [810]		Breeding known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species

Name	Threatened	Type of Presence
Monarcha trivirgatus Spectacled Monarch [610]	Critically Endangered	habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]		Species or species habitat known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]	Vulnerable	Breeding known to occur within area
Phoebetria fusca Sooty Albatross [1075]		Species or species habitat may occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Puffinus griseus Sooty Shearwater [1024]		Species or species habitat likely to occur within area
Puffinus pacificus Wedge-tailed Shearwater [1027]	Endangered*	Breeding known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]		Species or species habitat likely to occur within area
Sterna albifrons Little Tern [813]		Breeding likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche sp. nov. Pacific Albatross [66511]	Vulnerable*	Species or species

Name	Threatened	Type of Presence
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	habitat may occur within area Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat may occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area
Fish		
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
Campichthys tryoni Tryon's Pipefish [66193]		Species or species habitat may occur within area
Corythoichthys amplexus Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area
Corythoichthys ocellatus Orange-spotted Pipefish, Ocellated Pipefish [66203]		Species or species habitat may occur within area
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area
Hippichthys cyanospilos Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area
Hippichthys heptagonus Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
Hippocampus kelloggi Kellogg's Seahorse, Great Seahorse [66723]		Species or species habitat may occur within area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area
Hippocampus trimaculatus Three-spot Seahorse, Low-crowned Seahorse,		Species or species

Name	Threatened	Type of Presence
Flat-faced Seahorse [66720]		habitat may occur within area
Hippocampus whitei		
White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]		Species or species habitat likely to occur within area
Lissocampus runa		
Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata		
Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Micrognathus andersonii		
Anderson's Pipefish, Shortnose Pipefish [66253]		Species or species habitat may occur within area
Micrognathus brevirostris		
thorntail Pipefish, Thorn-tailed Pipefish [66254]		Species or species habitat may occur within area
Microphis manadensis		
Manado Pipefish, Manado River Pipefish [66258]		Species or species habitat may occur within area
Solegnathus dunckeri		
Duncker's Pipehorse [66271]		Species or species habitat may occur within area
Solegnathus hardwickii		
Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area
Solegnathus spinosissimus		
Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Solenostomus cyanopterus		
Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Solenostomus paradoxus		
Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area
Stigmatopora nigra		
Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Syngnathoides biaculeatus		
Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus		
Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
Urocampus carinirostris		
Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer		
Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Mammals		
Dugong dugon		
Dugong [28]		Species or species habitat may occur within area
Reptiles		

Name	Threatened	Type of Presence
Caretta caretta Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Hydrophis elegans Elegant Seasnake [1104]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur

Name	Status	Type of Presence
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		within area Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Bongil Bongil	NSW
LNE Special Management Zone No1	NSW

Regional Forest Agreements	[Resource Information]
----------------------------	--------------------------

Note that all areas with completed RFAs have been included.

Name	State
North East NSW RFA	New South Wales

Invasive Species	[Resource Information]
------------------	--------------------------

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species

Name	Status	Type of Presence
Turdus merula Common Blackbird, Eurasian Blackbird [596]		habitat likely to occur within area Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171] Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892] Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

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.

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

Where very little information is available for 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 reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

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

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

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

Coordinates

-30.34306 153.06861,-30.34333 153.06972,-30.33667 153.0775,-30.33667 153.07333,-30.33694 153.07,-30.34306 153.06861

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.

Appendix 3 Vegetation integrity score results (plot one)

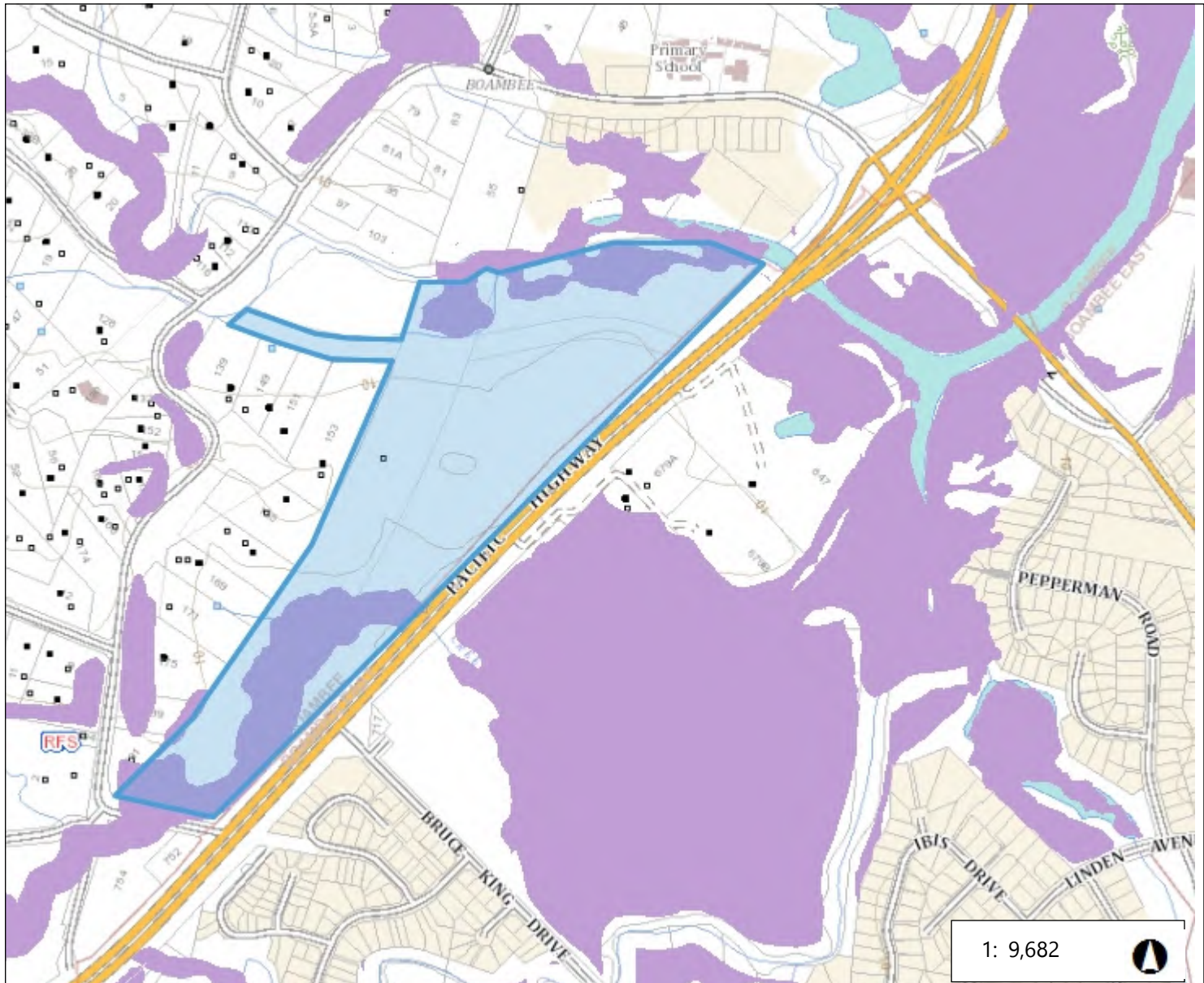

IMPORT SITE

Vegetation zones (Current vegetation integrity score)

#	Import	PCT code	Condition class *	Vegetation zone name	Patch Size*	Area (ha)*	Location	Composition condition score	Structure condition score	Function condition score	Current vegetation integrity score	Management zones	Delete
1		692 ▾	Classne	692_Class name1	10	1		26.4	8.4	13.2	14.3		

Appendix 4 BOSET report

Biodiversity Offset Scheme (BOS) Entry Threshold Map



491.8 0 245.91 491.8 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

© Office of Environment and Heritage |
NSW Environment & Heritage

Biodiversity Values Map and Threshold Report

Results Summary

Date of Calculation	14/01/2020 8:26 AM	BDAR Required*
Total Digitised Area	20.72 ha	
Minimum Lot Size Method	LEP	
Minimum Lot Size	1 ha	
Area Clearing Threshold	0.5 ha	
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)?	yes	yes
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 BOSET 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 Office of Environment and Heritage 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: 14/01/2020 08:26 AM

Revision History

Revision No.	Revision date	Details	Prepared by	Reviewed by	Approved by
00	15/01/2020	Environmental Assessment Boambee	Elspeth Thorpe, Scientist	Nigel Cotsell, Team Leader Coffs Harbour	Natalie Toon, Senior Environmental Scientist
01	04/08/2021	Environmental Assessment Boambee.FI	Trudy Thompson, Senior Scientist	Nigel Cotsell, Team Leader Coffs Harbour	Natalie Toon, Senior Environmental Scientist

Distribution List

Copy #	Date	Type	Issued to	Name
1	04/08/2021	Electronic	Environmental Planning Consultant	Grahame Fry
2	04/08/2021	Electronic	Ecosure	Administration

Citation: Ecosure, 2021, *Boambee Ecological Assessment*, Report to Jinderpal Singh Rai. Coffs Harbour

Report compiled by Ecosure Pty Ltd

ABN: 63 106 067 976

admin@ecosure.com.au

www.ecosure.com.au

PR4965-RE.EA Boambee.FI

Adelaide

PO Box 145
Pooraka SA 5095
P 1300 112 021
M 0407 295 766

Brisbane

PO Box 675
Fortitude Valley QLD 4006
P 07 3606 1030

Coffs Harbour

PO Box 4370
Coffs Harbour Jetty NSW 2450
P 02 5621 8103

Gladstone

PO Box 5420
Gladstone QLD 4720
P 07 4994 1000

Gold Coast

PO Box 404
West Burleigh QLD 4219
P 07 5508 2046
F 07 5508 2544

Rockhampton

PO Box 235
Rockhampton QLD 4700
P 07 4994 1000

Sunshine Coast

PO Box 1457
Noosaville QLD 4566
P 07 5357 6019

Sydney

PO Box 880
Surry Hills NSW 2010
P 1300 112 021

Townsville

PO Box 2335
Townsville QLD 4810
P 1300 112 021



© Ecosure Proprietary Limited 2021

Commercial in confidence. The information contained in this document produced by Ecosure Pty Ltd is solely for the use of the Client identified on the cover sheet for the purpose for which it has been prepared and Ecosure Pty Ltd undertakes no duty to or accepts any responsibility to any third party who may rely upon this document. All rights reserved. No section or element of this document may be removed from this document, reproduced, electronically stored or transmitted in any form without the written permission of Ecosure Pty Ltd.

Appendix 4

Review of impacts of proposed modification of C2 Zone at Lot 101 DP 732172 on Square-stemmed spike-rush *Eleocharis tetraquetra*

**Review of impacts of proposed modification of C2 Zone at Lot 101 DP
732172 on Square-stemmed spike-rush *Eleocharis tetraquetra***

Prepared for

Keiley Hunter Town Planner

G N Elks BSc MLitt. Botanist and Plant Ecologist

Idyll Spaces Environmental Consultants

21 Titans Close Bonville 2450

gregelks@bigpond.com

10 October 2022

Contents

Introduction	3
Background	3
History of C2 zone & <i>Eleocharis tetraquetra</i>	3
Justification for proposed amendments to C2 Zone.....	6
Conclusion-.....	7
References	8

Figures

Figure 1. 2015 invasion of <i>E. tetraquetra</i> habitat by <i>Setaria</i> grass from stockpile.....	4
Figure 2. Aerial image of the northern part of the property (CHCC 2022) showing the SSSR population, relevant adjoining features and existing & proposed C2 zone boundaries.	5
Figure 3. Ecological significance criteria for identification of conservation zoning.....	6

Introduction

Background

A Planning Proposal prepared for land located between Lindsays Road and the Pacific Highway at Boambee approximately 6 kilometres southwest of Coffs Harbour (Keiley Hunter Urban Planners 2021) would enable a residential subdivision of the land resulting in up to 15 rural residential lots.

The PP seeks to amend the CHLEP 2013 to reduce the Minimum Subdivision Lot Size of the R5 Large Lot Residential zoned part of the subject land from 1 ha to 6,000 m²; and adjust the C2 Environmental Conservation zone boundary to exclude invasive exotic grassland and reflect the actual extent of high conservation value land, as recommended by Ecosure (2021).

History of C2 zone & *Eleocharis tetraquetra*

Exotic grassland was included in the C2 zone under the provisions of LEP 2000 as a 50 metre buffer to three occurrences of the Square-stemmed spike-rush *Eleocharis tetraquetra*, a recently re-discovered plant species.

Until it was recorded in Boambee in 1998, the Square-stemmed spike-rush (SSSR) was classified as extinct in NSW. The species was initially recorded at two locations on the property, one in the north of the property (numerous clumps occupying an extensive area) and another in the east (a single small clump). Some additional clumps were detected in 1999 on a property adjoining s to the west of the subject property as part of the preparation of a recovery plan for the species.

The *Eleocharis tetraquetra* Recovery Plan (Elks Brown & Cotsell 1999) identified threats to the population associated with cessation of a stable long-term agricultural landuse regime, and movement and stockpiling of large quantities of soil in the catchment of the main northern occurrence of the species, potentially causing changes to soil moisture and nutrient regimes and introduction of new invasive plant species.

Soil stockpiled in the species catchment was later identified (Whitehead & Associates 2016) as consisting of approximately 14,000m³ of 'excess roadcut subsoils and poor engineering swampy soils sourced from alongside the Pacific Highway during upgrade works'.

Field research undertaken by Bell (2004) indicated that SSSR is a coloniser of disturbed ground and that recruitment only occurs in gaps. Survival of the population is therefore likely to be dependent upon some form of disturbance to open up gaps. In the past this included cattle grazing, trampling by Wallabies and gaps from weed control activities.

Monitoring undertaken concurrently by Benwell (1999 - 2004) found a major decrease in cover of SSSR and an associated increase in the native grass *Isachne globosa* in the years from 2001 to 2004, which he attributed to several factors, including (i) removal of cattle grazing of the grass *Isachne globosa* (ii) eutrophication from run-off from the large, earth stockpile formed alongside the site during highway construction work and (iii) a decline in dry season rainfall.

Searches undertaken for the flora assessment (Elks 2015) found that SSSR had survived on the site but that the extent of its habitat in the northern part of the property had contracted due to invasion by exotic *Setaria* grass. *Setaria* was introduced to the property during roadworks in the late 1990's

and by 2015 was completely dominant, especially on the soil stockpile upslope from the main SSSR habitat, with an invasion front moving into and eliminating part of the population. (Figure 1).



Figure 1. 2015 invasion of *E. tetraquetra* habitat (foreground) by *Setaria* grass from stockpile (background)

In order to manage this problem the VMP (Elks 2015a) proposed that the area between the proposed access road and the freshwater wetland supporting main population of SSSR be planted with *Callistemon salignus* and *Lomandra longifolia* and mulched which, together with the roadway would function as a physical barrier to invasion of SSSR habitat by *Setaria* dispersed as seed from upslope.

In addition the VMP proposed maintenance over 5 years to control weeds within 10m of SSSR, thereby minimising the impacts of weed invasion in general and of *Setaria* grass in particular as representative of the Key Threatening Process *Invasion of native plant communities by exotic perennial grasses*.

A further increase in cover and abundance of *Setaria* in SSSR habitat has been documented (Elks 2020 p.4). Subsequent observations (Elks 2022) confirm that the main threat to the species is still weed invasion; other weeds that have become common in the habitat since the late 1990's include *Paspalum mandiocanum*, *Ageratina adenophora* and *Ageratum houstonianum*.

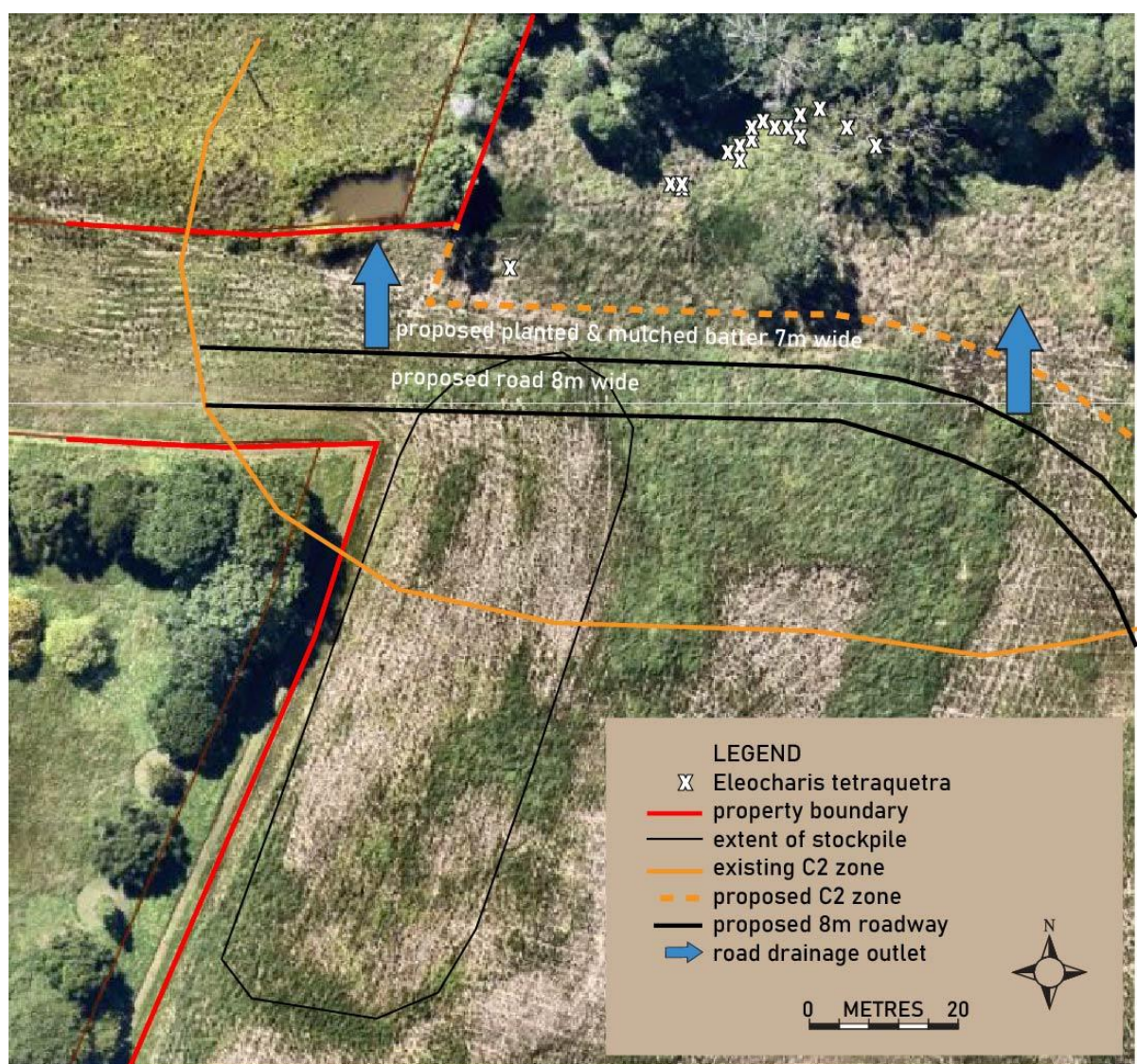


Figure 2. Aerial image of the northern part of the property (CHCC 2022) showing the SSSR population, relevant adjoining features and existing & proposed C2 zone boundaries.

Justification for proposed amendments to C2 Zone

1. That part of the existing C2 zone proposed to be re-zoned R5 Large Lot Residential does not contain high conservation value vegetation

Vegetation included in C2 zones are generally those identified as being of high or very high ecological significance as documented in Table 1 of Ecograph in February 2002 (**Figure 3**) and zoned for environmental protection in LEP 2000 and LEP 2013.

TABLE 1 - ECOLOGICAL SIGNIFICANCE CRITERIA

Ecological Attribute	Ecological Status Category (GIS code; Field = ECOLCRA4)			
	Very High (1)	High (2)	Moderate (3)	Low (4)
Reservation Status (% target Met)	Not conserved (0-33%)	Poorly conserved (33-67%)	Inadequately conserved (67-100%)	Adequately conserved (>100%)
Depletion Status (% Remaining)	Very Highly depleted (0-30%)	Highly depleted (30-50%)	Moderately depleted (50-70%)	Not significantly depleted (70-100%)
R&E Status (Endangered, Vulnerable, etc)	Rare, Vulnerable inadequately conserved (target not met)	Vulnerable adequately conserved (target met)	-	-
Growth Stage (Old Growth etc)	Candidate Old Growth	Disturbed Old Forest; Mature Forest	Disturbed Mature Forest	-
Significant Ecosystems (Riparian, Wetlands, Estuarine, Dunal, Biodiverse)	All	-	-	-
Koala Habitat	Primary	Secondary	Tertiary >25ha	Tertiary <25ha
Key Fauna Habitats (Core, Hot Spots, Centres of Endemism)	N/A	All	-	-
Corridors	N/A	Regional	Sub-regional	-
Connectivity	N/A	N/A	Well Connected	Partially Connected
Remnant Size	N/A	>500ha	25-500ha	<25ha
Remnant Diversity (No of Vegtypes in Remnant)	N/A	N/A	>=4	<4
Disturbance Status (Regrowth, Scattered Trees etc)	NOT "Regrowth", "Scattered Trees", "Eucalypt Plantation", "Highly Disturbed Riparian"	NOT "Regrowth", "Scattered Trees", "Eucalypt Plantation"	NOT "Regrowth", "Scattered Trees", "Eucalypt Plantation"	"Regrowth", "Scattered Trees", "Eucalypt Plantation"

Notes for Table 1

- Allocation to categories hierarchical: Very High determined first, High determined second etc.
- Mapped areas must meet at least one of the criteria listed for the relevant category but not of the exclusions associated with Disturbance Status.

Figure 3. Ecological significance criteria for identification of conservation zoning

The existing 50 metre wide buffers to SSSR were apparently added outside of these criteria in an attempt to protect the recently re-discovered SSSR, at a time when there was little information available as to its ecology.

However the 50 metre buffer proposed for re-zoning to R5 consists almost entirely of the invasive exotic grass *Setaria*. No native plant species were recorded in this community adjoining the northern population (Ecosure 2021). The vegetation in the areas proposed for re-zoning does not meet any of the above ecological significance criteria for inclusion in the C2 zone.

Nor does the vegetation meet any of the E2 Zone criteria set out in Table 1 of NSW Department of Planning and Environment's (2015) E Zone Review.

2. Vegetation in that part of the existing C2 zone proposed for re-zoning threatens SSSR

Setaria is currently the major threat to SSSR on the property. In order to minimise that threat it is essential that the dispersal of *Setaria* seed into SSSR habitat is reduced.

There are two main ways of reducing dispersal of *Setaria* seed into SSSR habitat:

- provide a physical barrier to dispersal, such as a roadway and a road verge free of *Setaria*, and
- reduce or prevent *Setaria* seed production by frequent mowing or replacing *Setaria* with a less invasive lawn grass species.

Conclusion-

The proposal includes re-zoning of parts of the C2 zone that do not contain vegetation of ecological or conservation significance to R5, construction of an access road, and large lot residential subdivision and occupation of the R5 land. The benefits of the proposal to SSSR and other ecologically significant vegetation are as follows.

Construction of the road would provide a physical barrier between vegetation of ecological significance, which includes freshwater wetlands and a population of SSSR, and exotic grassland threatening that vegetation. It is proposed that the road would divert stormwater away from the population of SSSR, upstream of that population into an existing artificial pond, and downstream of the population into an area of non-wetland vegetation. The physical barrier of the road, stormwater infrastructure and a benignly vegetated and mulched road batter and would divert stormwater flows and any associated sediment, nutrients and weed seeds away from the northern SSSR population.

The re-zoning would facilitate large lot residential development, which would reduce or prevent *Setaria* seed production by means of frequent mowing and/or replacing *Setaria* with less invasive lawn grass species, which will reduce invasion of *Setaria* into adjoining vegetation of ecological significance. Establishment of lawns and frequent mowing, which are characteristic management regimes in large lot residential areas, would also reduce the numbers of other weeds such as *Paspalum mandiocanum*, *Ageratina adenophora* and *Ageratum houstonianum* that are currently common on the property and invading areas of ecological significance.

References

- Bell DM, ML Campbell and JJ Bruhl 2000. Population Dynamics and Disturbance Regime of the Threatened Plant Square-stemmed Spike-rush *Eleocharis tetraquetra* Nees. Botany, School of Rural Science and Natural Resources UNE, Armidale
- Benwell A 2004. Population Monitoring of the Square-stemmed Spike Rush (*Eleocharis tetraquetra*) in NSW: Year 6. National Parks and Wildlife Service Coffs Harbour
- Ecosure 2021. Environmental Assessment Boambee. Keiley Hunter Urban Planners Coffs Harbour.
- Elks G, D Brown and N Cotsell 1999. *Eleocharis tetraquetra* Nees Recovery Plan. NSW NPWS Hurstville.
- Elks G 2015. Flora & Fauna Assessment, proposed tree removal at Boambee. Keiley Hunter Urban Planners Coffs Harbour.
- Elks G 2015a. Vegetation Management Plan, Lindsays Road Boambee. Keiley Hunter Urban Planners Coffs Harbour.
- Elks G 2020. Review of extent of works carried out under the 2015 VMP for Lindsays Road Boambee. Keiley Hunter Urban Planners Coffs Harbour.
- Elks G 2022. Targeted survey for *Arthraxon hispidus* and *Eleocharis tetraquetra* Lot 15 DP 861057, Lots 101/102 DP 732172 & Lot 4 DP 1049350, Boambee. Keiley Hunter Urban Planners Coffs Harbour.
- NSW Department of Planning and Environment 2015. Northern Councils E Zone Review Final Recommendations Report.
- Whitehead & Associates 2016. Preliminary Stockpile Contamination Assessment for Lindsays Road, Boambee. Keiley Hunter Urban Planners Coffs Harbour.



Whitehead & Associates

Environmental Consultants Pty Ltd

2/13 Industrial Drive, North Boambee Valley NSW 2450

PO Box 23 Bellingen NSW 2454 Australia

Telephone +61 2 6651 1512

Email mnc@whiteheadenvironmental.com.au

Wastewater Capability Assessment Lot 4, 10, 15, 101 & 102 Lindsays Road, Boambee

Prepared for: Jindra Rai

Prepared by: Heather Murphy

Whitehead & Associates Environmental Consultants Pty Ltd
2/13 Industrial Drive, North Boambee Valley NSW 2450

Telephone: 02 6651 1512

Email: mnc@whiteheadenvironmental.com.au

Document Control Sheet

Document and Project Details					
Document Title:	Wastewater Capability Assessment Lot 4, 10, 15, 101 & 102 Lindsays Road, Boambee				
Author:	Heather Murphy				
Project Manager:	Strider Duerinckx				
Date of Issue:	4 February 2020				
Job Reference:	2539 WCA 040220sd				
Synopsis:	A broad assessment of minimum lot size for wastewater capability at the subject site to support a planning proposal.				
Client Details					
Client:	Jindra Rai				
Primary Contact:	Keiley Hunter Town Planning				
Document Distribution					
Version Number	Date	Status	DISTRIBUTION – NUMBER OF COPIES (p – print copy; e – electronic copy)		
			Client	Council	Planner
1	090120	DRAFT	1e	-	1e
2	040220	Final	1e		1e
Document Verification					
Checked by:			Issued by:		
Strider Duerinckx 			Heather Murphy 		

Disclaimer

The information contained in this report is based on independent research undertaken by Heather Murphy of Whitehead & Associates Environmental Consultants Pty Ltd. To our knowledge, it does not contain any false, misleading or incomplete information. Recommendations are based on an honest appraisal of the Site's opportunities and constraints, subject to the limited scope and resources available for this project, and follow relevant best practice standards and guidelines where applicable, including:

- AS/NZS 1547: *On-site Domestic Wastewater Management* (Standards Australia / Standards New Zealand, 2012); and
- NSW Department of Local Government (1998) *Environment & Health Protection Guidelines: Onsite Sewage Management for Single Households*.

Copyright Note

© Whitehead & Associates Environmental Consultants Pty Ltd, 2020

This report and accompanying plans were prepared for the exclusive use of Jindra Rai (the "Client"). No extract of text of this document may be reproduced, stored or transmitted in any form without the prior consent of Whitehead & Associates. Plans accompanying this document may not be reproduced, stored or transmitted in any form unless this copyright note is included.

Table of Contents

1. Introduction	1
1.1. Site Identification	1
1.2. Purpose and Scope	1
2. Site & Soil Assessment.....	1
2.1. Site Constraints	1
2.2. Soils.....	4
2.3. Climate	5
2.4. Water & Nutrient Balance	5
2.4.1 Primary Treatment	5
2.4.2 Secondary Treatment	7
2.4.3 Summary of Maximum Wastewater Envelope	8
3. Lot Size Comparison.....	8
3.1. Methodology	8
3.2. Buffer Distances	9
3.3. Lots Assessed	9
3.4. Assessed Available Effluent Management Area	9
4. Minimum Lot Size	10
5. Conclusions	11
6. References	11

Tables

Table 1: Proposed Lot Site Constraints	2
Table 2: Inputs and Results of Primary Treatment Hydraulic Modelling	6
Table 3: Inputs and Results of Primary Treatment Nutrient Balance Modelling	6
Table 4: Inputs and Results of Secondary Treatment Water Balance Modelling	7
Table 5: Inputs and Results of Secondary Treatment Nutrient Balance Modelling	7
Table 6: Maximum Land Application Area Required.....	8
Table 7: Lot Comparison for Restricted Area and Available EMA	10
Table 8: Minimum Lot Size Analysis	10

Figures

Figure 1	Site Location
Figure 2	Zoning and Flood Boundaries
Figure 3	Site and Soil Constraints
Figure 4	Minimum Lot Size Assessment

Appendices

Appendix A	Water & Nutrient Balances
------------	---------------------------

1. Introduction

Whitehead & associates (W&A) were engaged to undertake a Wastewater Capability Assessment (WCA) for Lot 4, 10, 15, 101 & 102 Lindsays Road, Boambee (the “Site”).

1.1. Site Identification

The Site is approximately 21.8Ha and is located between Lindsays Road and the Pacific Highway at Boambee (Figure 1). The Site comprises 5 lots including:

- Lot 4 DP1049350;
- Lot 10 DP701170;
- Lot 15 DP861057;
- Lot 101 DP732172; and
- Lot 102 DP732172.

The Site is zoned R5 Large Lot Residential in the central portion and E2 Environmental Conservation in the northern portion bordering Boambee Creek and the southern portion bordering Cordwells Creek Flood Channel (Figure 2). A 7.9ha portion has been approved for subdivision into 6 lots of minimum 10,000m² area per lot.

1.2. Purpose and Scope

Currently the minimum lot size for R5 large lot residential is 10,000m² in area. It is proposed to reduce the minimum lot size to 5,000m², and the purpose of this WCA is to show that there is sufficient area available for sustainable wastewater application at the reduced area.

In order to achieve this purpose, W&A undertook comparative lot size analysis on three adjacent large lot residential properties. The scope included:

- A preliminary desktop review of site and soil conditions;
- Modelling of required wastewater envelopes for the subdivided property under assumed conditions; and
- Assessment of lot sizing and wastewater capability in four existing adjacent lots. For each of these properties, the developed footprint, buffer requirements and site constraints (flooding, waterways, etc) were assessed such as to calculate the typical available area for on-site wastewater application. Then the available area was compared to the maximum required wastewater envelope.

2. Site & Soil Assessment

The Site is located on a broad ridgeline, with swampy ground associated with creeks to the north and south. The Site currently vegetated mainly with grasses.

2.1. Site Constraints

Table 1 summarises the Site constraints for effluent management for the proposed area for subdivision. These are discussed in terms of the degree of limitation they present (i.e. minor, moderate or major limitation) for on-site effluent application. Reference is made to the rating scale described in Table 4 of DLG (1998). Site features are presented in Figure 3.

Table 1: Proposed Lot Site Constraints

Constraint	Degree of Limitation
Landform: Waxing divergent to linear divergent to convergent upper slope to midslope locations.	Minor to moderate
Exposure: Good exposure. All areas are cleared with minimal shading.	Minor
Slope: Gentle to moderate slopes of 4-18%.	Minor
Rocks and Rock Outcrops: None noted nor expected for the soil landscape and position.	Minor
Erosion Potential: No active erosion was noted. The gentle to moderate slopes would give a moderate risk of erosion.	Moderate
Climate: The Site experiences a sub-tropical-temperate climate, typical of north-eastern NSW.	Minor
Vegetation: Grass paddock.	Minor
Fill: A large fill platform was present in the northwest portion of the Site. This platform had been created during upgrade of the adjacent Pacific Highway upgrade, but was removed in early 2018 and the groundsurface restored to prefilling levels. No fill is visible on the remainder of the area.	Moderate
Surface Waters: The development area straddles a broad ridgeline crest running through the centre of the Site from west to east. The northern portion generally drains to the north over grassed paddock over 100m from the nearest lot edge to Boambee Creek, which is a perennial waterway. The southern portion drains generally to the south towards the Cordwells Creek Flood Channel, which is an intermittent waterway. Lot layout would allow for a 100m buffer from the effluent management areas to the Boambee Creek and 40m buffer to the Flood Channel.	Minor
Groundwater: (NSW Office of Water: Groundwater Bore Search) The closest registered domestic bore is over 75m to the west of the central portion of the development area (GW073420). The bore is 47m deep, with the standing water level at 19m and water bearing zones at 21-22m and 35-36m in fractured bedrock. A second registered domestic bore is located over 90m to the west of the southern portion of the area (GW304169). The bore is 24m deep, with the standing water level at 6m and a water bearing zone at 12-24m in fractured bedrock.	Major

Constraint	Degree of Limitation
A third registered domestic bore is over 120m to the west of the northern portion of the area (GW065690). The bore is 15m deep, with the standing water level at 6m and a water bearing zone at 9-15m in fractured bedrock. Groundwater vulnerability? Clay subsoil and deep groundwater depth indicate that the risk to groundwater would be minimal.	
Stormwater run-on and upslope seepage: Given the ridge crest and upper slope positions, the lots would have only minor to moderate run-on from upslope areas.	Minor-Moderate
Flood Potential: A very small portion of the northeast corner of the development area is impacted by flood extents on the CHCC flood mapping (Figure 2). DLG (1998) Guidelines only require effluent application to land to be located above the 1 in 20 year flooding extents, which are lower in height than the 1 in 100 year flood heights, therefore impacting less of the proposed area. 1 in 20 year flood mapping is not available on Council's online GIS, as such the higher 1 in 100 flood extents have been used for this study as a worst case scenario.	Moderate



Photograph 1: View of long northern slope, looking southwest towards the ridgeline

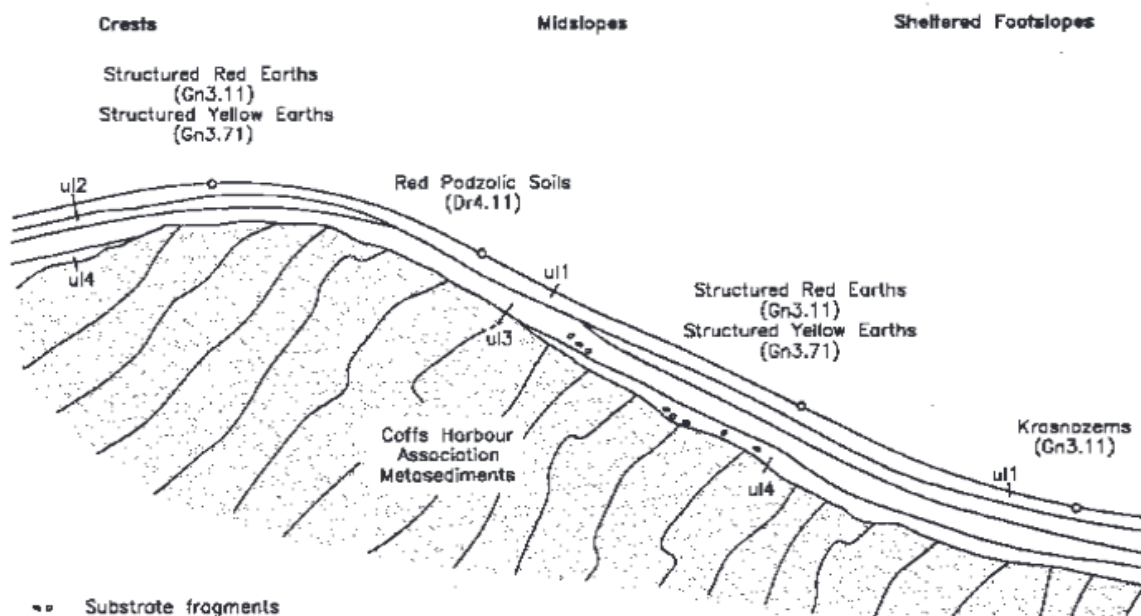
2.2. Soils

Soils and associated landform elements play a vital role in the design, operation and performance of OSMS. Key soil properties can be evaluated to assess a soil's capacity for absorption of wastewater, including soil texture, structure, permeability, drainage characteristics, total depth, and depth to limiting layers, such as bedrock, hardpans or water tables.

There are two mapped soil landscapes on the Site; of which only Ulong Soil Landscape falls within the area identified for potential subdivision based on the Coffs Harbour 1:100,000 soil landscape series (Milford, 1999) (Figure 3). Ulong Soil Landscape is an erosional landscape located on undulating to rolling low hills on late Carboniferous metasediments of the Coffs Harbour association. Slopes within the landscape are typically 5-20% and vegetation is partially cleared, tall open-forest and tall closed-forest.

Soils are moderately deep to deep (>100cm), well-drained structured Red and Brown Earths and Red and Yellow Podzolic Soils. Deep (>1.5m), well-drained Krasnozems occur in moistest areas, and moderately deep (>1m), imperfectly-drained structured Yellow Earths and Podzolic Soils in drier areas. Soil depth generally increases from upper slope to lower slopes. Limitations include strongly to very strongly acid soils with low subsoil fertility.

The soils are characterised by thick dark loam to clay loam topsoil (up to 300mm), underlain by reddish brown clay loam and clay of 0.8-1m thickness, underlain by reddish brown light to medium silty clay (up to 1m thick). Bedrock is typically located at 1-2.5m depth.



Photograph 2: Typical Ulong Soil Landscape cross section

Based on extensive experience of drilling boreholes on Ulong Soil Landscape and in Boambee by the author, the limiting subsoil horizon for effluent application would be the B Horizon of light clay from 0.4/0.5-1.1m depth. A Design Loading Rate (DLR) of 8mm/day

for primary treated effluent into trenches and 12mm/day for secondary treated effluent into trenches, and a Design Irrigation Rate (DIR) of 3mm/day for secondary treated effluent with subsurface irrigation is recommended by AS/NZS 1547:2012.

2.3. Climate

The nearest Bureau of Metrology (BoM) weather station to the Site is Coffs Harbour MO (opened 1943, closed 2015) (BoM number 59040) which is approximately 4km north-northwest of the Site. Coffs Harbour MO experiences a mean annual rainfall of 1,699mm, with a monthly high of 234.6mm in March and monthly low of 59.9mm in September. Coffs Harbour experiences mean annual pan evaporation of 1,606mm, with a monthly high of 192.2mm in January and December and a monthly low of 69mm in June.

Average rainfall data rather than median data was conservatively utilised for the modelling of effluent application at this broad scale of study.

2.4. Water & Nutrient Balance

Water and nutrient balance modelling was undertaken for assumed developed conditions to calculate the maximum wastewater envelope that could be required for the lots. Both primary treated and secondary treated conditions were modelled with different (trench or irrigation) options so as to determine the maximum envelope requirement. The largest footprint was then adopted.

2.4.1 Primary Treatment

Water balance modelling was undertaken to determine sustainable effluent application rates, and from this estimate the necessary size of the Effluent Management Area (EMA) required for effluent to be applied from a primary treatment system trench or beds. The procedures used in the water balance generally follow the AS/NZS 1547:2012 standard and DLG (1998) guideline. The water balance used is a monthly nominated area model. These calculations determined minimum EMAs for given effluent loads for each month of the year. The water balance can be expressed by the following equation:

$$\text{Precipitation} + \text{Effluent Applied} = \text{Evapotranspiration} + \text{Percolation} + \text{Storage}$$

The water balance conservatively assumes a retained rainfall coefficient of 0.9; that is, generally 90% of rainfall will percolate into the soil and 10% will run off. Given the gentle slopes and good groundcover at the Site, this is considered a conservative value. The rainfall hydraulic load is incorporated into the water balance to ensure that runoff from the EMA will not occur under design climatic conditions.

Water balance modelling has been based on a four bedroom home on reticulated town water (or tank water with a groundwater bore or creek back-up) in accordance with AS/NZS 1547:2012 with a rate of 150L/p/day. This has been conservatively used to allow for the potential for future connection to reticulated town water, which is possible considering the location. The input data and results for the primary treated trench/ bed water balance are presented in Table 2, and calculation sheets in Appendix A.

A conservative nutrient balance was also undertaken, which calculates the minimum buffer around a trench or bed to enable nutrients to be assimilated by the soils and vegetation. The nutrient balance used here is based on the simplistic DLG (1998) methodology, but improves this by more accurately accounting for natural nutrient cycles and processes. It acknowledges that a proportion of nitrogen will be retained in the soil through processes such as ammonification (the conversion of organic nitrogen to ammonia) and a certain amount will be lost by denitrification, microbial digestion and

volatilisation (Patterson, 2003). Patterson (2002) estimates that these processes may account for up to 40% of total nitrogen loss from soil. In this case, a more conservative estimate of 20% is adopted for the nitrogen losses due to soil processes. A summary of the nutrient balance is provided in Table 3.

Table 2: Inputs and Results of Primary Treatment Hydraulic Modelling

Data Parameter	Units	Value	Comments
Hydraulic load	L/day	900	6 persons occupancy
Precipitation	mm/month	Coffs Harbour MO	BoM, mean monthly
Pan Evaporation	mm/month	Coffs Harbour MO	BoM, mean monthly
Retained rainfall	unitless	0.9	Proportion of rainfall that remains onsite and infiltrates the soil, allowing for 10% runoff.
Crop Factor	unitless	0.6-0.8	Expected annual range for vegetation based on monthly values.
Design Loading Rate (DLR) - Primary	mm/day	8	Maximum rate for design purposes, based on light clay subsoils.
Minimum primary treatment trench/ bed basal area for hydraulic load (m²)			165m²

Table 3: Inputs and Results of Primary Treatment Nutrient Balance Modelling

Data Parameter	Units	Value	Comments
Effluent total nitrogen concentration	mg/L	60	Target effluent quality for primary treatment systems.
Nitrogen lost to soil processes (denitrification and volatilisation)	annual percentage	20	Patterson (2002).
Effluent total phosphorus concentration	mg/L	15	Target effluent quality for primary treatment systems.
Soil phosphorus sorption capacity	mg/kg	790	Value based on soil landscape data for ul3.
Nitrogen uptake rate by plants	kg/Ha/yr	250	Conservative estimated value.
Phosphorus uptake rate by plants	kg/Ha/yr	25	Conservative estimated value.
Design life of system (for nutrient management)	years	50	Reasonable minimum service life for system.
Minimum primary treatment trench/ bed area for total phosphorus load, without off-site export			258m²
Minimum primary treatment trench/ bed area for total nitrogen load, without off-site export			631m²

2.4.2 Secondary Treatment

Water and nutrient balance modelling were also undertaken to determine sustainable sizing of trench/bed and irrigation EMAs for secondary treated effluent.

Irrigation areas are calculated to achieve no net excess of water and hence “zero” storage for all months. Due to the average monthly rainfall data being higher than the evaporation during the month of March, the standard monthly nominated area water balance is not able to be utilised. As such, the daily water balance calculator from Clarence Valley Council has been updated with Coffs Harbour rainfall data to provide the SSI figure. The daily model utilises individual day rainfall and evaporation climatic data that overcomes the monthly aggregation method used in the monthly waterbalance, but provides a less conservative calculation.

Table 4 and Table 5 below contain the input data and results of the water and nutrient balances.

Table 4: Inputs and Results of Secondary Treatment Water Balance Modelling

Data Parameter	Units	Value	Comments
Hydraulic load	L/day	900	6 persons occupancy
Precipitation	mm/month	Coffs Harbour MO	BoM, mean monthly
Pan Evaporation	mm/month	Coffs Harbour MO	BoM, mean monthly
Retained rainfall	unitless	0.9	Proportion of rainfall that remains onsite and infiltrates the soil, allowing for 10% runoff.
Crop Factor	unitless	0.6-0.8	Expected annual range for vegetation based on monthly values.
Design Irrigation Rate (DIR)	mm/day	3	Maximum rate for design purposes, based on light clay subsoils.
DLR - Secondary	mm/day	12	Maximum rate for design purposes, based on light clay subsoils.
Minimum secondary treatment irrigation area for hydraulic load, without wet weather storage (m²)			380m²
Minimum secondary treatment trench/ bed basal area for hydraulic load (m²)			96m²

Table 5: Inputs and Results of Secondary Treatment Nutrient Balance Modelling

Data Parameter	Units	Value	Comments
Effluent total nitrogen concentration	mg/L	30	Target effluent quality for secondary treatment systems.
Nitrogen lost to soil processes (denitrification and volatilisation)	annual percentage	20	Patterson (2002).
Effluent total phosphorus concentration	mg/L	10	Target effluent quality for secondary treatment systems.

Soil phosphorus sorption capacity	mg/kg	790	Value based on soil landscape data for ul3.
Nitrogen uptake rate by plants	kg/Ha/yr	250	Conservative estimated value.
Phosphorus uptake rate by plants	kg/Ha/yr	25	Conservative estimated value.
Design life of system (for nutrient management)	years	50	Reasonable minimum service life for system.
Minimum secondary treatment EMA for total phosphorus load, without off-site export			172m²
Minimum secondary treatment EMA for total nitrogen load, without off-site export			315m²

2.4.3 Summary of Maximum Wastewater Envelope

The calculated maximum land application area requirements for each of the treatment scenarios are summarised in Table 6. Based on the modelling, a maximum wastewater envelope of 1,262m² has been adopted. This is a conservatively large envelope to show for planning purposes suitability of a minimum lot size for the Site.

Table 6: Maximum Land Application Area Required

Condition	Area Required (m²)	Max Area Including Backup or Reserve Area (m²)
Primary Treatment - Trench/Bed Absorption System	631	1,262
Secondary Treatment - Trench/Bed Absorption System	315	630
Subsurface Irrigation	380	760

3. Lot Size Comparison

3.1. Methodology

When considering the suitability for a lot to sustainably manage wastewater on-site, we typically refer to 'available effluent management area'. This broadly refers to available areas (i.e. not built out or used for a conflicting purpose) where OSMS will not be unduly constrained by site and soil characteristics. Available Effluent Management Area (available EMA) is assessed by excluding land area on a lot that includes the following, then comparing the residual available footprint with maximum calculated required area:

- total building area (including dwellings, sheds, pools etc.) which includes a defined building envelope but may extend beyond with additional improvements to a property such as driveways and paths (impervious areas), gardens/vegetated areas and recreational inner yards that are unsuitable for effluent application;
- dams, intermittent and permanent watercourses running through lots;
- maintenance of appropriate buffer distances from property boundaries, buildings, driveways and paths, dams and watercourses (Section 3.2);

- flood prone land;
- excessive slope;
- excessively shallow soils;
- heavy (clay) soils with low permeability;
- excessively poor drainage, shallow groundwater and/or stormwater run-on; and
- excessive shading by vegetation.

3.2. Buffer Distances

Buffer distances from EMAs are typically enforced to minimise risk to public health, maintain public amenity and protect sensitive environments. Generally, adopted environmental buffers for primary treated effluent land applied into absorption trenches/beds based on DLG (1998) are:

- 250m from domestic groundwater bores;
- 100m from permanent watercourses;
- 40m from intermittent watercourses and dams;
- 12m from downslope property boundaries and 6m from upslope property boundaries; and
- 6m from downslope buildings and 3m from upslope buildings.

In addition, ASNZS1547:2012 provides suggested buffer distances that include buffers to inground water tanks and swimming pools, cuttings and recreation areas. In the comparative lot assessment by W&A these additional land use situations were also buffered.

These buffer distances have been applied to our Minimum Lot Size Analysis for all future OSMS in the assessed area. Figure 3 highlights the available buffers to watercourses for the development area.

3.3. Lots Assessed

Three representative lots were selected that have already been subdivided to ~0.6-0.76ha lot sizes (zoned R5) from adjacent to the Site in Boambee (Figures 1 and 4). The properties typically included a dwelling, garage/shed, pool, landscaped trees and shrubs, driveways, water tanks, and recreational space. This development style will be similar to that proposed for the Site and therefore minimum lot size and development potential should be consistent.

3.4. Assessed Available Effluent Management Area

Table 7 shows the assessment of available EMA for each of the three lots. Comparison of the lots indicates that buffers to waterways (Lot 8) provides the greatest impact on available EMA sizing as the relative footprints of buildings, driveways etc are similar across the lots.

From the sample selection of lots investigated, the larger lot sizes of approximately 6,000-7,676m² (Table 7) provided an available effluent application area of 33-48% of the lots, representing ~2,000-3,300m².

Table 7: Lot Comparison for Restricted Area and Available EMA

Lot	Lot Area (m ²)	Total Restricted Area (m ²)	Available EMA (m ²)	Percent of Lot Restricted (%)	Percent of Lot Available for EMA (%)
4	7,676	4,462	3,214	59	41
7	6,836	3,552	3,284	52	48
8	6,000	4,015	1,985	57	33

4. Minimum Lot Size

As shown in the previous section, assessment of adjacent lots showed that the available EMA is about 33-48% of the lots, representing ~2,000-3,300m², and the restricted area for each lot (including developed area and buffers), was ~3,500-4,500m², about 52-67% of each lot. Based on these ranges, a minimum lot size analysis was undertaken (Table 8).

Table 8: Minimum Lot Size Analysis

Lot Area (m ²)	Percent of Lot Restricted (%)	Percent of Lot Available for EMA (%)	Area Available for EMA (m ²)	>1262m ² Area Available for Primary Treatment?
8,000	52	48	3760	Yes
6,000	57	33	2580	Yes
5,000	61	39	1,950	Yes
4,000	65	35	1,400	Yes
2,000	70	30	600	No

The calculations show that lot sizes as small as about 4,000m² footprint could just be sustained, and a lot size of up to 6,000m² provides factor of safety (FOS) of 2. It has to be remembered that a maximum EMA has been assigned based on:

- Primary treatment only, whereas secondary treatment could be utilised with smaller required EMAs of 630-760m² about half that required for primary treated wastewater;
- Nutrient uptake of nitrogen and phosphorus within the EMA has been allowed for, even with primary treatment and trenches application. AS/NZS1547:2012 does not require nutrient modelling to be undertaken for trenches (normative information in the standard only); and
- Trench sizing was based on mean rainfall rather than median rainfall that is typically utilised for design purposes, which has resulted in larger required trench footprints.

It is considered that:

- A minimum lot size of 5,000m² could be acceptable for the Site subject to consideration of secondary treatment and the block having no battle axe alignment (ie maximise the area to perimeter ratio) as these narrow strips of land tend to reduce the available EMA on a lot;
- A minimum lot size of 6,000m² would be acceptable for the Site with no restrictions;

5. Conclusions

This report provides an assessment of the ability of the approved subdivision area to be re-subdivided into smaller lot sizes than the minimum 10,000m² for R5 zoned land.

A conservative comparative lot study confirmed that subdivision of the proposed development area into lots of 6,000m² would provide sufficient area for sustainable land application of effluent on each future lot.

We recommend that a subdivision Land Capability Assessment (LCA) be undertaken once the lot arrangements are finalised such that an appropriate building development and wastewater envelopes can be delineated.

6. References

Coffs Harbour City Council, (2013) *Coffs Harbour Local Environmental Plan 2013*. Coffs Harbour.

Coffs Harbour City Council (2015) *On-site Sewage Management Strategy 2015*, Coffs Harbour.

Department of Local Government et al. (1998). *Environment & Health Protection Guidelines: On-site Sewage Management for Single Households*.

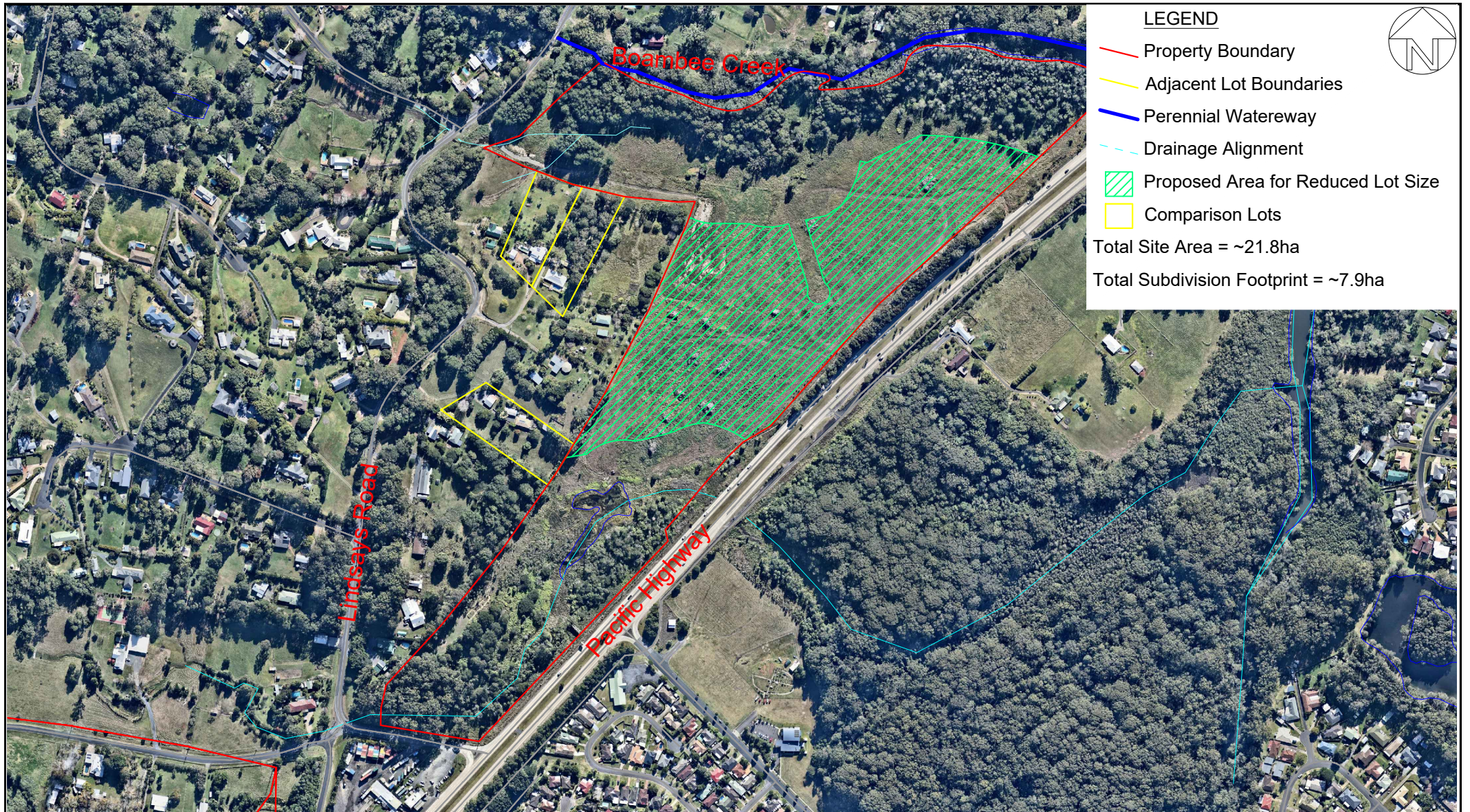
Milford, H. B., (1999) *Soil Landscapes of the Coffs Harbour 1:100 000 Sheet*, Department of Land and Water Conservation Soil Landscape Series.

Patterson, R.A. (2002). 'Workshop 2 – Calculations for Nutrient Balances.' In *Evaluating Site and Soil Assessment Reports for On-site Wastewater Systems*. A one-day training course held in Fairfield, Sydney. Centre for Environment Training, Cardiff Heights NSW. March 2002.

Patterson, R.A. (2003). *Nitrogen in Wastewater and its Role in Constraining On-Site Planning*. In Patterson & Jones (Eds.) *Proceedings of On-site '03 Conference: Future Directions for On-site Systems: Best Management Practice*. Lanfax Laboratories, Armidale.

Standards Australia / Standards New Zealand (2012). *AS/NZS 1547:2012 On-site Domestic-wastewater Management*.

FIGURES

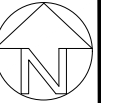


LEGEND

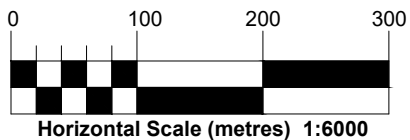
- Property Boundary
- Adjacent Lot Boundaries
- Perennial Waterway
- Drainage Alignment
- Proposed Area for Reduced Lot Size
- Comparison Lots

Total Site Area = ~21.8ha

Total Subdivision Footprint = ~7.9ha



Whitehead & Associates
Environmental Consultants



Client:
JINDRA RAI

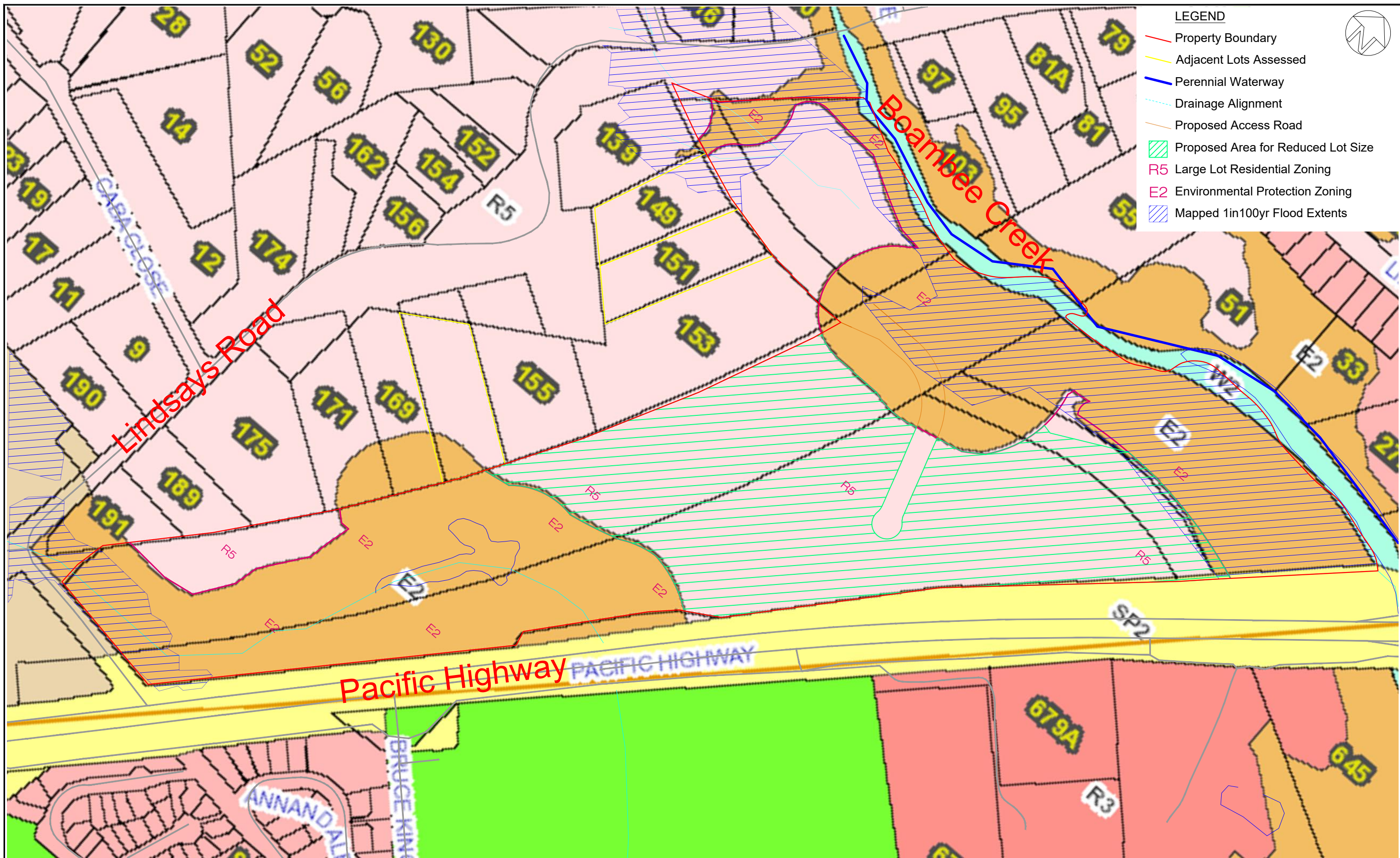
Project:
**WASTEWATER CAPABILITY
ASSESSMENT FOR LOT 4, 10,
15, 101 & 102 LINDSAYS ROAD,
BOAMBEE**

Title:
SITE LOCATION

Source:
CHCC 2020, NEARMAP 2020

Note:
**AERIAL PHOTOGRAPHS &
BOUNDARIES ARE INDICATIVE ONLY**

Drawn:	Reviewed:	Approved:	Date:	Scale: 1:6,000 Approx @ A4	
HM	SD	SD	7/1/20	Job No: 2539	Sheet: 1 of 1
All units in m unless otherwise specified				Drawing No: Figure 1	Revision No: 1





LEGEND

Property Boundary

Adjacent Lots Assessed

Perennial Waterway

Drainage Alignment

Contour (2m)

Proposed Access Road

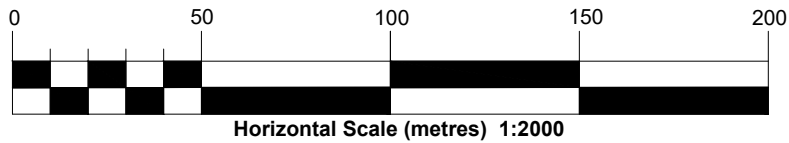
Proposed Area for Reduced Lot Size

9537cc

Soil Landscape

Water Bore

Mapped 1in100 Flood Extents



W

Whitehead & Associates
Environmental Consultants

Note: **AERIAL PHOTOGRAPHS &
BOUNDARIES ARE INDICATIVE ONLY**

Client:
JINDRA RAI

Project:
**WASTEWATER CAPABILITY
ASSESSMENT FOR LOT 4, 10,
15, 101 & 102 LINDSAYS ROAD,
BOAMBEE**

Title:
SITE AND SOIL CONSTRAINTS

Source:
CHCC 2020, NEARMAP 2020

Drawn:	Reviewed:	Approved:	Date:	Scale: 1:2,000 Approx @ A3	
HM	SD	SD	6/1/20	Job No: 2539	Sheet: 1 of 1
All units in m unless otherwise specified				Drawing No: Figure 3	Revision No: 1



 Whitehead & Associates Environmental Consultants	Client: JINDRA RAI		Title: MINIMUM LOT SIZE ASSESSMENT		Drawn:	Reviewed:	Approved:	Date:	Scale: 1:1000 Approx @ A3	
	Project: WASTEWATER CAPABILITY ASSESSMENT FOR LOT 4, 10, 15, 101 & 102 LINDSAYS ROAD, BOAMBEE		Source: CHCC 2020, NEARMAP 2020		HM	SD	SD	7/1/20	Job No: 2539	Sheet: 1 of 1
			Note: AERIAL PHOTOGRAPHS & BOUNDARIES ARE INDICATIVE ONLY		All units in m unless otherwise specified				Drawing No: Figure 5	Revision No: 1

APPENDIX A

Water & Nutrient Balances

Site Address: Lindsays Road, Boambee

Design Wastewater Flow	Q	900	L/day
Daily DLR		8.0	mm/day
Crop Factor	C	0.6-0.8	unitless
Retained Rainfall Coefficient	RRc	0.9	unitless
Void Space Ratio	V	0.3	unitless
Rainfall Data	Coffs Harbour MO - Mean		
Evaporation Data	Coffs Harbour MO - Average		

Flow Allowance	150	l/p/d
Water Saving Fittngs	N	100%
No. of bedrooms	4	bdr
Occupancy	1.5	p/room

Nominated Land Application Area	165	sqm
Trench/Bed wetted thickness	0.1	m
Trench/Bed Width	1.2	m

Parameter	Symbol	Formula	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Days in month	D	\	days	31	28	31	30	31	30	31	31	30	31	30	31	365
Median Rainfall	R	\	mm/month	187.5	224.8	234.6	178.4	160.8	120.8	72.5	79.5	59.9	96.3	144.7	144.9	1699
Average Evaporation	E	\	mm/month	192.2	156.8	148.8	114	86.8	69	77.5	105.4	135	164.3	171	192.2	0
Crop Factor	C			0.80	0.80	0.80	0.70	0.70	0.60	0.60	0.60	0.70	0.80	0.80	0.80	
OUTPUTS																
Evapotranspiration	ET	ExC	mm/month	154	125	119	80	61	41	47	63	95	131	137	154	1206.44
Percolation	B	DLRxD	mm/month	248.0	224	248.0	240.0	248.0	240.0	248.0	248.0	240.0	248.0	240.0	248.0	2920.0
Outputs		ET+B	mm/month	401.8	349.44	367.0	319.8	308.8	281.4	294.5	311.2	334.5	379.4	376.8	401.8	4126.4
INPUTS																
Retained Rainfall	RR	R*RRc	mm/month	168.75	202.32	211.14	160.56	144.72	108.72	65.25	71.55	53.91	86.67	130.23	130.41	1534.23
Effluent Irrigation	W	(QxD)/L	mm/month	169.1	152.7	169.1	163.6	169.1	163.6	169.1	169.1	163.6	169.1	163.6	169.1	1990.9
Inputs		RR+W	mm/month	337.8	355.0	380.2	324.2	313.8	272.4	234.3	240.6	217.5	255.8	293.9	299.5	3525.1
STORAGE CALCULATION																
Storage remaining from previous month			mm/month		0.0	18.7	62.7	77.3	94.2	64.0	0.0	0.0	0.0	0.0	0.0	
Storage for the month	S	(RR+W)-(ET+B)	mm/month	-213.1	18.7	44.0	14.7	16.8	-30.1	-200.5	-235.3	-389.8	-412.3	-276.4	-340.9	-371.9
Cumulative Storage	M		mm	0.0	18.7	62.7	77.3	94.2	64.0	0.0	0.0	0.0	0.0	0.0	0.0	316.8
Maximum Bed Storage Depth for Area	BS		mm	94.15	Exceeds available storage in trench/bed based on nominated depth?										No, proceed to length calculation	
Total length based on nominated width				137.5	m											
No. of beds				6												
Individual bed lengths				22.9												
Spacing of beds				1.5												
Width of LAA				14.7												
Application area				337												

Nutrient Balance

Site Address: Lindsays Road, Boambee



Whitehead & Associates
Environmental Consultants

Please read the attached notes before using this spreadsheet.

SUMMARY - LAND APPLICATION AREA REQUIRED BASED ON THE MOST LIMITING BALANCE =

631 m²

INPUT DATA ^[1]							
Wastewater Loading				Nutrient Crop Uptake			
Hydraulic Load	900	L/Day		Crop N Uptake	250	kg/ha/yr	which equals 68 mg/m ² /day
Effluent N Concentration	60	mg/L		Crop P Uptake	25	kg/ha/yr	which equals 7 mg/m ² /day
% Lost to Soil Processes (Geary & Gardner 1996)	0.2	Decimal		Phosphorus Sorption			
Total N Loss to Soil	10800	mg/day		P-sorption result	790	mg/kg	which equals 11060 kg/ha
Remaining N Load after soil loss	43200	mg/day		Bulk Density	1.4	g/cm ²	
Effluent P Concentration	15	mg/L		Depth of Soil	1	m	
Design Life of System	50	yrs		% of Predicted P-sorp. ^[2]	0.75	Decimal	

METHOD 1: NUTRIENT BALANCE BASED ON ANNUAL CROP UPTAKE RATES

Minimum Area required with zero buffer		Determination of Buffer Zone Size for a Nominated Land Application Area (LAA)			
Nitrogen	631 m ²	Nominated LAA Size	337	m ²	
Phosphorus	258 m ²	Predicted N Export from LAA	7.35	kg/year	
		Predicted P Export from LAA	-1.50	kg/year	
		Phosphorus Longevity for LAA	68	Years	
		Minimum Buffer Required for excess nutrient	294	m ²	

PHOSPHORUS BALANCE

STEP 1: Using the nominated LAA Size

Nominated LAA Size	336.875	m ²				
Daily P Load	0.0135	kg/day	→	Phosphorus generated over life of system	246.375	kg
Daily Uptake	0.0023074	kg/day	→	Phosphorus vegetative uptake for life of system	0.125	kg/m ²
Measured p-sorption capacity	1.106	kg/m ²				
Assumed p-sorption capacity	0.830	kg/m ²	→	Phosphorus adsorbed in 50 years	0.830	kg/m ²
Site P-sorption capacity	279.44	kg	→	Desired Annual P Application Rate	6.431	kg/year
				which equals	0.01762	kg/day
P-load to be sorbed	4.09	kg/year				

NOTES

[1]. Model sensitivity to input parameters will affect the accuracy of the result obtained. Where possible site specific data should be used. Otherwise data should be obtained from a reliable source such as,

- Environment and Health Protection Guidelines: Onsite Sewage Management for Single Households
- Appropriate Peer Reviewed Papers
- EPA Guidelines for Effluent Irrigation
- USEPA Onsite Systems Manual.

[2]. A multiplier, normally between 0.25 and 0.75, is used to estimate actual P-sorption under field conditions which is assumed to be less than laboratory estimates.

Site Address: Lindsays Road, Boambee

Design Wastewater Flow	Q	900	L/day
Daily DLR		12.0	mm/day
Crop Factor	C	0.6-0.8	unitless
Retained Rainfall Coefficient	RRc	0.9	unitless
Void Space Ratio	V	0.3	unitless
Rainfall Data	Coffs Harbour MO - Mean		
Evaporation Data	Coffs Harbour MO - Average		

Flow Allowance	150	l/p/d
Water Saving Fittngs	N	100%
No. of bedrooms	4	bdr
Occupancy	1.5	p/room

Nominated Land Application Area	96	sqm
Trench/Bed wetted thickness	0.1	m
Trench/Bed Width	1.2	m

Parameter	Symbol	Formula	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Days in month	D	\	days	31	28	31	30	31	30	31	31	30	31	30	31	365
Median Rainfall	R	\	mm/month	187.5	224.8	234.6	178.4	160.8	120.8	72.5	79.5	59.9	96.3	144.7	144.9	1699
Average Evaporation	E	\	mm/month	192.2	156.8	148.8	114	86.8	69	77.5	105.4	135	164.3	171	192.2	0
Crop Factor	C			0.80	0.80	0.80	0.70	0.70	0.60	0.60	0.60	0.70	0.80	0.80	0.80	
OUTPUTS																
Evapotranspiration	ET	ExC	mm/month	154	125	119	80	61	41	47	63	95	131	137	154	1206.44
Percolation	B	DLRxD	mm/month	372.0	336	372.0	360.0	372.0	360.0	372.0	372.0	360.0	372.0	360.0	372.0	4380.0
Outputs		ET+B	mm/month	525.8	461.44	491.0	439.8	432.8	401.4	418.5	435.2	454.5	503.4	496.8	525.8	5586.4
INPUTS																
Retained Rainfall	RR	R*RRc	mm/month	168.75	202.32	211.14	160.56	144.72	108.72	65.25	71.55	53.91	86.67	130.23	130.41	1534.23
Effluent Irrigation	W	(QxD)/L	mm/month	290.6	262.5	290.6	281.3	290.6	281.3	290.6	290.6	281.3	290.6	281.3	290.6	3421.9
Inputs		RR+W	mm/month	459.4	464.8	501.8	441.8	435.3	390.0	355.9	362.2	335.2	377.3	411.5	421.0	4956.1
STORAGE CALCULATION																
Storage remaining from previous month			mm/month		0.0	11.3	47.0	53.7	62.3	24.2	0.0	0.0	0.0	0.0	0.0	
Storage for the month	S	(RR+W)-(ET+B)	mm/month	-221.3	11.3	35.8	6.7	8.6	-38.1	-208.8	-243.6	-397.8	-420.5	-284.4	-349.1	-428.1
Cumulative Storage	M		mm	0.0	11.3	47.0	53.7	62.3	24.2	0.0	0.0	0.0	0.0	0.0	0.0	198.6
Maximum Bed Storage Depth for Area	BS		mm	62.33	Exceeds available storage in trench/bed based on nominated depth										No, proceed to length calculation	
Total length based on nominated width				80.0	m											
No. of beds				4												
Individual bed lengths				20.0												
Spacing of beds				1.5												
Width of area				9.3												
Application area				186												

Nutrient Balance

Site Address:

Lindsays Road, Boambee



Whitehead & Associates
Environmental Consultants

Please read the attached notes before using this spreadsheet.

SUMMARY - LAND APPLICATION AREA REQUIRED BASED ON THE MOST LIMITING BALANCE =

315 m²

INPUT DATA ^[1]							
Wastewater Loading				Nutrient Crop Uptake			
Hydraulic Load	900	L/Day		Crop N Uptake	250	kg/ha/yr	which equals 68 mg/m ² /day
Effluent N Concentration	30	mg/L		Crop P Uptake	25	kg/ha/yr	which equals 7 mg/m ² /day
% Lost to Soil Processes (Geary & Gardner 1996)	0.2	Decimal		Phosphorus Sorption			
Total N Loss to Soil	5400	mg/day		P-sorption result	790	mg/kg	which equals 11060 kg/ha
Remaining N Load after soil loss	21600	mg/day		Bulk Density	1.4	g/cm ²	
Effluent P Concentration	10	mg/L		Depth of Soil	1	m	
Design Life of System	50	yrs		% of Predicted P-sorp. ^[2]	0.75	Decimal	

METHOD 1: NUTRIENT BALANCE BASED ON ANNUAL CROP UPTAKE RATES

Minimum Area required with zero buffer		Determination of Buffer Zone Size for a Nominated Land Application Area (LAA)			
Nitrogen	315 m ²	Nominated LAA Size	380	m ²	
Phosphorus	172 m ²	Predicted N Export from LAA	-1.62	kg/year	
		Predicted P Export from LAA	-3.97	kg/year	
		Phosphorus Longevity for LAA	135	Years	
		Minimum Buffer Required for excess nutrient	0	m ²	

PHOSPHORUS BALANCE

STEP 1: Using the nominated LAA Size

Nominated LAA Size	380	m ²			
Daily P Load	0.009	kg/day	→	Phosphorus generated over life of system	164.25 kg
Daily Uptake	0.0026027	kg/day	→	Phosphorus vegetative uptake for life of system	0.125 kg/m ²
Measured p-sorption capacity	1.106	kg/m ²			
Assumed p-sorption capacity	0.830	kg/m ²	→	Phosphorus adsorbed in 50 years	0.830 kg/m ²
Site P-sorption capacity	315.21	kg	→	Desired Annual P Application Rate	7.254 kg/year
				which equals	0.01987 kg/day
P-load to be sorbed	2.34	kg/year			

NOTES

[1]. Model sensitivity to input parameters will affect the accuracy of the result obtained. Where possible site specific data should be used. Otherwise data should be obtained from a reliable source such as,

- Environment and Health Protection Guidelines: Onsite Sewage Management for Single Households
- Appropriate Peer Reviewed Papers
- EPA Guidelines for Effluent Irrigation
- USEPA Onsite Systems Manual.

[2]. A multiplier, normally between 0.25 and 0.75, is used to estimate actual P-sorption under field conditions which is assumed to be less than laboratory estimates.



CVC On-site Wastewater Model (Single Rural Households)

Default User-defined

1 Client

Jindra Rai

2 Address

Lot 4, 10, 15, 101 and 102 Lindsays Road, Boambee

☐ Simplified (casual user)

3 User info

☒ Advanced (consultants)

4 Site

Block size

5000

Buffer (m) from land application at Gully (Intermittent) ▼

>40

Water (L/p.d) from Reticulated supply (bore, spring, creek) ▼

180

150

Bedrooms

4

5 Wastewater components

Toilet ☒

Bathroom ☒

Laundry ☒

Kitchen ☒

Total wastewater flow (L/d) [needs caution if user-defined]

900

6 Soil info

ch; all; Clay; Grafton Formation.....Ashby ▼

Likely dispersive soil

Phosphorus sorption (kg/ha.m) calc. from Morand 2001 data

6300

11000

Depth to water table (m) reference Morand 2001

2.0

9.0

Depth to bedrock (m) reference Morand 2001

1.0

Light clays - strongly structured ▼

DIR (mm/d)

4.3

3.0

Please read note ==>

7 Treatment system

Secondary: AWTs ▼

Nitrogen removal % (default gives BOD 20mg/L treatment)

20%

Maximum N allowed to percolate down from system (kg/yr)

15

8 Land application system

Subsurface drip irrigation (SD) ▼

Depth of root zone (mm)

300

9 Land Application Area required

Hydraulic area (m2)* (or enter SSI industry estimate)

379.6

Nitrogen area (m2) [allowing export of 11.65 kg/yr]

223.7

Phosphorus area (m2)

150.0

Required land application area (LAA) (m2)

379.6

**BUSH FIRE
ASSESSMENT
REPORT**

**Planning Proposed
Subdivision**

Lot 101/102 DP 732172

Lot 15 DP 861057

Lot 4 DP 1049350

**Lindsays Road
Boambee**

Jinda Rai

September 2023

1.0 INTRODUCTION

A Bush Fire Assessment has been carried out for a 15 x Lot Planning Proposed Subdivision at Lot 101/102 DP 732172, Lot 15 DP 861057 and Lot 4 DP 1049350 Lindsays Road, Boambee.

A six (6) x lot proposed subdivision was approved for the site by Coffs Harbour City Council on the 9th December 2016.

Due to the increase in construction costs, it was found that the development was not economically viable.

An updated layout has been prepared by the Surveyor and the Consultant Planner for 15 x Lots, (See **Appendix 1**).

The original layout did not include a perimeter road and because of the restraints it is proposed not to provide a perimeter road. This aspect of the development was discussed with the Rural Fire Service at a recent Fire Design Brief Meeting (FDBM) and performance reporting has been completed.

The original report by this Company was completed in August 2021, however this amended report alters the planning proposed subdivision concept by:

1. Including a grave site within a five (5) ha lot;
2. shifting the internal access road a few metres to the south to avoid some threatened grass species; and
3. decreasing the min lot size from 6000 m² to 5000 m².

This report is based on a site assessment carried out in January 2021 and February 2021 and provides a basis for compliance with respect to NSW Rural Fire Services, Planning for Bush Fire Protection 2019 (PBP, 2019) and AS3959 (2018).

Any subdivision would be an integrated development and has a requirement for a Bushfire Safety Authority under Section 100B of the *Rural Fires Act 1997*.

NOTE

The report has been prepared with all reasonable skill, care and diligence.

The information contained in this report has been gathered from field survey, experience and has been completed in consideration of the following legislation.

1. Rural Fires Act 1997.
2. Environmental Planning and Assessment Act 1979 No 203.
3. Building Code of Australia.
4. Council Local Environment Plans and Development Control Plans where applicable.
5. NSW Rural Fire Services, Planning for Bushfire Protection, 2019 (PBP, 2019).
6. AS 3959-2018 Construction of Buildings in Bushfire Prone Areas.

The report recognizes the fact that no property and lives can be guaranteed to survive a bushfire attack.

The report examines ways the risk of bushfire attack can be reduced where the subdivision site falls within the scope of the legislation.

The report is confidential and the writer accepts no responsibility of whatsoever nature, to third parties who use this report or part thereof is made known.

Any such party relies on this report at their own risk.

1.1 Objectives

The objectives of this report are to:

- Ensure that the planning proposed subdivision meets the aims and objectives of NSW Rural Fire Services, *Planning for Bushfire Protection*, 2019 and has measures sufficient to minimize the impact of bushfires; and
- Reduce the risk to property and the community from bushfire; and
- Comply where applicable with AS3959 – 2018.

1.2 Legislative Framework

In NSW, the bushfire protection provisions of the BCA are applied to Class 1, 2, 3, Class 4 parts of buildings, some Class 10 and Class 9 buildings that are Special Fire Protection Purposes (SFPPs).

The BCA references AS3959 – 2018 as the deemed-to-satisfy (DTS) solution for construction requirements in bushfire prone areas for NSW.

All development on bushfire prone land in NSW should comply with the requirements of the bushfire protection measures identified within NSW Rural Fire Service, *Planning for Bushfire Protection*, 2019.

Any proposed subdivision is required to obtain a Bushfire Safety Authority from the NSW Rural Fire Service.

1.3 Location

The site is located at Lot 101/102 DP 732172, Lot 15 DP 861057 and Lot 4 DP 1049350 Lindsays Road, Boambee.

Locality – Boambee

Local Government Area - Coffs Harbour City Council

Closest Rural Fire Service – Boambee

Closest Fire Control Centre – Coffs Harbour

Figure 1: Topographic Map

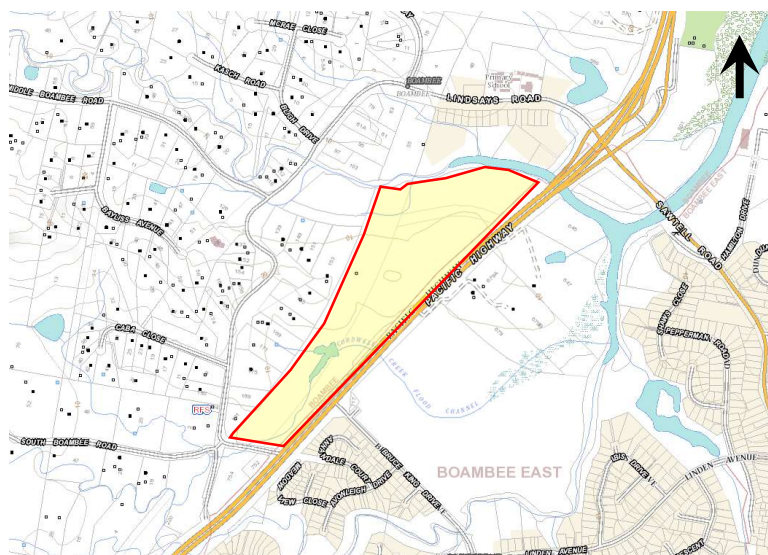
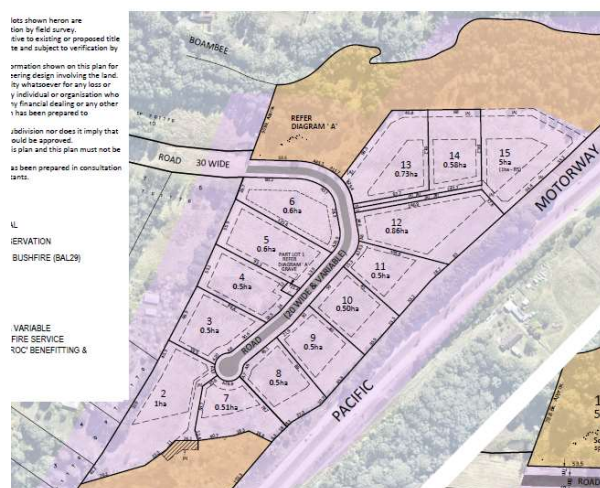


Figure 2: Aerial View



Figure 3: Aerial View Close Up Layout



1.4 Development Proposed and History

A Planning Proposal is to be submitted to Council which seeks to amend the CHLEP to:

1. Reduce the minimum planning proposed subdivision lot size of the large lot residential zoned part of the subject land from one (1) hectare to 5000m²; and
2. Adjust the C2 Environmental Conservation zone boundary to reflect the actual extent of high conservation value land.

A six (6) lot subdivision was approved in December 2016 however the yield for the site has been re-examined to ensure economic viability.

Ecological report has identified high conservation areas of the site and the planning proposed subdivision has been completed with regards to the report.

The site is approximately 20 hectares and it is proposed to subdivide the subject lot into 15 lots suitable for rural residential housing.

2.0 BUSH FIRE ASSESSMENT

2.1 Assessment Methodology

Several factors need to be considered in determining the bushfire hazard.

These factors are slope, vegetation type, and distance from hazard, access/egress and fire weather.

Each of these factors has been reviewed in determining the bushfire protection measures.

The assessment of slope and vegetation being carried out in accordance with NSW Rural Fire Service, Planning for Bushfire Protection, 2019.

2.2 Slope Assessment

Slope is a major factor to consider when assessing the bushfire risk.

The slopes were measured using a Suunto PM-5/360 PC Clinometer.

The hazard vegetation on adjacent land was also identified and the slopes within the vegetation measured.

The following table shows the results:

Table 1 – Hazard Vegetation Slopes

Hazard Aspect	Slope	Upslope/Downslope or Flat
North	0-5°	Downslope
South	0-5°	Downslope
East	15-20°	Downslope
West	0-5°	Downslope

2.3 Vegetation Assessment

The vegetation on and surrounding the subject site was assessed over a distance of 140m.

The vegetation formations were classified using the vegetation formation as detailed in Planning for Bush Fire Protection, 2019.

2.3.1 Vegetation on the Subject Lot

Ecological reporting was completed for the site.

The existing site is mostly grassland with forest vegetation to the north and south of the site.

The recommendations of the Draft Ecological report prepared by Ecosure stated:

“Any future DA to increase the yield should be accompanied by a VMP to protect the riparian zone along Boambee Creek and back swamp of Cordswell Creek. The VMP should be prepared in accordance with Council’s preliminary VMP guidelines and the NSW Department of Industry Guidelines for controlled activities on waterfront land, riparian corridors and include:

- ***specific protection measures to protect SSSR and HJG habitat including invasive weed removal around these two species.***
- ***enhancement planting of koala food trees.***
- ***removal of invading bamboo and slash pine.”***

There is a steep bank of remnant forest to the east that extends to the highway from the proposed development site. This slope is approximately 20m wide and has been considered as a 15-20° downslope for the purposes of the report.

This vegetation is considered further in the hazard section.

2.3.2 Vegetation adjacent and adjoining the Subject Lot

The majority of surrounding land consists of mostly large lot residential to the north and west.

There are larger lots to the southwest.

Directly to the south is developed land and to the southeast is the residential development of Boambee.

The main hazard surrounding the development is the forest hazard to the east. The hazard is approximately 37 hectares in size and has a 270m frontage to the highway and the proposed site. There are two (2) areas of grassland that fragment the hazard frontage.

There is some remnant forest vegetation between the highway and the subject property which is approximately 15-20m wide.

Figure 4: Bushfire Mapping



Table 2 – Hazard Vegetation

Hazard Aspect	Vegetation
North	Forest
South	Forest
East	Forest
West	Grassland

2.4 Hazard

The hazards are located to the north, south, east and west.

Figure 5: Hazards

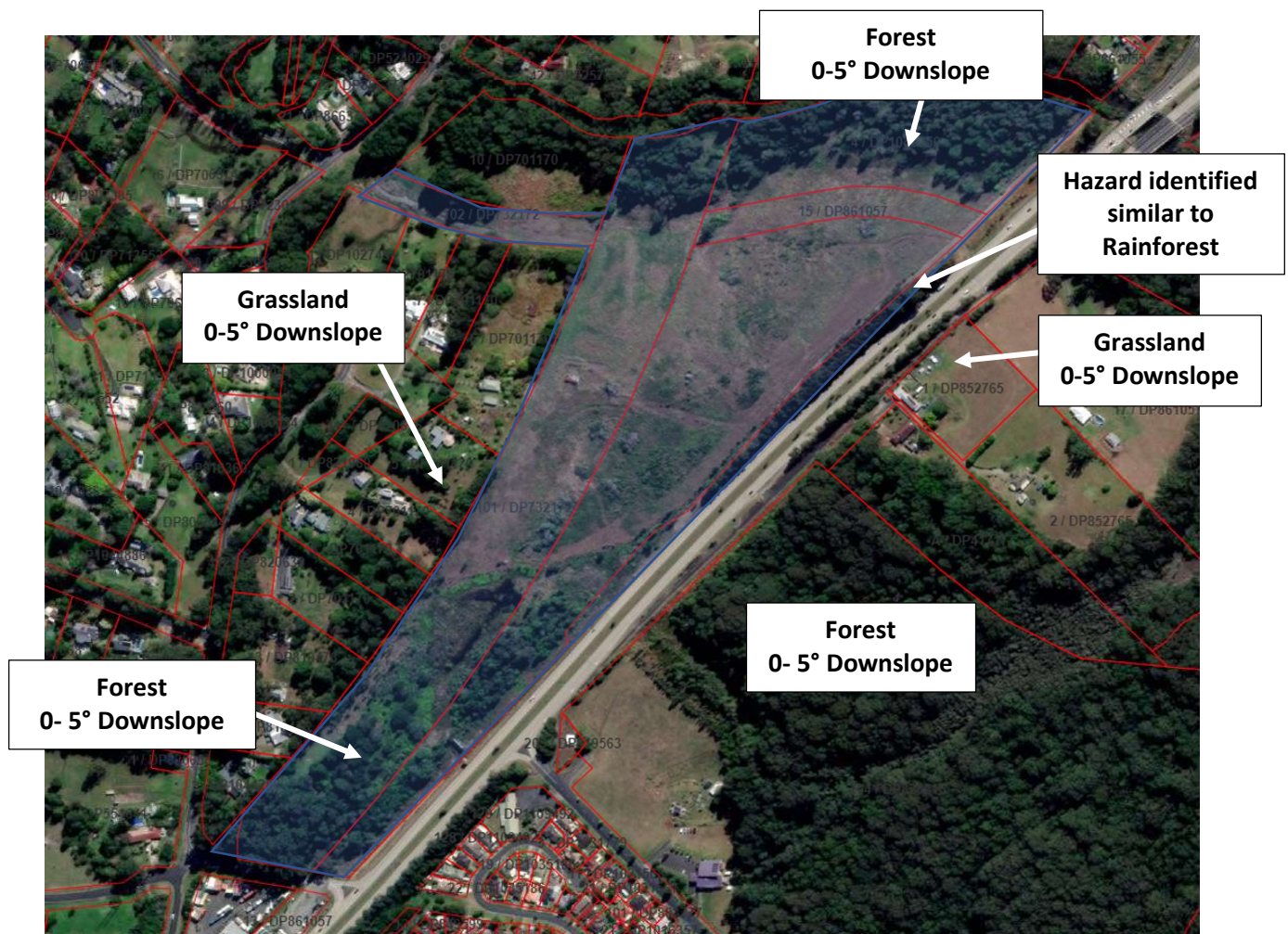


Table 3 – Summary of Hazard Characteristics

Hazard Aspect	Hazard	Slope	Upslope/Downslope or Flat
North	Forest	0-5°	Downslope
South	Forest	0-5°	Downslope
East	Rainforest	15-20°	Downslope
West	Grassland	0-5°	Downslope

2.5 Fire Danger Index

The fire weather for the site is assumed on the worst-case scenario. In accordance with NSW Rural Fire Service the fire weather for the site is based upon the 1:50 year fire weather scenario and has a Fire Danger Index (FDI) of 80.

3.0 BUSHFIRE THREAT REDUCTION MEASURES

3.1 NSW Rural Fire Services, *Planning for Bushfire Protection*, 2019

The following provisions of NSW Rural Fire Service, *Planning for Bushfire Protection*, 2019 have been identified:

3.1.1 Defendable Space/Asset Protection Zone (APZ)

To ensure that the aims and objectives of NSW Rural Fire Services, PBP, 2019, a defendable space between the asset and the hazard should be provided. The defendable space provides for, minimal separation for safe firefighting, reduced radiant heat, reduced influence of convection driven winds, reduced ember viability and dispersal of smoke.

The proposed Planning Proposed Subdivision is not considered to be subject to the Special Fire Protection Purpose requirements which are applicable to schools, (the proposed development is not a school).

The dominant hazards have been identified for the Asset Protection Zones. It is recommended that the Asset protection Zones be based upon the minimum requirements for Asset Protection Zones as set out in Planning for Bush Fire Protection, 2019.

Table 4 - APZ Requirements (PBP 2019) for the Proposed Lot 15 of the Planning Proposed Subdivision

Hazard Aspect	Vegetation Type	Slope	IPA	OPA	Total APZ Required (IPA + OPA)
North	Forest	0-5° Downslope	15m	10m	25m
West	Grassland	5-10° Downslope	12m	-	12m

APZ Requirements (PBP 2019) for the Proposed Lot 14 of the Planning Proposed Subdivision

Hazard Aspect	Vegetation Type	Slope	IPA	OPA	Total APZ Required (IPA + OPA)
North	Forest	0-5° Downslope	10m	15m	25m (See <i>Note 1</i>)
East	Similar to Rainforest	15-20° Downslope	25m	-	25m

Note 1 – An APZ of 34m is proposed.

APZ Requirements (PBP 2019) for the Proposed Lot 5 of the Planning Proposed Subdivision

Hazard Aspect	Vegetation Type	Slope	IPA	OPA	Total APZ Required (IPA + OPA)
North	Forest	0-5° Downslope	10m	15m	25m

APZ Requirements (PBP 2019) for the Proposed Lots 5 and 12 of the Planning Proposed Subdivision

Hazard Aspect	Vegetation Type	Slope	IPA	OPA	Total APZ Required (IPA + OPA)
North	Grassland	5-10° Downslope	12m	-	12m
	Forest	0-5° Downslope	15m	10m	25m

APZ Requirements (PBP 2019) for the Proposed Lots 9, 10, and 11 of the Planning Proposed Subdivision

Hazard Aspect	Vegetation Type	Slope	IPA	OPA	Total APZ Required (IPA + OPA)
East	Similar to Rainforest	15-20° Downslope	25m	-	25m

APZ Requirements (PBP 2019) for the Proposed Lot 8 of the Planning Proposed Subdivision

Hazard Aspect	Vegetation Type	Slope	IPA	OPA	Total APZ Required (IPA + OPA)
East	Similar to Rainforest	15-20° Downslope	25m	-	25m
South	Forest	0-5° Downslope	15m	10m	25m

APZ Requirements (PBP 2019) for the Proposed Lot 7 of the Planning Proposed Subdivision

Hazard Aspect	Vegetation Type	Slope	IPA	OPA	Total APZ Required (IPA + OPA)
South	Forest	0-5° Downslope	15m	10m	25m

APZ Requirements (PBP 2019) for the Proposed Lots 3 and 4 of the Planning Proposed Subdivision

Hazard Aspect	Vegetation Type	Slope	IPA	OPA	Total APZ Required (IPA + OPA)
West	Grassland	0-5° Downslope	11m	-	11m

APZ Requirements (PBP 2019) for the Proposed Lot 2 of the Planning Proposed Subdivision

Hazard Aspect	Vegetation Type	Slope	IPA	OPA	Total APZ Required (IPA + OPA)
West	Grassland	0-5° Downslope	11m	-	11m
South	Forest	0-5° Downslope	15m	10m	25m

APZ Requirements (PBP 2019) for the Proposed Lot 1 of the Planning Proposed Subdivision

Hazard Aspect	Vegetation Type	Slope	IPA	OPA	Total APZ Required (IPA + OPA)
East	Forest	0-5° Downslope	15m	10m	25m
South	Forest	0-5° Downslope	15m	10m	25m
North	Forest	0-5° Downslope	15m	10m	25m

With respect to the above APZs:

1. It may be possible to reduce the APZs to all hazards with performance reporting.
2. It is understood that with respect to the hazards, a Vegetation Management Plan is proposed.

The minimum Asset Protection Zones can be seen in **Appendix 2**.

3.1.2 Inner (IPAs) and Outer (OPAs) Protection Area Requirements

Inner: The IPA is the area closest to the building and creates a fuel managed area which can minimise the impact of direct flame contact and radiant heat on the development and act as a defendable space. Vegetation within the IPA should be kept to a minimum level. Litter fuels within the IPA should be kept below 1cm in height and be discontinuous.

In practical terms the IPA is typically the curtilage around the building, consisting of a mown lawn and well-maintained gardens.

When establishing and maintaining an IPA the following requirements apply:

Trees

- Tree canopy cover should be less than 15% at maturity;
- Trees at maturity should not touch or overhang the building;
- Lower limbs should be removed up to a height of 2m above the ground;
- Tree canopies should be separated by 2 to 5m; and
- Preference should be given to smooth barked and evergreen trees.

Shrubs

- The creation of large discontinuities or gaps in the vegetation, to slow down or break the progress of fire towards buildings, should be provided;
- Shrubs should not be located under trees;
- Shrubs should not form more than 10% ground cover; and
- Clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.

Grass

- Grass should be kept mown (as a guide grass should be kept to no more than 100mm in height); and
- Leaves and vegetation debris should be removed.

Outer: An OPA is located between the IPA and the unmanaged vegetation. It is an area where there is maintenance of the understorey and some separation in the canopy. The reduction of fuel in this area aims to decrease the intensity of an approaching fire and restricts the potential for fire spread from crowns; reducing the level of direct flame, radiant heat and ember attack on the IPA.

Because of the nature of an OPA, they are only applicable in forest vegetation.

When establishing and maintaining an OPA the following requirements apply:

Trees

- Tree canopy cover should be less than 30%; and
- Canopies should be separated by 2 to 5m.

Shrubs

- Shrubs should not form a continuous canopy; and
- Shrubs should form no more than 20% of ground cover.

Grass

- Grass should be kept mown to a height of less than 100mm; and
- Leaf and other debris should be removed.

An APZ should be maintained in perpetuity to ensure ongoing protection from the impact of bushfires.

Maintenance of the IPA and the OPA as described above should be undertaken regularly, particularly in advance of the bushfire season.

3.1.3 Operational Access and Egress

Access to and egress from each of the proposed lots will be via public roads to be completed as part of the planning proposed subdivision or from an existing road system.

The road access proposed is approximately 320m long. It is noted that the access was approved as part of the original Development Approval for six (6) lots.

The issue of the perimeter roads and the maximum travel distance was discussed at a Bush Fire Design Brief/Pre-development meeting and it was concluded that the most significant hazard was to the north and therefore it has been considered necessary to ensure good Brigade access to Lots 13, 14 and 15.

A four (4) metre fire trail with a six (6) metre pavement is proposed on the vegetation interface to lots 13, 14 and 15 that will provide a second access/egress.

The six (6) metres will allow the Brigade to setup on the trail. The nominated access is less than 200m however this trail will allow for Fire Brigade access/egress to the interface without entering the individual lots. It will also be necessary to ensure that access to the static water supply for each lot is available to the brigade.

The following performance assessment considers the single point of access/egress.

1. Deemed to Satisfy Provisions Table 5.3b

- *All roads are through roads;*
- *Dead end roads are not recommended, but if unavoidable are not more than 200m in length, incorporate a minimum 12 metre outer radius turning circle, and are clearly sign posted as a dead end.*
- *Are through roads, and these are linked to the internal road system at an interval of no greater than 500m.*

2. Performance Criteria

- *Fire fighting vehicles are provided with safe all weather access to structures.*
- *Access roads are designed to allow for safe access and egress for firefighting vehicles while residents are evacuating as well as providing safe operation environment for emergency service personnel during firefighting and emergency management on the interface.*

3. Assessment Method and Analysis

It is proposed to use comparison with the deemed to satisfy as an assessment method and qualitative analysis has been undertaken.

4. Discussion

The issue of the perimeter roads and the maximum travel distance was discussed at a Bush Fire Design Brief/Pre-development meeting, it was concluded that the most significant hazard was to the north. The northern hazard is also limited with a direct run of fire of approximately 150m. The eastern hazard on the eastern side of the Motorway is the most significant.

With respect to access roads are designed to allow for safe access and egress for firefighting vehicles while residents are evacuating as well as providing safe operation environment for emergency service personnel during firefighting and emergency management on the interface, it is noted that in a residential situation there maybe, up to 20 dwellings located on a maximum 200m road (ie. 20m frontage). In this scenario we have a maximum of 15 dwellings.

To ensure more effective firefighting a perimeter trail is proposed on the northern interface to the east of the main access/egress.

5. Assumptions

The proposed main access road will comply with the deemed to satisfy requirements of a perimeter road.

6. Conclusion

Considering the extent and locations of the hazards and with this proposed perimeter trail and access to all lots for the Brigade and the number of dwellings it is recommended that the performance criteria as nominated above can be achieved.

Table 5

Table 5.3b		
Performance criteria	Acceptable Solution	Comment
ACCESS – GENERAL REQUIREMENTS	The intent may be achieved where:	
	Firefighting vehicles are provided with safe, all weather access to structures	- Property access roads are two wheel drive, all weather roads. - Perimeter roads are provided for residential subdivisions of three or more allotments. - Subdivision of three or more allotments have more than one access in and out of the development. - Traffic management devices are constructed to not prohibit access by emergency services vehicles. - Maximum grades for sealed roads do not exceed 15° and an average grade of not more than 10 ° or other gradient specified by road design standards, whichever is the lesser gradient. - All roads are through roads. - Dead end roads are not recommended, but if avoidable, are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle and are clearly sign posted as a dead end. - Where kerb and guttering are provided on perimeter roads, roll top kerbing should be used to the hazard side of the road. - Where access/egress can only be achieved through forest, woodland and heath vegetation,
		Main property access road to comply See reporting
		See reporting
		To comply
		To comply
		See reporting To comply
		To comply
		See reporting
		To comply
		See reporting

		secondary access shall be provided to an alternate point on the existing public road system. One way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.	To comply
	The capacity of access roads is adequate for firefighting vehicles There is appropriate access to water supply	- The capacity of perimeter and non-perimeter road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23tonnes) bridges/causeways are to clearly indicate load rating. - Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression. - Hydrants are provided in accordance with the relevant clauses of AS2419.1:2005 – Fire Hydrant Installations Systems design, installation and commissioning; and - There is suitable access for a Category 1 fire appliance to within 4 metres of the static water supply where no reticulated supply is available.	To comply To comply To comply To comply

PERIMETER ROADS	Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating	- Are two-way sealed roads; - Minimum 8 metre carriageway width kerb to kerb; - Parking is provided outside of the carriageway width; - Hydrants are located clear of parking areas; - Are through roads and these are linked to the internal road system at an interval of no greater than 500 metres; - Curves of roads have a minimum inner radius of 6 metres; - The maximum grade road is 15° and average grade is 10°; - The road crossfall does not exceed 3°; - A minimum vertical clearance of 4 metres to any overhanging obstructions, including tree branches, is provided.	To comply To comply To comply To comply See reporting To comply To comply To comply To comply
-----------------	--	---	--

The Property Access/Egress Table specifically considers fire trails for Lots 13, 14 and 15.

Table 5.3b			
Performance criteria		Acceptable Solution	Comment
P R O P E R T Y A C C E S S	The intent may be achieved where:		
	Firefighting vehicles can access the dwelling and exit the property safely.	- There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles. In circumstances where this cannot occur the following requirements apply: - Minimum 4m carriageway width; - In forest, woodland and heath situations, rural property access roads have passing bays at every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m at the passing bay; - A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; - Provide a suitable turning area in accordance with Appendix 3;	N/A 4m trail and 6m pavement 6m pavement recommended To comply See Reporting

		• Curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress; • The minimum distance between inner and outer curves is 6m; • The crossfall is not more than 10 degrees; • Maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads; and • A development comprising more than three dwellings has access by dedication of a road and not by right of way.	To comply To comply To comply To comply Noted
--	--	---	--

Performance Reporting was completed with respect to provision of suitable turning areas for each dwelling.

1. Deemed to Satisfy provision of Table 5.3b

Provide a suitable turning area in accordance with Appendix 3;

2. Performance Requirement

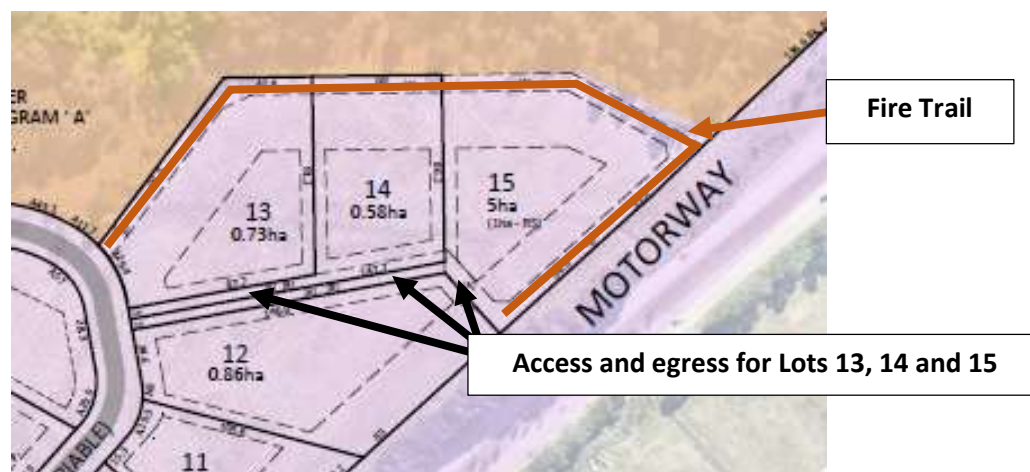
Firefighting vehicles can access the dwelling and exit the property safely.

3. Discussion

In lieu of Fire Brigade access to individual Lots 13, 14 and 15, a fire trail is proposed to allow for the Brigade to get to the interface and provide a second access/egress to Lot 15.

The fire trail will extend along the interface and join with the main access way to Lot 15. At an earlier Fire Design Brief Meeting it was established that the main hazard is to the north. For firefighting purposes the trail will have a pavement width of 6m and a 4m fire trail. It is proposed that there is a separate access/egress for Lots 13 and 14 and separate access and egress for Lot 15.

It will also be necessary to ensure that access to the static water supply for each lot is available to the brigade.



4. Assumptions

1. All other lots in the planning proposed subdivision will provide turning areas within the lots.
2. The fire trail and the main access to lots 13, 14 and 15 will comply with all other requirements of Property Access in Table 5.3b.

5. Conclusion

It is concluded that fire fighting vehicles can access the lots.

3.1.4 Services - Water, Gas and Electricity

As set out in *Planning for Bushfire Protection*, 2019, developments in bushfire prone areas must maintain a water supply for firefighting purposes. Reticulated water is not available therefore a static water supply is required in accordance with PBP, 2019.

Electricity supply is available and will be connected to the planning proposed subdivision site and will be required in accordance with Table 6.

Table 6

Table 5.3c			
	Performance Criteria	Acceptable Solutions	Comment
WATER SUPPLIES	The intent may be achieved where:		
	Inadequate water supplies is provided for firefighting purposes	• Reticulated water supply is to be provided to the development where available. • A static water and hydrant supply are provided for non-reticulated developments or where reticulated water supply cannot be guaranteed. • Static water supplies shall comply with Table 5.3d of the NSW Planning for Bushfire Protection 2019.	Static water supplies to comply with PBP, 2019.
	Water supplies are located at regular intervals The water supply is accessible and reliable for firefighting operations	• Fire hydrant, spacing, design and sizing complies with the relevant clauses of the Australian Standard AS 2419.1 – 2005. • Hydrants are not located within any road carriageway. • Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter road.	N/A
	Flows and pressures are appropriate	• Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.	N/A

	The integrity of the water supply is maintained	- All above ground water service pipes are metal, including and up to any taps. - Above ground water storage tanks shall be of concrete or metal.	To comply
ELECTRICITY SERVICES	Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings Regular inspection of lines is undertaken to ensure they are not fouled by branches	- Where practical, electrical transmission lines are underground. - Where overhead electrical transmission lines are proposed: - Lines are installed with short pole spacing (30 metres) unless crossing gullies, gorges or riparian areas; and - No part of a tree is closer to a power line than the distance set out in ISSC3 "Guideline for Managing Vegetation near Power Lines.	To comply
GAS SERVICES	Location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings	- Reticulated or bottle gas is installed and maintained in accordance with AS 1596:2014 – The storage and handling of LP Gas, the requirements of relevant authorities and metal piping is to be used. - All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation. - Connections to and from gas cylinders are metal. - Polymer-sheathed flexible gas supply lines are not used. - Above ground gas service pipes are metal, including and up to any outlets.	To comply
W A T E R	The integrity of the water supply is maintained.	All above ground water service pipes external to the building are metal, including and up to the taps.	To comply
	A static water supply is provided for firefighting purposes in areas where reticulated water is not available.	- Where no reticulated water supply is available, water for firefighting purposes is provided in accordance with Table 5.3d; - A connection for firefighting purposes is located within the IPA or non-hazard side and away from the structure; 65mm Storz outlet with a ball valve is fitted to the outlet; - Ball valve and pipes are adequate for water flow and are metal; - Supply pipes from tank to ball valve have the same bore size to ensure flow volume;	To comply To comply To comply To comply if applicable

S U P P L I E S		Underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank;	To comply
		A hardened ground surface for truck access is supplied within 4m;	To comply
		Above ground tanks are manufactured from concrete or metal;	To comply if applicable
		Raised tanks have their stands constructed from non-combustible material or bush fire resisting timber (See Appendix F of AS3959);	To comply
		Unobstructed access can be provided at all times;	To comply
		Underground tanks are clearly marked;	To comply
		Tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters;	To comply
		All exposed water pipes external to the building are metal, including any fittings;	To comply
		Where pumps are provided, they are a minimum 5hp or 3kW petrol or diesel-powered pump, and are shielded against bushfire attack; any hose and reel for firefighting connected to the pump shall be 19mm internal diameter; and	To comply if provided
		Fire hose reels are constructed in accordance with AS/NZS 1221:1997, and installed in accordance with the relevant clauses of AS 2441:2005.	To comply if provided

3.1.5 Landscaping

Landscaping is a major cause of fire spreading to buildings, and therefore any landscaping will need consideration when planning, to produce gardens that do not contribute to the spread of a bushfire.

When planning any future landscaping surrounding any proposed building or subdivision, consideration should be given to the following:

- The choice of vegetation – consideration should be given to the flammability of the plant and the relation of their location to their flammability and on-going maintenance to remove flammable fuels.
- Trees as windbreaks/firebreaks – Trees in the landscaping can be used as windbreaks and also firebreaks by trapping embers and flying debris.
- Vegetation management – Maintain a garden that does not contribute to the spread of bushfire.
- Maintenance of property – Maintenance of the property is an important factor in the prevention of losses from bushfire.

Appendix 4 of NSW Rural Fire Services, *Planning for Bushfire Protection*, 2019, contains standards that are applicable to the provision and maintenance of Asset Protection Zones.

For a complete guide to APZs and landscaping download the NSW RFS document Standards for Asset Protection Zones at the RFS www.rfs.nsw.gov.au.

3.1.6 Emergency Evacuation Planning

It is recommended that the owners develop a bushfire survival plan with respect to the site.

The decision to stay and defend or to leave should be made well in advance of the arrival of the bushfire. Any bush fire survival plan should consider the advice offered by the RFS website www.rfs.nsw.gov.au.

3.2 Construction of Buildings

3.2.1 General

The deemed-to-satisfy provisions for construction requirements are detailed in AS 3953-2018.

The relevant Bushfire Attack Level and construction requirements have been determined in accordance with PBP, 2019 and AS 3959-2018.

3.2.2 AS3959 – 2018 Construction of Buildings in Bushfire Prone Areas

The following construction requirements in accordance with AS 3959 – 2018 Construction of Buildings in Bushfire Prone Areas is required for the bushfire attack categories.

Table 7

Bushfire Attack Level (BAL)
BAL - LOW No construction requirements under AS 3959-2018
BAL - 12.5
BAL - 19
BAL - 29
BAL - 40
BAL - FZ

The following table indicates the Bushfire Attack Levels applicable once the recommended APZs have been established:

Table 8 – Categories of Attack/Construction Standard Assessment

Aspect	Hazard Vegetation	Slope	Min Distance to Hazard once APZ Applied	AS 3959-2018 Bushfire Attack Level (BAL)
North	Forest	0-5° Downslope	25m	BAL 29
South	Forest	0-5° Downslope	25m	BAL 29
East	Rainforest	15-20° Downslope	25m	BAL 29
West	Grassland	0-5° Downslope	11m	BAL 29

The distances for BAL 29 construction can be seen in **Appendix 2**.

3.2.3 Fences and Gates

Fences and gates may play a significant role in the vulnerability of structures during a bush fire.

With regard to new fences and gates:

1. All new fences in bush fire prone areas should be made of either hardwood or non-combustible material.
2. Where the fence is within 6m of the building or in areas of BAL 29, they should only be made of non-combustible material.

4.0 REQUIREMENTS

The following requirements are considered to be integral to this bushfire risk assessment:

1. Asset Protection Zones as detailed in Section 3.1.1 of this report are to be provided.
2. The planning proposed subdivision is to comply with the relevant performance criteria/acceptable solutions as provided for by PBP, 2019.
3. A vegetation Management Plan is to be prepared for the development.
4. Adopt landscaping principals in accordance with NSW Rural Fire Services, PBP, 2019.
5. Any future dwelling is to be constructed in accordance with Section 3.2 of this report.

5.0 CONCLUSION

It is suggested that with the implementation of this report, and its recommendations, that the bushfire risk is manageable and will be consistent with the acceptable bushfire protection measure solutions, provided for in NSW Rural Fire Services, PBP, 2019.

The report provides that the required APZ's can be achieved and that the proposed Planning Proposed Subdivision can be constructed so as to comply with the requirements of AS 3959-2018 and PBP, 2019.

This report is however contingent upon the following assumptions and limitations:

Assumptions

1. For a satisfactory level of bushfire safety to be achieved, regular inspection and testing of proposed measures, building elements and methods of construction, specifically nominated in this report, is essential and is assumed in the conclusion of this assessment.
2. There are no re-vegetation plans in respect to hazard vegetation and therefore the assumed fuel loading will not alter.
3. It is assumed that the building works will comply with the DTS provisions of the BCA including the relevant requirements of Australian Standard 3959 – 2018.
4. The planning proposed subdivision is constructed and maintained in accordance with the risk reduction strategy in this report.
5. The vegetation characteristics of the subject site and surrounding land remains unchanged from that observed at the time of inspection.

Limitations

1. The data, methodologies, calculations and conclusions documented within this report specifically relate to the planning proposed subdivision and must not be used for any other purpose.
2. A reassessment will be required to verify consistency with this assessment if there are any alterations and/or additions, or changes to the risk reduction strategy contained in this report.

Regards



Tim Mecham
Midcoast Building and Environmental

6.0 DISCLAIMER

This report is not intended for or to be used where aluminium composite panels are proposed. The report is not to be construed as an assessment of the building material or compliance with the recommended bushfire attack level/s.

7.0 REFERENCES

NSW Rural Fire Services, ***Planning for Bushfire Protection***, 2019
AS 3959-2018 ***Construction of Buildings in Bushfire Prone Areas***
Keith David 2004, Ocean ***Shores to Desert Dunes, The Native Vegetation of New South Wales and the ACT***, Department of Environment and Conservation
NSW State Government (1997) Rural Fires Act 1997
NSW Rural Fire Service – ***Guideline for Bushfire Prone Land Mapping 2002***

APPENDIX 1 – Planning Proposed Subdivision Layout

NOTE:

- The dimensions, areas and numbers of lots shown hereon are approximate and are subject to verification by field survey.
- The location of all physical features relative to existing or proposed title boundaries shown hereon is approximate and subject to verification by field survey.
- No reliance should be placed on the information shown on this plan for any financial dealings or detailed engineering design involving the land. Land Metrics Pty Ltd disclaims any liability whatsoever for any loss or damage that is incurred arising from any individual or organization who uses or relies upon this document for any financial dealing or any other purpose, including as a document which has been prepared to accompany a development application.
- This Plan is not a plan of an approved subdivision nor does it imply that the proposed boundary arrangement would be approved.
- This note remains an intrinsic part of this plan and this plan must not be reproduced without this note.
- The proposed C2 Zone shown hereon has been prepared in consultation with Idyll Spaces Environmental Consultants.

LEGEND

- R5 LARGE LOT RESIDENTIAL
- C2 ENVIRONMENTAL CONSERVATION
- BUILDING SETBACK (DCP / BUSHFIRE (BAL29))

R5 LAND USE ZONE AREAS:

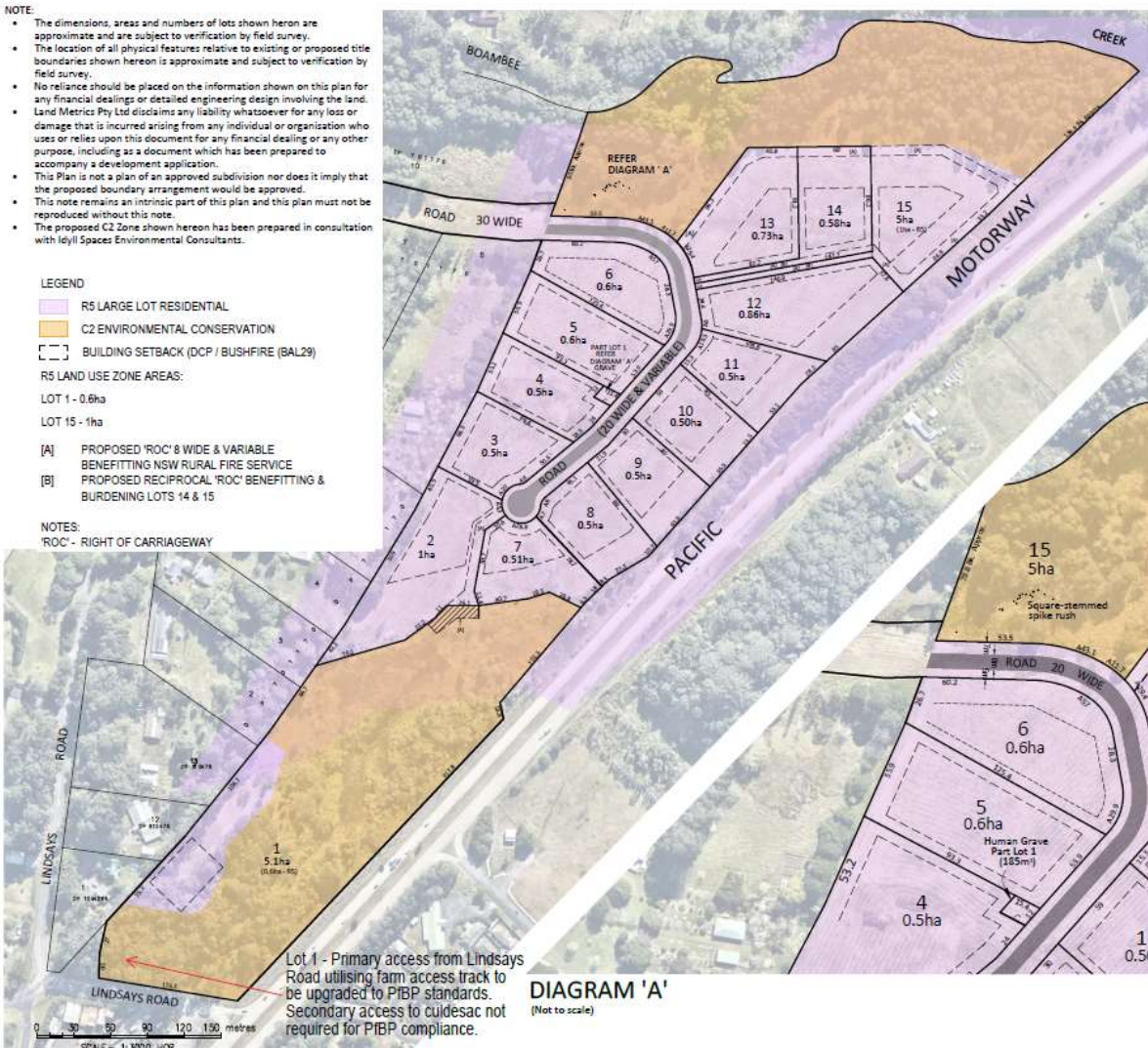
LOT 1 - 0.6ha

LOT 15 - 1ha

- [A] PROPOSED 'ROC' 8 WIDE & VARIABLE BENEFITTING NSW RURAL FIRE SERVICE
- [B] PROPOSED RECIPROCAL 'ROC' BENEFITTING & BURDENING LOTS 14 & 15

NOTES:

'ROC' - RIGHT OF CARRIAGEWAY



NOTE:

- * The dimensions, area and numbers of lots shown here are approximate and are subject to verification by field survey.
- * The location of all physical features relative to existing boundaries, town hieron is approximate and subject to field survey.
- * No reliance should be placed on the information shown in any financial dealings or detailed engineering design in connection with this plan.
- * Land Metrics Pty Ltd disclaims any liability whatsoever arising from its providing this plan for any financial decision made in reliance upon this document which has been prepared as a development application.
- * This Plan is not a part of an approved subdivision nor does it constitute a guarantee of title.
- * This note remains an intrinsic part of this plan and this reproduction without this note.
- * The proposed C2 Zone shown hereon has been prepared with Leyll Spaces Environmental Consultants.

LEGEND

- R8 LARGE LOT RESIDENTIAL
- C2 ENVIRONMENTAL CONSERVATION
- BUILDING SETBACK (DCP / BUSHFIRE (BAL29))
- R5 LAND USE ZONE AREAS:
- LOT 1 - 0.6ha
- LOT 15 - 1ha

[A] PROPOSED 'ROC' 8 WIDE & VARIABLE BENEFITTING NSW RURAL FIRE SERVICE
[B] PROPOSED RECIPROCAL 'ROC' BENEFITTING & BURDENING LOTS 14 & 15

NOTES:
 ROC - RIGHT OF CARRIAGEWAY

The map shows 15 lots with the following details:
 Lot 1: 0.6ha
 Lot 2: 1ha
 Lot 3: 0.5ha
 Lot 4: 0.5ha
 Lot 5: 0.6ha
 Lot 6: 0.6ha
 Lot 7: 0.5ha
 Lot 8: 0.5ha
 Lot 9: 0.5ha
 Lot 10: 0.5ha
 Lot 11: 0.5ha
 Lot 12: 0.6ha
 Lot 13: 0.7ha
 Lot 14: 0.5ha
 Lot 15: 0.5ha

Vegetation Callouts:
 Forest 0-5° Downslope Minimum APZ 25m (Lots 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15)
 Grassland Vegetation Minimum APZ 12m (Lots 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15)

MOTORWAY
PACIFIC ROAD
LINDSAYS ROAD

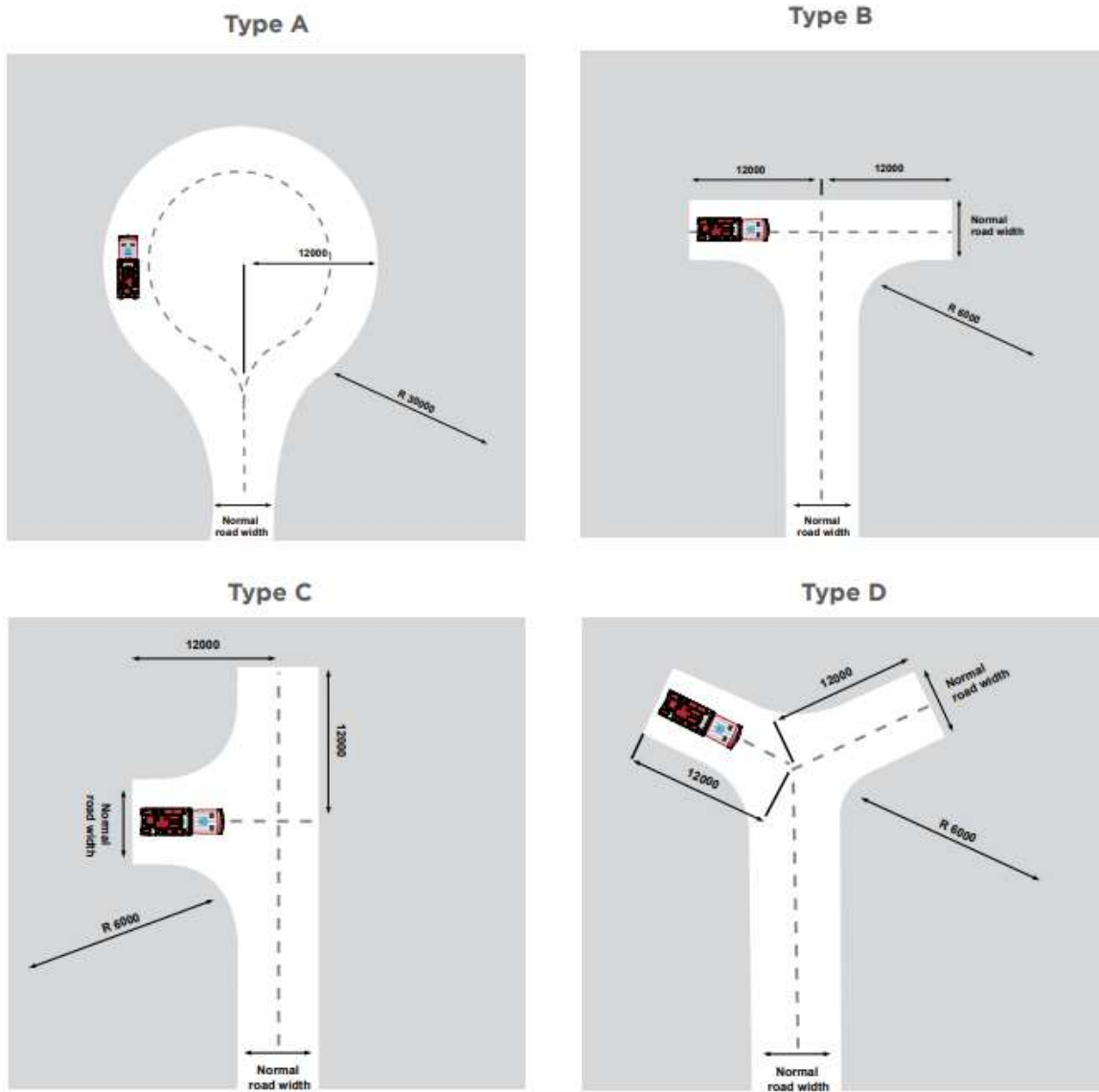
Scale: 1:1000
 0 20 40 60 80 100 metres

Midcoast Building and Environmental

APPENDIX 3 – Turning Head Options

Figure A3.3

Multipoint turning options.



NOISE IMPACT ASSESSMENT

Proposed Housing Development

Report No. M24255.01

Site: 2023-2086 Lindsays Road, Boambee NSW 2450

Prepared by: Philip Thornton BE(UNSW) MIEAust CPEng NER MAAS
Acoustic Consultant
Matrix Thornton Consulting Engineers

Date: 18 November 2024

SUMMARY

A new residential subdivision is proposed adjacent to the Pacific Highway in Boambee. This report assessed traffic noise from the Pacific Highway and noise treatments were suggested.

Matrix Industries Report M14347.01 (11 February 2015) presented results of noise modelling and measurements for a previous site layout. This new report updates the noise impact assessment based on the revised site layout.

No dwellings have been designed. The report describes noise mitigation such as architectural treatment that can be used to achieve noise goals, but the treatments will depend on the lot, siting of dwelling, house orientation and materials.

At some lots we have predicted that noise levels will be low enough to meet the acoustic requirements with the provision of mechanical ventilation or building siting. Dwellings at some lots will require acoustic design.

CONTENTS

1	INTRODUCTION	3
2	DESCRIPTION OF THE DEVELOPMENT	3
3	TRANSPORT AND INFRASTRUCTURE SEPP	4
	3.1 BUILDING ENVELOPE NOISE REDUCTION.....	5
4	MEASURED EXTERNAL NOISE LEVELS	6
	4.1 MEASUREMENT PROCEDURE.....	6
	4.2 MEASURED ROAD TRAFFIC NOISE LEVELS	7
5	PREDICTED NOISE LEVELS AT RESIDENTIAL LOTS.....	7
	5.1 METHOD.....	7
	5.2 TRAFFIC VOLUMES	7
6	BUILDING REQUIREMENTS.....	9
7	RECOMMENDATIONS	9
8	NOISE REDUCTION BY SHIELDING	10
9	CERTIFICATION FOR NOISE IMPACT STATEMENT	11
10	CONCLUSION	11
	APPENDIX A: GLOSSARY OF ACOUSTIC TERMS	12
	APPENDIX B: ACOUSTIC TREATMENT OF RESIDENCES	13

FIGURES

FIGURE 2-1	LOCATION OF THE SITE.....	3
FIGURE 2-2	LAYOUT OF PROPOSED LOTS	4
FIGURE 4-1	NOISE LOGGER LOCATION.....	7

TABLES

TABLE 3-1	ACOUSTIC REQUIREMENTS	6
TABLE 5-1	PREDICTED TRAFFIC VOLUME, 2024, BOAMBEE.....	8
TABLE 5-2	PREDICTED TRAFFIC NOISE LEVELS AT APPROXIMATE DISTANCES, 2024	9
TABLE 6-1	ACOUSTIC REQUIREMENTS AT LOTS.....	9

1 INTRODUCTION

A new residential subdivision is proposed west of the Pacific Highway off Lindsays Road, Boambee. As there are high levels of traffic noise at the site, Coffs Harbour City Council requires an acoustic report to ensure suitable noise levels within any new dwellings.

Matrix Industries Report M14347.01 dated 15, February 2015, presented a noise impact assessment of the site. Since 2015 the proposed layout of the lots has been changed. This report updates the noise impact assessment based on the revised layout.

This report assesses traffic noise at the proposed residential lots and discusses potential means of noise mitigation including treatments of the buildings, shielding by other houses, and consideration of providing a noise wall at the highway side of the development.

2 DESCRIPTION OF THE DEVELOPMENT

Figure 2-1 shows the location of the site. The site is adjacent to the Pacific Highway at Boambee, south of Coffs Harbour. The acoustic environment is dominated by traffic on the Pacific Highway.

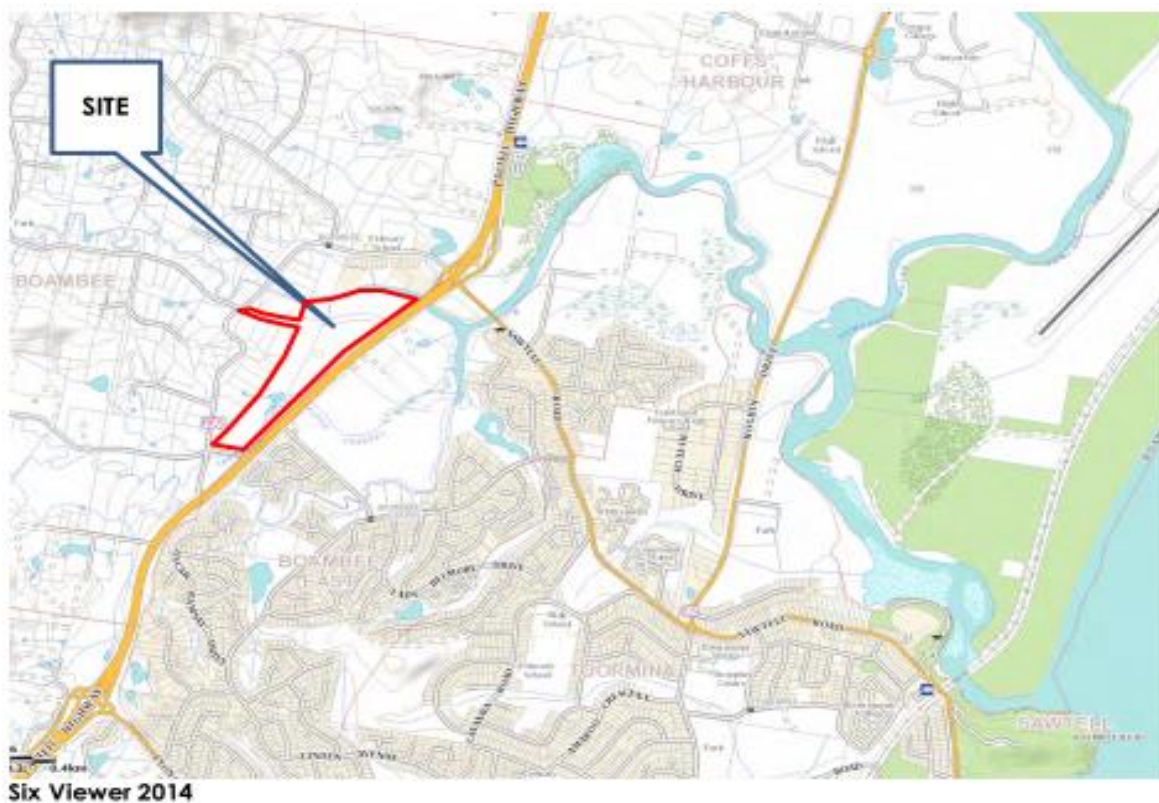


Figure 2-1 Location of the site

The proposed development is shown in Figure 2-2. Fifteen lots are proposed, and the figure shows the building envelope where dwellings would be constructed on the lots

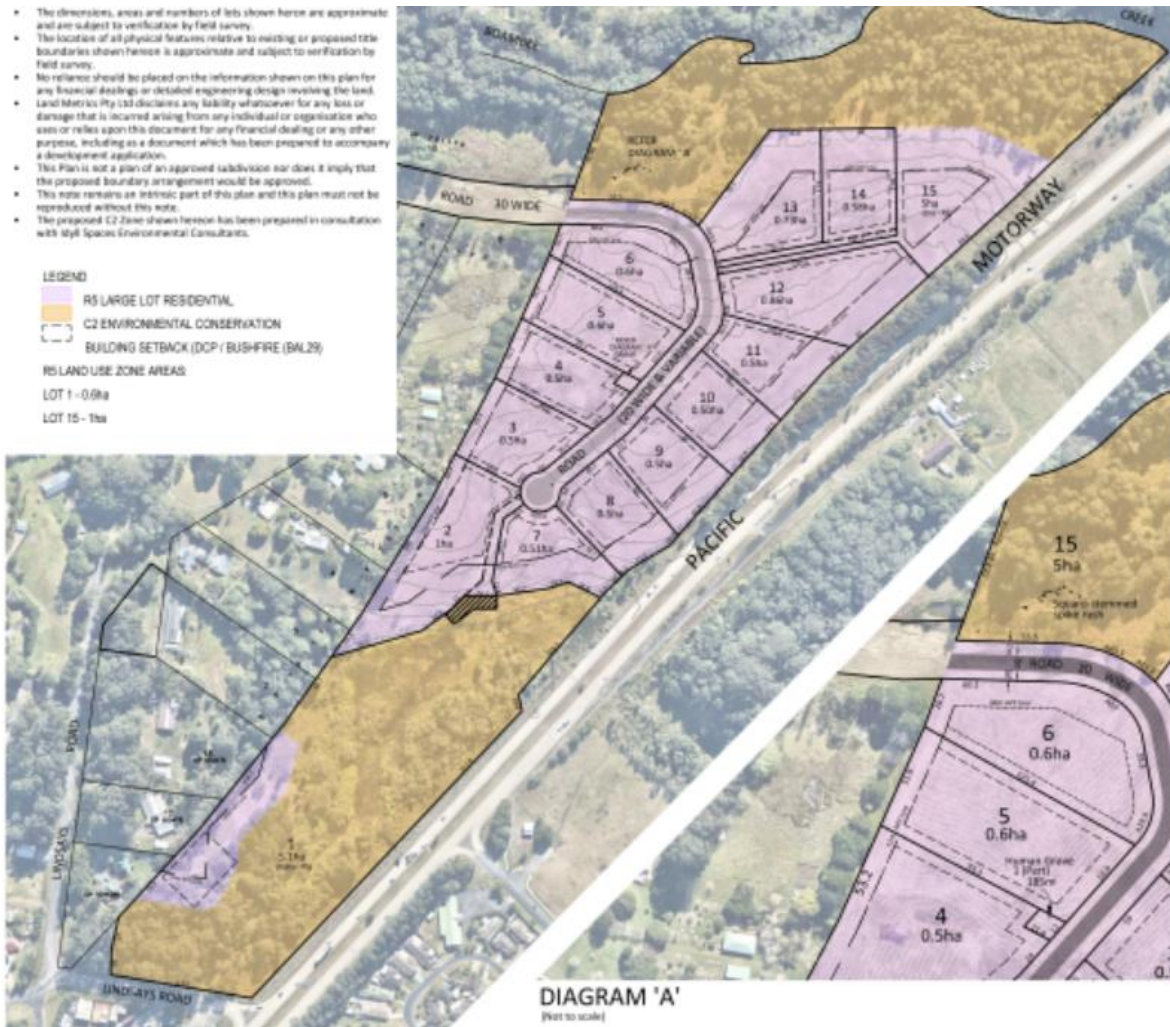


Figure 2-2 Layout of Proposed Lots

3 TRANSPORT AND INFRASTRUCTURE SEPP

The development is potentially impacted by traffic noise from the Pacific Highway, east of the development.

State Environmental Planning Policy (Transport and Infrastructure) 2021 (SEPP) Clause 2.120 states the following with regard to road traffic noise impacts on non-road developments.

(1) This section applies to development for any of the following purposes that is on land in or adjacent to the road corridor for a freeway, a tollway or a transitway or any other road with an annual average daily traffic volume of more than 20,000 vehicles (based on the traffic volume data published on the website of TfNSW) and that the consent authority considers is likely to be adversely affected by road noise or vibration—

- (a) residential accommodation,*
- (b) a place of public worship,*
- (c) a hospital,*
- (d) an educational establishment or centre-based child care facility.*

(2) Before determining a development application for development to which this section applies, the consent authority must take into consideration any guidelines that are issued by the Planning Secretary for the purposes of this section and published in the Gazette.

(3) If the development is for the purposes of residential accommodation, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded—

(a) in any bedroom in the residential accommodation—35 dB(A) at any time between 10 pm and 7 am,

(b) anywhere else in the residential accommodation (other than a garage, kitchen, bathroom or hallway)—40 dB(A) at any time.

(3A) Subsection (3) does not apply to a building to which State Environmental Planning Policy (Housing) 2021, Chapter 3, Part 7 applies.

(4) In this section, freeway, tollway and transitway have the same meanings as they have in the Roads Act 1993.

The NSW Department of Planning *Development Near Rail Corridors and Busy Roads – Interim Guideline* (The Guideline) gives guidelines for application of the SEPP, including the following:

The night-time ‘sleeping areas’ criterion is 5dBA more stringent than the ‘living areas’ criteria to promote passive acoustic design principles. For example, designing the building such that sleeping areas are less exposed to road or rail noise than living areas may result in less onerous requirements for glazing, wall construction and acoustic seals.

If internal noise levels with windows or doors open exceed the criteria by more than 10dBA, the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia.

3.1 BUILDING ENVELOPE NOISE REDUCTION

The criteria detailed in the SEPP (Infrastructure) 2021 refer to internal noise levels. Internal noise levels are affected by building methods and constructions. The noise reducing properties of various categories of construction are discussed in the Guideline. For the purposes of this assessment, it is assumed that all dwellings on the site would meet or exceed the properties of Category 1 as described by the Guideline. Category 1 materials are described in Appendix B.

Most buildings will achieve an internal noise level 10dBA below the external noise level with the windows open, without providing additional treatment.

Based on the SEPP criteria and the indication that the minimum noise reduction by a building façade, the mitigation requirements for various noise levels are given in Table 3-1. Note that all the external noise level criteria above refer to free-field noise levels.

Day time Noise – $L_{Aeq, 15hr}$ dBA	Night-time Noise to Sleeping Areas– $L_{Aeq, 9hr}$ dBA	Mitigation Requirements
Up to 60	Up to 55	No Requirement
61-65	55-60	Mechanical Ventilation
>65	>60	Acoustic Design

Table 3-1 Acoustic Requirements

Note: Day is defined as 7.00am to 10.00pm, Monday to Saturday; 8.00am to 6.00pm Sunday and Public Holidays.
Night is defined as 10.00pm to 7.00am, Monday to Saturday; 10.00pm to 8.00am Sunday and Public Holidays.

4 MEASURED EXTERNAL NOISE LEVELS

4.1 MEASUREMENT PROCEDURE

Noise levels were measured on site from 4 November to 12 November 2014.

One ARL brand, model EL-316, Type 1 environmental noise logger was used to measure the background noise levels. A Lutron sound level calibrator, model SC-941, was used as a reference sound source immediately before and after measurements were taken. All instruments are in current calibration from a National Association of Testing Authorities (NATA) registered laboratory. A noise logger measures the noise levels over a 15 minute sampling period and then determines LA1 through to LA99, L_{Amax} and L_{Aeq}. Both SLM and the loggers are integrating sound level meters which are able to process a continuous, variable, intermittent or impulsive signal to give a single integrated level or L_{Aeq} for the sampling period. This equipment complies with AS 1259 ‘Acoustics-Sound level meters’, Part 2 “Integrating-Averaging” and the testing procedure with AS 2659 “Guide to the use of sound measuring equipment”.

The logger was located between, on the property boundary, at the eastern end of the site, adjacent to the Pacific Highway corridor, as shown in Figure 4-1.



Figure 4-1 Noise Logger Location

4.2 MEASURED ROAD TRAFFIC NOISE LEVELS

The results of the noise logging (2014) show the existing noise on the eastern boundary of the site to be:

- Daytime – $L_{Aeq,15hr}$ 66dBA; and
- Night Time – $L_{Aeq,9hr}$ 64dBA.

5 PREDICTED NOISE LEVELS AT RESIDENTIAL LOTS

5.1 METHOD

Noise is predicted using the Calculation of Road Traffic Noise (CoRTN) procedures. The noise levels are based on the traffic volume, percentage of heavy vehicles, topography and road characteristics. Because noise measurements were done at this location, the model results can be validated by comparing predicted levels with measured levels for the monitoring location.

5.2 TRAFFIC VOLUMES

In Report 14347.01 we used Traffic volumes for the Pacific Highway south of Coffs Harbour from the *Coffs Harbour Bypass Concept Design Report*, Roads and Maritime Services, September 2008. At the time of that report the fate of the Coffs Harbour Bypass was unknown so traffic volumes with and without the bypass were considered. The bypass has since been approved and is under construction.

For the Matrix Industries Report M14347.01, traffic volumes at the site were estimated at 40,000 vehicles per day, based on information in the *Coffs Harbour Bypass Concept Design Report*, and the noise measurement recorded on site was used to calibrate the noise model.

Traffic volumes have since been revised and published in the Coffs Harbour Bypass Environmental Impact Statement, Appendix F, Traffic and Transport Assessment (Arup, September 2019).

Based on that report the Pacific Highway Traffic Volumes at Boambee are:

- 2016 – 31,500 vehicles per day and
- 2024 (with bypass) – 38,600 vehicles per day.

Heavy vehicles make up 14% of the volume.

The increase in traffic volume from 2016 to 2024 would result in a 1dBA increase in L_{Aeq} level at the house locations.

In this way, the model corrects for the actual traffic volume measured during the measurement period. Based on typical traffic profiles for the Pacific Highway taken from previous Matrix Industries projects, the daytime and vehicle type splits lead to the volumes given in Table 5-1.

Year	Daytime		Night Time	
	Volume	Percent Heavy Vehicles	Volume	Percent Heavy Vehicles
2024	34315	12	4285	23

Table 5-1 Predicted Traffic Volume, 2024, Boambee

The predicted noise levels are shown in Table 5-1. For the building area within each lot, the results are for the point nearest the road kerb. As the potential building envelope is larger than a single house would be, another prediction is given for a house within the building envelope but as far from the road kerb as possible.

Receiver Location	Dwelling within building envelope					
	Nearest to highway			Furthest from highway		
	Approximate Distance (m) from kerb	Noise Level, Day, $L_{Aeq,15hr}$ dBA	Noise Level, Night, $L_{Aeq,9hr}$ dBA	Approximate Distance (m) from kerb	Noise Level, Day, $L_{Aeq,15hr}$ dBA	Noise Level, Night, $L_{Aeq,9hr}$ dBA
Logger (2016)	25	66	64	25	66	64
Lot 1	125	60	58	135	60	58
Lot 2	140	60	58	180	58	56
Lot 3	125	60	58	210	58	56
Lot 4	125	60	58	225	57	55
Lot 5	125	60	58	245	57	55
Lot 6	125	60	58	250	57	55
Lot 7	25	67	65	110	61	59

Lot 8	35	66	64	100	61	59
Lot 9	35	66	64	100	61	59
Lot 10	35	66	64	100	61	59
Lot 11	40	65	63	100	61	59
Lot 12	40	65	63	110	61	59
Lot 13	95	61	59	135	60	58
Lot 14	65	63	61	95	61	59
Lot 15	45	64	62	60	63	61

Table 5-2 Predicted traffic noise levels at approximate distances, 2024

6 BUILDING REQUIREMENTS

Based on the predicted noise levels, the acoustic requirements for dwellings built on any lot are indicated in Table 6-1. Where mechanical ventilation is indicated, the intention is to allow the occupant to leave doors and windows closed for acoustic reasons. Where “Acoustic Design” is indicated, any dwelling on the lot will require an acoustic assessment. The noise levels in the dwelling will depend on location, layout, shielding by fences and architectural elements.

Lot	Noise Level, Day, $L_{Aeq,15hr}$	Acoustic Requirements - Living Areas	Noise Level, Night, $L_{Aeq,9hr}$ dBA	Acoustic Requirements - Bedroom
Lot 1	60	No Requirement	58	Mechanical Ventilation
Lot 2	60	No Requirement	58	Mechanical Ventilation
Lot 3	60	No Requirement	58	Mechanical Ventilation
Lot 4	60	No Requirement	58	Mechanical Ventilation
Lot 5	60	No Requirement	58	Mechanical Ventilation
Lot 6	60	No Requirement	58	Mechanical Ventilation
Lot 7	67	Acoustic Design	65	Acoustic Design
Lot 8	66	Acoustic Design	64	Acoustic Design
Lot 9	66	Acoustic Design	64	Acoustic Design
Lot 10	66	Acoustic Design	64	Acoustic Design
Lot 11	65	Mechanical Ventilation	63	Acoustic Design
Lot 12	65	Mechanical Ventilation	63	Acoustic Design
Lot 13	61	Mechanical Ventilation	59	Mechanical Ventilation
Lot 14	63	Mechanical Ventilation	61	Acoustic Design
Lot 15	64	Mechanical Ventilation	62	Acoustic Design

Table 6-1 Acoustic Requirements at Lots

7 RECOMMENDATIONS

The recommendations for any dwelling will be subject to the placement of the dwelling, orientation and layout, as well as provision of any acoustic shielding.

Six categories of construction are detailed in the Appendix C.

For all Lots we recommend minimum Category 2 Construction. For Lots where “Acoustic Design” is indicated in Table 6-1, we recommend Category 4. The main elements required are provision of 10.38mm laminated glass, mechanical ventilation and acoustic seals on all external windows and doors.

General acoustic considerations for lots are:

- Locate the dwellings as far west as practical within the building envelope;
- Concrete slab on ground;
- Position the bedrooms on the western and northern façades;
- Position garages and noisy rooms on eastern and southern façades;
- Mechanical ventilation required as required by Table 6-1;
- Masonry external walls with acoustic seals for windows and doors.

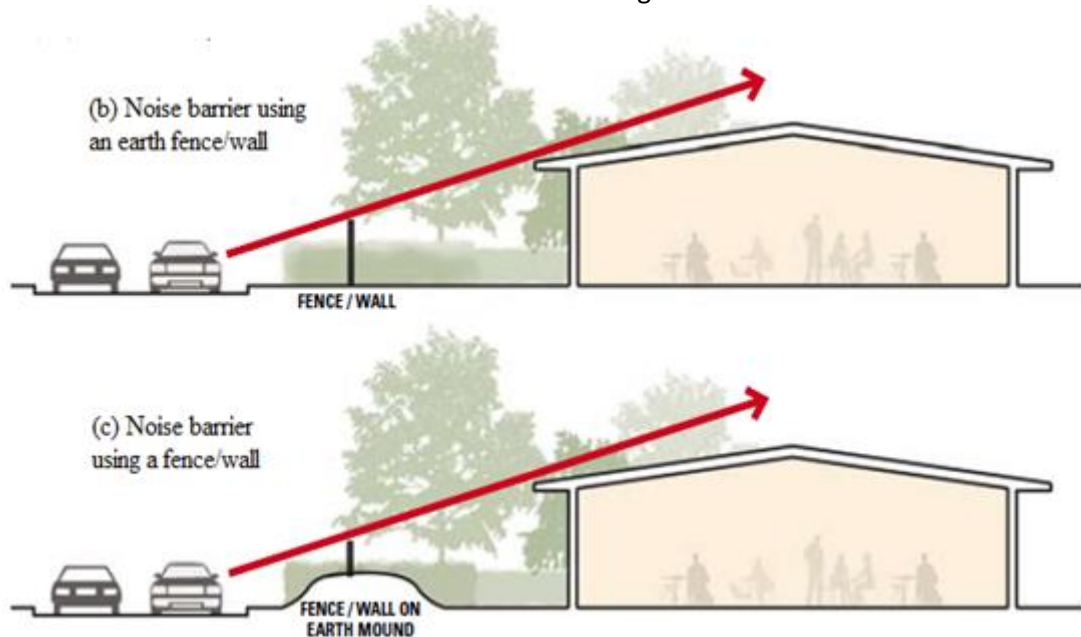
8 NOISE REDUCTION BY SHIELDING

Reductions could be achieved by construction of a fence on the eastern and southern boundary of the site. To provide significant mitigation the fence would be at least 2.1 m high and preferably 3 m.

The fence could be timber or Colorbond construction. For the 3 m fence timber is preferred and timber fences should be lapped and capped. The prediction reduction at the façade of these noise barriers is:

- 2.1 m barrier- 3dBA; and
- 3 m barrier – 5dBA.

To be effective the fence would need to be at least 200 m long.



Example of noise barrier using fence/wall or fence/wall with earth mound

Noise at any house could also be affected by shielding provided by other houses. Given the size of land allocated for building at each lot, this would be minimal and is not considered significant for this report.

9 CERTIFICATION FOR NOISE IMPACT STATEMENT

To accompany a Development Application for construction of each of the dwellings, a certification for noise impact can be written once the architectural and design details have been finalised.

10 CONCLUSION

A new residential subdivision is proposed adjacent to the Pacific Highway in Boambee. Traffic noise could result in excessive noise levels indoors, depending on dwelling siting and architecture.

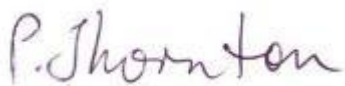
This report assessed traffic noise to each Lot from the Pacific Highway and noise treatments were suggested. Noise predictions were updated from our 2015 report based on a new layout of the site, and the Environmental Impact Statement (EIS) for the Coffs Harbour Bypass.

Noise mitigation can be achieved by applying acoustic architectural treatment to houses as per our recommendations, such as provision of mechanical ventilation or laminated glass.

At some lots we have predicted that noise levels will be low enough to meet the acoustic requirements with the provision of mechanical ventilation or building siting. Dwellings at some lots will require acoustic design.

Appropriate noise levels at Lots 1, 2, 3, 4, 5, 6 and 13 can be achieved using mechanical ventilation or air-conditioning to allow occupants to leave windows and doors closed.

Lots 7, 8, 9, 10, 11, 12, 14 and 15 will require acoustic design.



Philip Thornton BE(UNSW) MIEAust CPEng NER RPEQ MAAS
Acoustic Consultant
Principal Engineer & Director
National Professional Engineers Register No. 295662
18 November 2024



ENGINEERS
AUSTRALIA
Chartered Professional Engineer
MEMBER

APPENDIX A: GLOSSARY OF ACOUSTIC TERMS

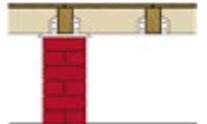
Assessment Period	The period in a day over which assessments are made.
dB(A)	Unit of sound level in A-weighted decibels. The A-weighting approximates the sensitivity of the human ear by filtering these frequencies. The dB(A) measurement is considered representative of average human hearing.
L_{Aeq}	The A-weighted equivalent continuous sound pressure level, used to quantify the average noise level over a time period.
L_{A10}	The A-weighted sound pressure level exceeded for 10% of the measurement period. It is usually used as the descriptor for intrusive noise level.
L_{A90}	The A-weighted sound pressure level exceeded for 90% of the measurement period. It is usually used as the descriptor for background noise level.
$L_{Aeq15min}$	Refers to the A-weighted energy averaged equivalent noise level over a 15 minute time period.
L_{Cpeak}	The highest instantaneous C-weighted sound pressure level over the measurement period. It is usually used for high impulsive noise.
L_{Amax}	The maximum A-weighted sound pressure level for the measurement period.
Loudness	A 3dB(A) change in sound pressure level is just noticeable or perceptible to the average human ear; a 5dB(A) increase is quite noticeable and a 10dB(A) increase is typically perceived as a doubling in loudness.
RBL	The overall single figure background level representing the assessment period over the whole monitoring period. For the short-term method of assessment, the RBL is the measured $L_{A90, 15min}$ value, or where a number of measurements have been made, the lowest $L_{A90, 15min}$ value.

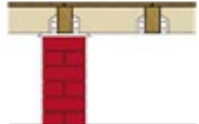
APPENDIX B: ACOUSTIC TREATMENT OF RESIDENCES

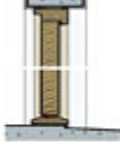
The tables set out deemed to satisfy constructions for each category of noise control treatment for the sleeping areas and other habitable areas of single/dual occupancy residential developments only. The assumptions made in the noise modelling are as follows:

- Typical layout of a modern dwelling taken from a recent large residential development in an outer Sydney suburb.
- Bedrooms and other habitable rooms are exposed to road noise.

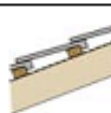
Category of Noise Control Treatment	R _w of Building Elements (minimum assumed)				
	Windows/Sliding Doors	Frontage Facade	Roof	Entry Door	Floor
Category 1	24	38	40	28	29
Category 2	27	45	43	30	29
Category 3	32	52	48	33	50
Category 4	35	55	52	33	50
Category 5	43	55	55	40	50

Category No.	Building Element	Standard Constructions	sample
1	Windows/Sliding Doors	Openable with minimum 4mm monolithic glass and standard weather seals	
	Frontage Facade	Timber Frame or Cladding: 6mm fibre cement sheeting or weatherboards or plank cladding externally, 90mm deep timber stud or 92mm metal stud, 13mm standard plasterboard internally	
		Brick Veneer: 110mm brick, 90mm timber stud or 92mm metal stud, minimum 50mm clearance between masonry and stud frame, 10mm standard plasterboard internally	
		Double Brick Cavity: 2 leaves of 110mm brickwork separated by 50mm gap	
	Roof	Pitched concrete or terracotta tile or metal sheet roof with sarking, 10mm plasterboard ceiling fixed to ceiling joists, R1.5 insulation batts in roof cavity.	
	Entry Door	35mm solid core timber door fitted with full perimeter acoustic seals	
	Floor	1 layer of 19mm structural floor boards, timber joist on piers	
		Concrete slab floor on ground	

Category No.	Building Element	Standard Constructions	sample
2	Windows/Sliding Doors	Openable with minimum 6mm monolithic glass and full perimeter acoustic seals	
	Frontage Facade	Timber Frame or Cladding Construction: 6mm fibre cement sheeting or weatherboards or plank cladding externally, 90mm deep timber stud or 92mm metal stud, 13mm standard plasterboard internally with R2 insulation in wall cavity.	
		Brick Veneer Construction: 110mm brick, 90mm timber stud frame or 92mm metal stud, minimum 50mm clearance between masonry and stud frame, 10mm standard plasterboard internally.	
		Double Brick Cavity Construction: 2 leaves of 110mm brickwork separated by 50mm gap	
	Roof	Pitched concrete or terracotta tile or metal sheet roof with sarking, 10mm plasterboard ceiling fixed to ceiling joists, R2 insulation batts in roof cavity.	
	Entry Door	40mm solid core timber door fitted with full perimeter acoustic seals	
	Floor	1 layer of 19mm structural floor boards, timber joist on piers	
		Concrete slab floor on ground	

Category No.	Building Element	Standard Constructions	sample
3	Windows/Sliding Doors	Openable with minimum 6.38mm laminated glass and full perimeter acoustic seals	
	Frontage Facade	Brick Veneer Construction: 110mm brick, 90mm timber stud or 92mm metal stud, minimum 50mm clearance between masonry and stud frame, 10mm standard plasterboard internally.	
		Double Brick Cavity Construction: 2 leaves of 110mm brickwork separated by 50mm gap	
	Roof	Pitched concrete or terracotta tile or sheet metal roof with sarking, 1 layer of 13mm sound-rated plasterboard fixed to ceiling joists, R2 insulation batts in roof cavity.	
	Entry Door	45mm solid core timber door fitted with full perimeter acoustic seals	
	Floor	Concrete slab floor on ground	

Category No.	Building Element	Standard Constructions	sample
4	Windows/Sliding Doors	Openable with minimum 10.38mm laminated glass and full perimeter acoustic seals	
	Frontage Facade	Brick Veneer Construction: 110mm brick, 90mm timber stud or 92mm metal stud, minimum 50mm clearance between masonry and stud frame, R2 insulation batts in wall cavity, 10mm standard plasterboard internally.	
		Double Brick Cavity Construction: 2 leaves of 110mm brickwork separated by 50mm gap	
	Roof	Pitched concrete or terracotta tile or sheet metal roof with sarking, 2 layers of 10mm sound-rated plasterboard fixed to ceiling joists, R2 insulation batts in roof cavity.	
	Entry Door	45mm solid core timber door fitted with full perimeter acoustic seals	
	Floor	Concrete slab floor on ground	

Category No.	Building Element	Standard Constructions	sample
5	Windows/Sliding Doors	Openable Double Glazing with separate panes: 5mm monolithic glass, 100mm air gap, 5mm monolithic glass with full perimeter acoustic seals.	
	Frontage Facade	Double Brick Cavity Construction: 2 leaves of 110mm brickwork separated by 50mm gap with cement render to the external face of the wall and cement render or 13mm plasterboard direct fixed to internal faces of the wall.	
	Roof	Pitched concrete or terracotta tile or sheet metal roof with sarking, 2 layers of 10mm sound-rated plasterboard fixed to ceiling joist using resilient mounts, R2 insulation batts in roof cavity	
	Entry Door	Special high performance acoustic door required - Consult an Acoustic Engineer	Door to acoustic consultant's specifications
	Floor	Concrete slab floor on ground	
6	All	Consult an Acoustic Engineer	



Tim Hill

Heritage Management and
Planning Pty Ltd
64 Reids Road
Bellingen NSW 2454
timhill.heritage@gmail.com
0473 033 615
ABN: 27 661 743 120

LINDSAYS ROAD PLANNING PROPOSAL, BOAMBEE

ABORIGINAL CULTURAL HERITAGE (DUE DILIGENCE) ASSESSMENT

September 2024

Mr. Jinderpal Rai



DOCUMENT CONTROL	
Report Reference	Hill, T. 2024. <i>Lindsays Road Large Lot Residential Planning Proposal, Boambee: Aboriginal Cultural Heritage (Due Diligence) Assessment</i> . Unpublished report for Mr. Jinderpal Rai
Project Number	TH 233
Author	Tim Hill
Client	Mr. Jinderpal Rai
Disclaimer <i>This document may only be used for the purpose for which it was commissioned. Heritage Management & Planning Pty Ltd accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report and its supporting material by any third party. Changes to available information, legislation and schedules are made on an ongoing basis and readers should obtain up to date information. Information provided is not intended to be a substitute for legal advice in relation to any matter. Unauthorised use of this report in any form is prohibited.</i>	
Status	Draft
Date	9 September 2024
Version	1B

CONTENTS

ABBREVIATIONS	5
1 INTRODUCTION	6
1.1 PROJECT BACKGROUND	6
1.2 PROJECT BRIEF & METHODOLOGY	6
1.3 REPORT AUTHORSHIP	7
1.4 LEGISLATIVE AND PLANNING CONTEXT	7
1.4.1 <i>Environmental Planning and Assessment Act (1979)</i>	7
1.4.2 <i>National Parks and Wildlife Act 1974 (NSW) and Regulations 2019 (NSW)</i>	7
1.4.3 <i>Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW</i>	8
1.4.4 <i>Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW</i>	9
2 DUE DILIGENCE ASSESSMENT	12
2.1 DESCRIPTION OF THE PROPOSAL	12
2.2 HERITAGE DATABASE	14
2.2.1 <i>Aboriginal Heritage Information Management System</i>	14
2.2.2 <i>Coffs Harbour Aboriginal Heritage Management Plan</i>	14
2.3 LANDFORM ASSESSMENT	17
2.4 DISTURBANCE HISTORY	18
2.5 FINDING OF THE DESKTOP STUDY	28
2.6 FIELD SURVEY: ABORIGINAL CULTURAL HERITAGE	28
2.6.1 <i>Summary of Aboriginal Community Consultation</i>	28
2.6.2 <i>Assessment Methodology</i>	29
2.6.3 <i>Survey Results</i>	33
2.6.4 <i>Requirement for Archaeological Excavation</i>	33
3 CONCLUSIONS AND MANAGEMENT RECOMMENDATIONS	35
3.1 ASSESSMENT CONCLUSIONS	35
3.2 RECOMMENDATIONS	35
4 REFERENCES	37
APPENDIX A: AHIMS EXTENSIVE SEARCH RESULTS	38
APPENDIX B- CONSULTATION WITH COFFS HARBOUR & DISTRICT LALC	39

FIGURES

FIGURE 1: LINDSAYS ROAD BOAMBEE- GENERAL LOCATION	11
FIGURE 2: LINDSAYS ROAD BOAMBEE – SUBDIVISION CONCEPT PLAN	13
FIGURE 3: AHIMS SEARCH RESULTS (#916293)	15
FIGURE 4: MIDDLE BOAMBEE CREEK 1: SITE LOCATION	16
FIGURE 5: LINDSAYS ROAD: COFFS HARBOUR ABORIGINAL CULTURAL HERITAGE MAPPING	16
FIGURE 6: LINDSAYS ROAD - TOPOGRAPHY AND STREAM ORDER	20
FIGURE 7: LINDSAYS ROAD -SOIL LANDSCAPE MAPPING (ESPADE.NSW.GOV.AU)	21
FIGURE 8: LINDSAYS ROAD - GEOLOGICAL MODEL (GEOLOGICAL SURVEY OF NSW)	22
FIGURE 9: LINDSAYS ROAD - 1886 CROWN PLAN	23
FIGURE 10: LINDSAYS ROAD - 1945 CROWN PLAN	24
FIGURE 11: LINDSAYS ROAD - 1974 AERIAL PHOTO	25
FIGURE 12: LINDSAYS ROAD - 1988 AERIAL PHOTO	26
FIGURE 13: LINDSAYS ROAD - 1993 AERIAL PHOTO	27
FIGURE 14: UNCLE IAN BROWN- INSPECTION OF THE MIDDLE BOAMBEE CREEK 1 SITE LOCATION	30
FIGURE 15: MIDDLE BOAMBEE CREEK 1- TYPICAL GRASS COVER AND VEGETATION ALONG THE CREEK BANK	30
FIGURE 16: INSPECTION OF THE Paddock EDGE OF THE RIDGELINE- LOOKING NORTH TO MIDDLE BOAMBEE CREEK	31
FIGURE 17: INSPECTION OF THE MAIN ACCESS TRACK ALONG THE RIDGE LINE- LOOKING NORTH	31
FIGURE 18: INSPECTION OF THE EDGE OF THE RIGGE CREST- LOOKING WEST TO THE DAIRY	32
FIGURE 19: BARE/ DISTURBED EARTH ASSOICITED WITH THE FORMER FARM ACCESS TRACK- LOOKING WEST TO THE DAIRY	32

Tables

TABLE 1: LANDFORM SUMMARY (DUE DILIGENCE CODE OF PRACTICE STEP 2B)	17
TABLE 2: LINDSAYS ROAD- SUMMARY OF SOIL LANDSCAPE MODELS	17
TABLE 3: LINDSAYS ROAD- PREVIOUS DISTURBANCE (CODE OF PRACTICE STEP 2C).....	18
TABLE 4: ABORIGINAL COMMUNITY CONSULTATION SUMMARY	29
TABLE 5: LINDSAYS ROAD- SUMMARY SURVEY EFFECTIVENESS	33

ABBREVIATIONS

ACH	Aboriginal Cultural Heritage
ACHCRP	<i>Aboriginal Cultural Heritage Consultation Requirements for Proponents in NSW (DEECW 2010C)</i>
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
CoPAI	<i>Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW (DEECW 2010B)</i>
Code of Practice	<i>Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW (DEECW 2010A)</i>
DEECW	Department of Environment, Climate Change and Water (now Heritage NSW)
EP&A	Environmental Planning and Assessment
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
NP&W	National Parks and Wildlife
Planning Proposal	Reduction of the minimum lot size and make changes to the zoning and terrestrial biodiversity mapping at Lot 4 DP 1049350, Lot 15 DP 861057 and Lots 101 and 102 DP 732172, Lindsays Road, Boambee to facilitate a large lot residential subdivision
Study Area	Part of Lot 4 DP 1049350, Lot 15 DP 861057 and Lots 101 and 102 DP 732172, Lindsays Road, Boambee NSW.

1 INTRODUCTION

1.1 Project Background

Heritage Management & Planning Pty Ltd has been commissioned by Mr. Jinderpal Rai to undertake a Aboriginal cultural heritage (Due Diligence) assessment to support the Planning Proposal for a large lot residential subdivision at Lindsays Road, Boambee NSW (**Figure 1** and **Figure 2**) (the Study Area).

The assessment has been commissioned to consider the potential impacts of the planning proposal on Aboriginal objects in accordance with the *Due diligence code of practice for the protection of Aboriginal objects in New South Wales* (DEECW 2010A) (Code of Practice). The Planning Proposal is being assessed under Part 3 of the *Environmental Planning and Assessment Act* (1979) (EP&A Act) (City of Coffs Harbour Council). A Due Diligence assessment meets the investigation and reporting requirements of the *NSW National Parks and Wildlife Act* (NSW) (1974) (NP&W Act) for residential development.

1.2 Project Brief & Methodology

The brief for this project was to undertake Aboriginal cultural heritage assessment in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DEECW 2010A). The assessment includes the following:

- a description of the Planning Proposal with specific consideration of future movement of topsoils that would reasonably be required to construct a Large Lot residential subdivision
- a search of relevant Aboriginal heritage registers, including the Aboriginal Heritage Information Management System (AHIMS)
- a review of environmental information to consider the potential that Study Area includes landforms or landscapes with an elevated potential to contain Aboriginal objects or cultural values
- a review of historic ground disturbance to consider the potential spatial integrity of sites to factors which might have removed Aboriginal objects from the area of proposed renovations
- completion of a site inspection with representatives of Coffs Harbour and District Local Aboriginal Land Council (LALC) to consider any cultural landscapes values which cannot otherwise be understood from a desktop or archaeological investigation, and
- documentation of the assessment outcomes including:
 - i. a summary of any archaeological sites or cultural landscape values within the Study Area
 - ii. appropriate mitigation measures to avoid known Aboriginal archaeological sites or landforms with the potential to contain Aboriginal archaeological sites, and
 - iii. statements on the adequacy of the assessment including the requirement for additional archaeological investigation and Aboriginal community consultation as part of the future Development Applications arising from the Planning Proposal.

1.3 Report Authorship

The study was undertaken by Tim Hill (BA. Hons. Archaeology and Palaeoanthropology, University of New England (1998)).

1.4 Legislative and Planning Context

1.4.1 *Environmental Planning and Assessment Act (1979)*

The Environmental Planning and Assessment Act (NSW) (1979) (EP&A Act) provides a framework to environmental assessment and approvals in NSW. The EPA Act includes three parts relevant to development proposals:

Part 3- Planning instruments which include Local Environment Plans (LEPs), Development Control Plans (DCPs) and other strategic planning controls.

Part 4- Development assessment and consent controls including approvals by local Councils and Regional Planning Panels.

Part 5- Self assessment and approvals by government agencies, or determining authorities, for infrastructure and environmental proposals, and for the approval of State Significant Infrastructure by the Planning Minister.

The planning proposal is being assessed by City of Coffs Harbour Council under Part 3 of the EP&A Act. Any future applications for the residential subdivision will be assessed by City of Coffs Harbour Council under Part 4 of the EP&A Act.

1.4.2 *National Parks and Wildlife Act 1974 (NSW) and Regulations 2019 (NSW)*

The National Parks and Wildlife Act 1974 (NSW) (NP&W Act) is the primary legislation concerning the identification and protection of Aboriginal cultural heritage in New South Wales. The three key definitions in the NP&W Act which are relevant to this assessment include:

- **Aboriginal object** means any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.
- **Aboriginal remains** means the body or the remains of the body of a deceased Aboriginal person, but does not include—
 - (a) a body or the remains of a body buried in a cemetery in which non-Aboriginal persons are also buried, or
 - (b) a body or the remains of a body dealt with or to be dealt with in accordance with a law of the State relating to medical treatment or the examination, for forensic or other purposes, of the bodies of deceased persons.
- **Harm** an object or place includes any act or omission that—
 - (a) destroys, defaces or damages the object or place, or
 - (b) in relation to an object—moves the object from the land on which it had been situated, or
 - (c) is specified by the regulations, or

(d) causes or permits the object or place to be harmed in a manner referred to in paragraph (a), (b) or (c),

but does not include any act or omission that—

(e) desecrates the object or place, or

(f) is trivial or negligible, or

(g) is excluded from this definition by the regulations.

Section 86 of the NPW Act provides offense provisions for Aboriginal objects, Aboriginal skeletal remains and Aboriginal places in NSW (see the definition of ‘Harm’ above). **Section 87** of the NPW Act outlines defences against prosecution relating to Aboriginal objects, skeletal remains and Aboriginal places. These include:

- acting in accordance with an Aboriginal Heritage Impact Permit (AHIP) issued under **Section 90** of the NP&W Act
- demonstrating that the “defendant exercised due diligence to determine whether the act or omission constituting the alleged offence would harm an Aboriginal object and reasonably determined that no Aboriginal object would be harmed”
- the activity was prescribed as a “low Impact” activity or an “omission” under the NPW Regulations (2019), and
- was undertaken in compliance with a Code of Practice adopted or prescribed by the NPW Regulations (2019).

The application of the Code of Practice is considered an appropriate approval pathway to comply with Section 87(2) of the NP&W Act for any works which do not meet the criteria of ‘low impact activities’.

1.4.3 Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW

The ACH assessment has been undertaken in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DEECW 2010A). The purpose of this Code of Practice is to establish a defence against prosecution in the event that Aboriginal objects may be inadvertently harmed during an activity (DEECW 2010A: 1 & 2). The Code of Practice:

...sets out the reasonable and practicable steps which individuals and organisations need to take in order to:

1. identify whether or not Aboriginal objects are, or are likely to be, present in an area
2. determine whether or not their activities are likely to harm Aboriginal objects (if present)
3. determine whether an AHIP application is required (DEECW 2010A:2).

The Code of Practice makes the following statement on the requirement for an AHIP (DEECW 2010A:2):

If Aboriginal objects are present or likely to be present and an activity will harm those objects, then an AHIP application will be required.

However, the practical application of the Code of Practice is that it is a process of establishing whether additional assessment is required. If the Due Diligence assessment concludes that harm to Aboriginal objects is likely, additional archaeological investigation, including Aboriginal community consultation, in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW* (DEECW 2010 B) (CoPAI) is required.

A key limitation of the Code of Practice and the CoPAI is that they do not clearly define the thresholds of “likely” or “highly likely”. To assist the assessment, the Merriam Webster dictionary definition (www.merriam-webster.com/dictionary) of “likely” is:

“Having a high probability of occurring or being true: very probable”

The Code of Practice makes an additional statement which removes the requirement to undertake additional investigation where there has been significance ground disturbance. The Code of Practice includes the following definition of ‘disturbed land’ (DEECW 2010A: 12, 18).

“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”.

The application of the previous disturbance provisions of the NP&W Act must be considered on a case-by-case basis. However, the general application of the previous disturbance defence outlined in the Code of Practice is that the ground disturbance must have removed the portion of the soil profile likely to contain Aboriginal objects from the local area or be of a nature whereby the ground disturbance would significantly reduce the likelihood of finding Aboriginal objects as part of an archaeological investigation. This is primarily because the procedure set out by the Code of Practice and CoPAI assume that the likelihood an activity will impact Aboriginal objects can be determined using standard archaeological investigation methods. Archaeological investigation under the Code of Practice and the CoPAI involves a sample survey to determine and/or infer the likelihood that Aboriginal objects are present - the confidence in results from archaeological investigations is significantly reduced where the land has been subject to ground disturbance.

1.4.4 Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW

The *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW* (DEECW 2010B) (CoPAI) provides the following statement on the application of the Code:

“This Code has been developed to support the process of investigating and assessing Aboriginal cultural heritage by specifying the minimum standards for archaeological investigation undertaken in NSW under the NPW Act. Where an Aboriginal cultural heritage assessment requires an archaeological investigation to be undertaken, this must be done in accordance with the requirements of this Code.” (DEECW 2010B:2).

The purpose of this CoPAI is to (DEECW 2010B:1):

1. establish the requirements for undertaking test excavation as a part of archaeological investigation without an AHIP. If you comply with these requirements and you harm an Aboriginal object when undertaking test excavations, your actions will be excluded from the definition of harm and as such you will not be committing an offence of harm to an Aboriginal object.
2. establish the requirements that must be followed when carrying out archaeological investigation in NSW where an application for an AHIP is likely to be made. Under the NPW Act, the Director General can require that certain information accompany an application for an AHIP. This Code explains what that information is in relation to archaeological investigations.

Compliance with the CoPAI is a minimum requirement for archaeological test excavation or archaeological investigation which results in harm to Aboriginal objects. However, where the CoPAI investigation concludes that

test excavations or an AHIP are not required the reporting requirements are considered a guideline for investigation and reporting- in this instance the defense against prosecution reverts back to the Due Diligence pathway (NP&W Act Section 87 (2)).



Figure 1: Lindsay Road Boambee- General location

2 Due Diligence Assessment

2.1 Description of the Proposal

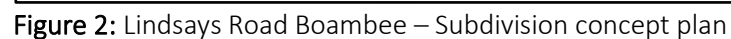
Understanding the nature of ground disturbance is critical to the Due Diligence assessment as site avoidance is the primary management response to avoid harm and is considered preferable to regulatory solutions including approval under a AHIP (NP&W Act Section 90).

The Planning Proposal for the large lot residential subdivision includes the following (**Figure 2**):

- reduce the minimum lot size
- make changes to the zoning, and
- make changes to terrestrial biodiversity mapping.

It is reasonable to proceed with the assessment on the basis that the following works would be required for the large lot residential subdivision (see **Figure 2**):

- bulk earthworks including the construction of internal roads/ cul-de-sacs, kerbs, gutters and drains
- stormwater detention basins
- underground utilities including power, water and sewer
- passive open space
- building pads including retaining walls
- land management works within the conservation zone required to implement the Vegetation Management Plan, and
- landscaping and remediation works.



2.2 Heritage Database

2.2.1 *Aboriginal Heritage Information Management System*

The Aboriginal Heritage Information Management System (AHIMS) provides a list of previously recorded Aboriginal sites in NSW. A search of the AHIMS database is a condition of compliance with the Due Diligence Code of Practice (Step 2A) and provides information on the types of sites which are, or may be, located within and around the Study Area.

A search was undertaken on 2 September 2024 for the area “Lot: 4, DP:DP1049350, Section : - with a Buffer of 50 meters..” (**Figure 3** and **Appendix A**). 1 Aboriginal site was returned within the search area, being the Middle Boambee Creek 1 site. The site was recorded in 1993 as part of the Sydney-Brisbane Optus Fibre Optic Cable project and includes two stone artefacts and a historic campsite on the southern bank of Middle Boambee Creek.

Artefacts located in 60m² area. No further artefacts could be located across terrace or spurline but local farmers have removed stones from paddock for many years.

1. Volcanic flake 22x23x7mm
2. Volcanic broken flake 46x35x15mm

2.2.2 *Coffs Harbour Aboriginal Heritage Management Plan*

The Coffs Harbour Aboriginal Heritage Management Plan provides a list of ‘known’ and ‘predicted’ Aboriginal cultural heritage sites within the Coffs Harbour local government area. The Management Plan provides a guideline for consultation with the Aboriginal community and provides advice on assessment requirements for activities in accordance with Section 5.10 (2) and 5.10(8) of the Coffs Harbour LEP. The consultation and assessment requirements are based on a mapping portal which includes Aboriginal sites of known and predicted Aboriginal heritage.

The Study Area is located within an area of ‘Known Aboriginal Cultural Heritage’ – this area is understood to relate to the Middle Boambee Creek 1 site.

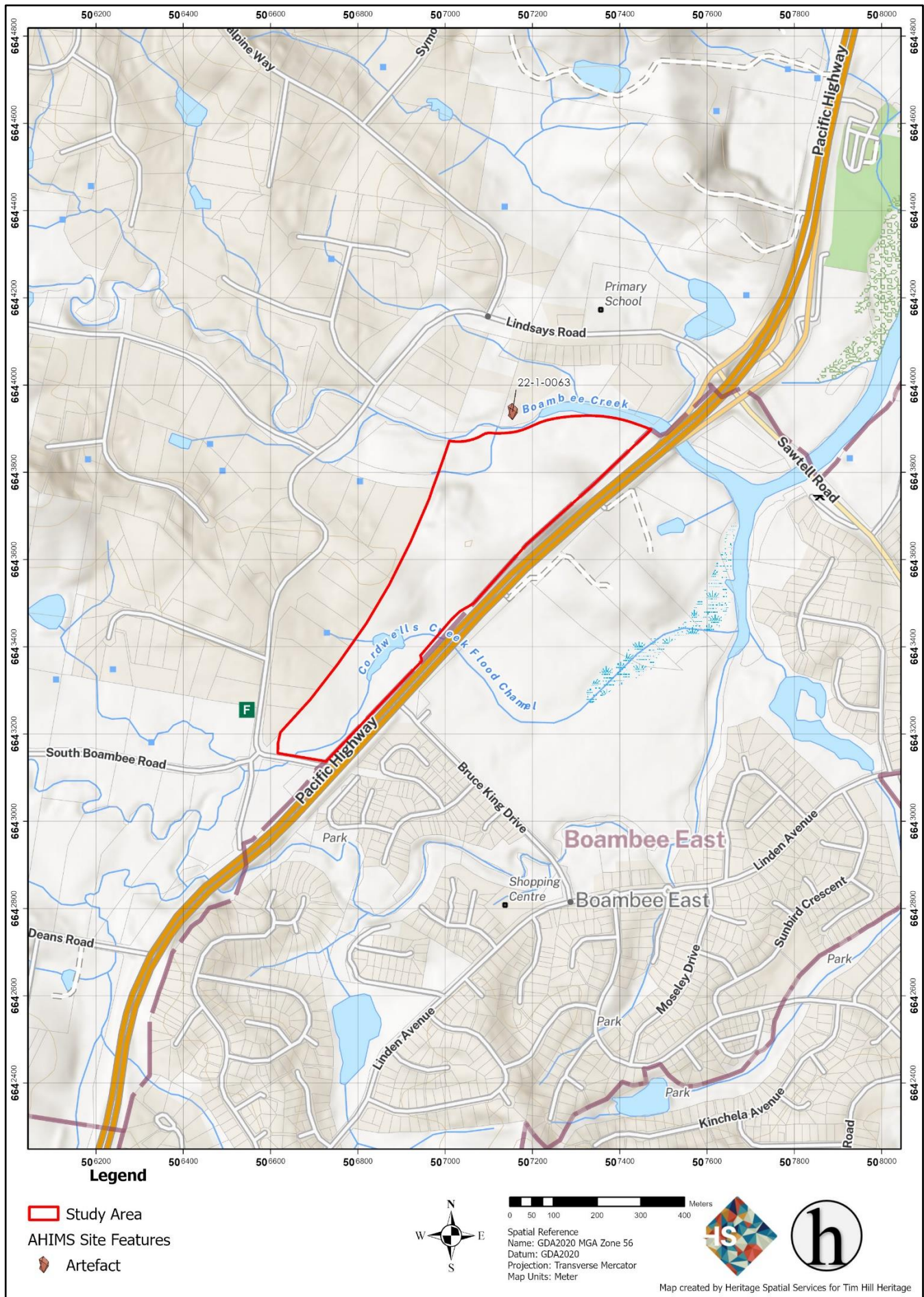


Figure 3: AHIMS search results (#916293)

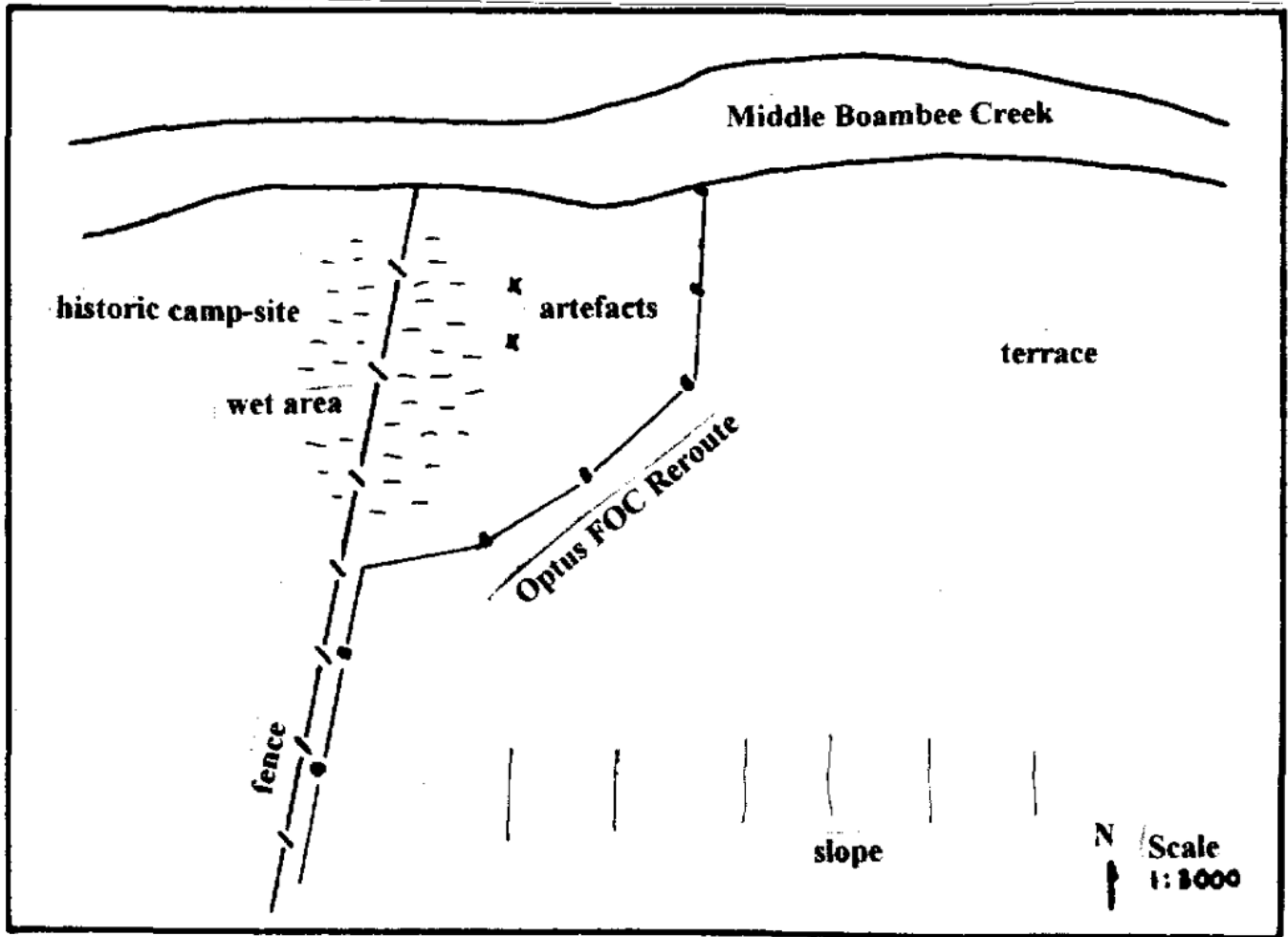


Figure 4: Middle Boambee Creek 1: Site location

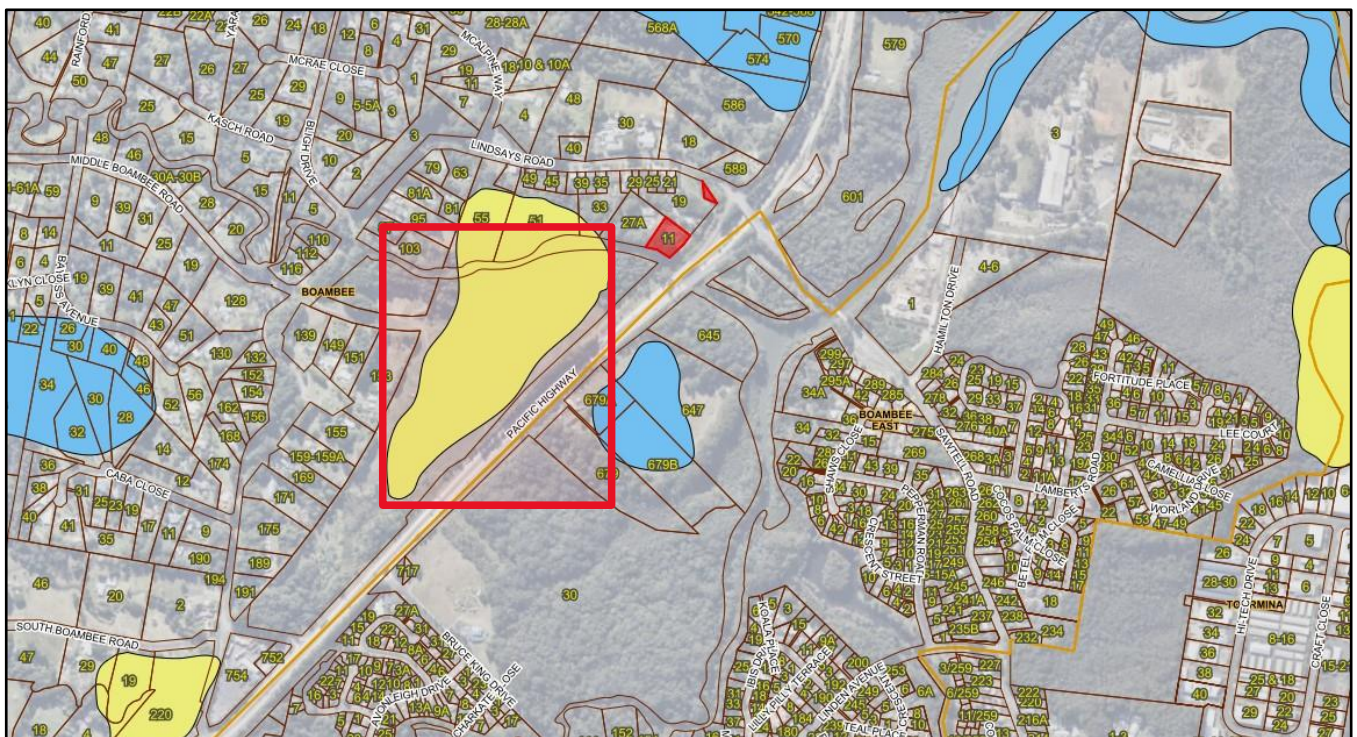


Figure 5: Lindsays Road: Coffs Harbour Aboriginal cultural heritage mapping

2.3 Landform assessment

The Code of Practice (Step 2b) identifies some landforms as having an increased potential to contain Aboriginal objects (Table 1).

Aboriginal objects are often associated with particular landscape features as a result of Aboriginal people's use of those features in their everyday lives and for traditional cultural activities. Examples of such landscape features are rock shelters, sand dunes, waterways, waterholes and wetlands. Therefore it is essential to determine whether the site contains landscape features that indicate the likely existence of Aboriginal objects (DEECW 2010A:12).

The Study Area includes a ridge line between Boambee Creek and Little Boambee (Table 1 and Figure 6)- as such additional assessment is required to comply with the Code of Practice.

Table 1: Landform summary (Due Diligence Code of Practice Step 2b)

Landform	Comment in relation to the Project Area
Within 200m of waters	Yes. The Study Area is within 200m of Middle Boambee Creek.
Located within a sand dune system	No
Located on a ridge top, ridge line or headland	Yes- The Study Area includes a ridge line off Little Boambee Peak.
Located within 200m below or above a cliff face	No
Within 20m of or in a cave, rock shelter, or a cave mouth	No

The soil landscape model for the Study Area includes a mix of rolling hills and undulating floodplains with tall open and open forests (see Table 2 and Figure 7). The geology of the elevated ridge line comprises sedimentary rock which has the potential for stone tool production and includes mudstones, greywacke, siltstone, chert, jasper and metamorphosed volcanics (Figure 8). The geological and landform characteristics of the Study Area are suitable for Aboriginal campsites and archaeological sites- as such additional assessment is required to comply with the Code of Practice.

Table 2: Lindsays Road- Summary of soil landscape models

Soil landscape	Landscape summary
Coffs Creek	Landscape- level to gently undulating floodplains, inset floodplains and terraces on Quaternary alluvium in the lower catchments of coastal streams draining the Gleniffer-Bonville Hills. Slopes 0 - 5%; relief < 20m; elevation 2 - 25m. Geology- Terrigenous gravels, sands, silts and clays of Quaternary age (Qa). Regolith is unconsolidated alluvium, generally in excess of 3 m deep. Vegetation- Extensively to completely cleared, tall open-forest and open-forest.
Ulong	Landscape- undulating to rolling low hills on Late Carboniferous metasediments of the Coffs Harbour association in the Coast Range and Gleniffer-Bonville Hills. Local relief to 90 m; slopes 5 - 20%, occasionally to 33%; elevation to 360 m Geology- Late Carboniferous Coffs Harbour association metasediments of the Coramba and Brooklana Beds and the Moombil Siltstone (Cccs/Ccbf/Ccmf), comprising a thick turbidite sequence dominated by siliceous mudstone, lithofeldspathic wacke and siltstone with minor metabasalt, felsic volcanics, chert and jasper. Lithology can change abruptly over short distances. These rocks are typically moderately to highly fractured, cleaved and deformed. Metamorphism generally increases from north to south. Regolith is typically

Soil landscape	Landscape summary
	100 cm or less of ferruginised and kaolinised decomposed rock overlying largely fresh fractured rock. Vegetation- Tall closed-forest, grading to tall open-forest on more exposed crests and north-facing slopes, particularly towards the northern range of this landscape. The drier exposed crests in the far north are occupied by a tall open-forest.

2.4 Disturbance history

The Code of Practice provides the following advice on the application of the definition of ‘disturbed lands’.

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 (DECCW 2010A:18).

The impacts of previous ground disturbance is an important consideration in the Due Diligence assessment (Step 2C), particularly where ground disturbance removes Aboriginal objects from the soil profile or disturbs the objects to a degree that the interpretation of the archaeological survey results is significantly compromised.

The following comments summarise historical aerals for the Study Area:

- 1886** the Crown Plan shows the Bellingen/ Coffs Harbour Road as a road reserve and an annotation for the current Pacific Motorway – the ridgeline is noted and the description of local vegetation includes ‘Gum, Oak. Blackbutt, Turpentine’ (**Figure 9**)
- 1945** the Crown Plan includes the road reserve for the ‘Links Road’- the annotation of vegetation includes “scattered gum oak & blackbutt” north of the ridge and “level grazing country’ to the south of the ridge (**Figure 10**)
- 1974-** the historic aerial photo shows the cleared paddocks and dairy- the Study Area is bare paddock and the ‘Links Road/ Pacific Highway’ is single lane to the east of the current motorway (**Figure 11**)
- 1988-** the historic aerial photo is substantially unchanged (**Figure 12**), and
- 1993-** the historic aerial photo is substantially unchanged (**Figure 13**).

It is reasonable to proceed with the Due Diligence assessment on the basis that the Study Area has been subject to historical ground disturbance which has resulted in clear and observable modification of the soil profile. However, based on the presence of the recorded Aboriginal site a site inspection is required to confirm the nature and extent of ground disturbance to comply with the Code of Practice.

Table 3: Lindsays Road- Previous disturbance (Code of Practice Step 2C)

Ground disturbance	Project
Soil ploughing	Yes

Ground disturbance	Project
Construction of rural infrastructure (such as dams and fences),	Yes
Construction of roads, trails and tracks (including fire trails and tracks and walking tracks),	Yes- the Study Area has been used for stockpiling fill from the Pacific Motorway duplication (c mid 1990's)
Clearing of vegetation,	Yes- the original open forests have been cleared.
Construction of buildings and the erection of other structures,	N/A
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),	Yes- the Study Area includes Telstra and Optus cables.
Substantial grazing involving the construction of rural infrastructure,	Yes- the Study Area has been used as a dairy
Construction of earthworks associated with anything referred to in paragraphs (a)–(g).	Yes- fill from the Motorway cutting has been placed over the Study Area.

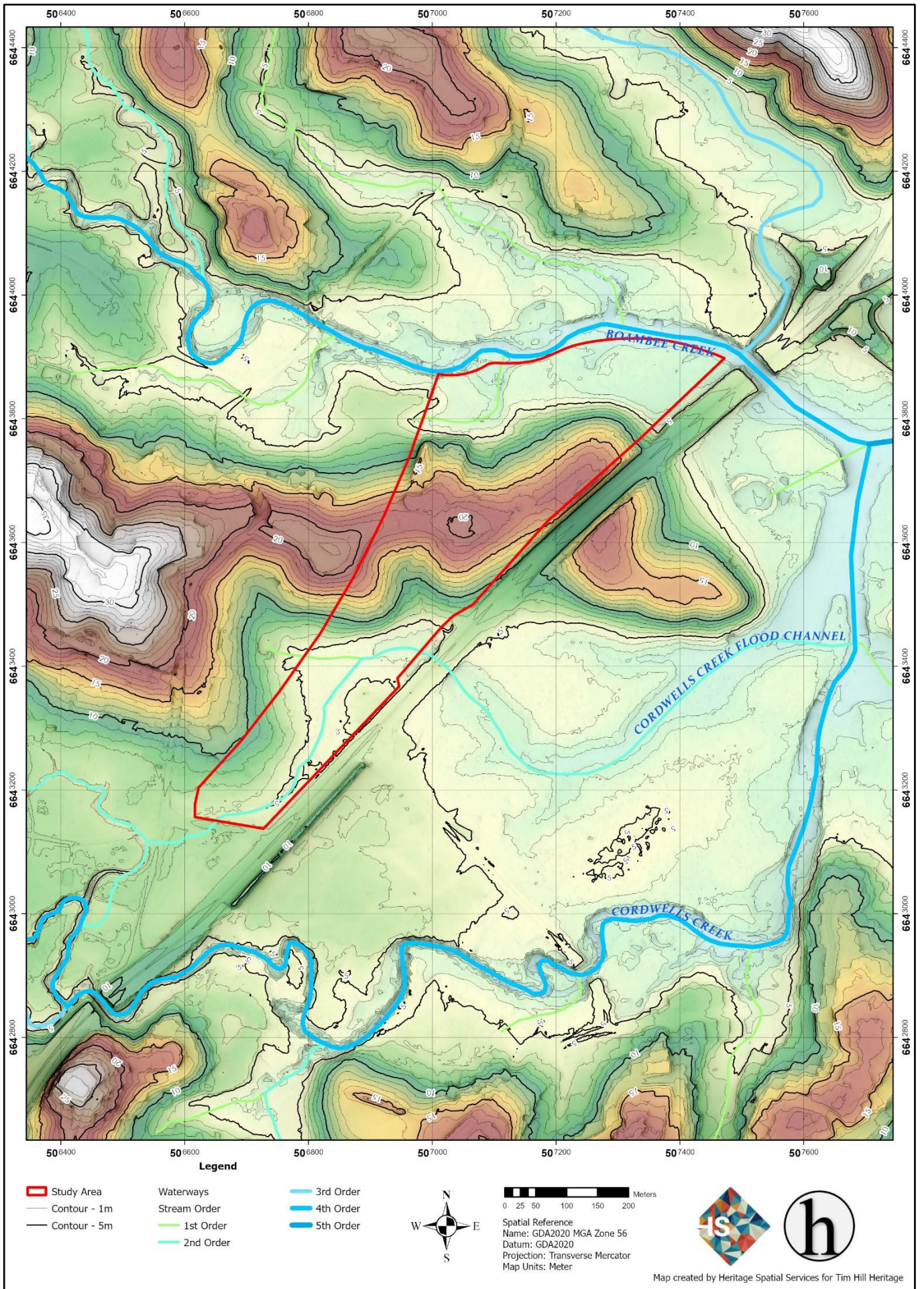


Figure 6: Lindsay's Road - Topography and stream order

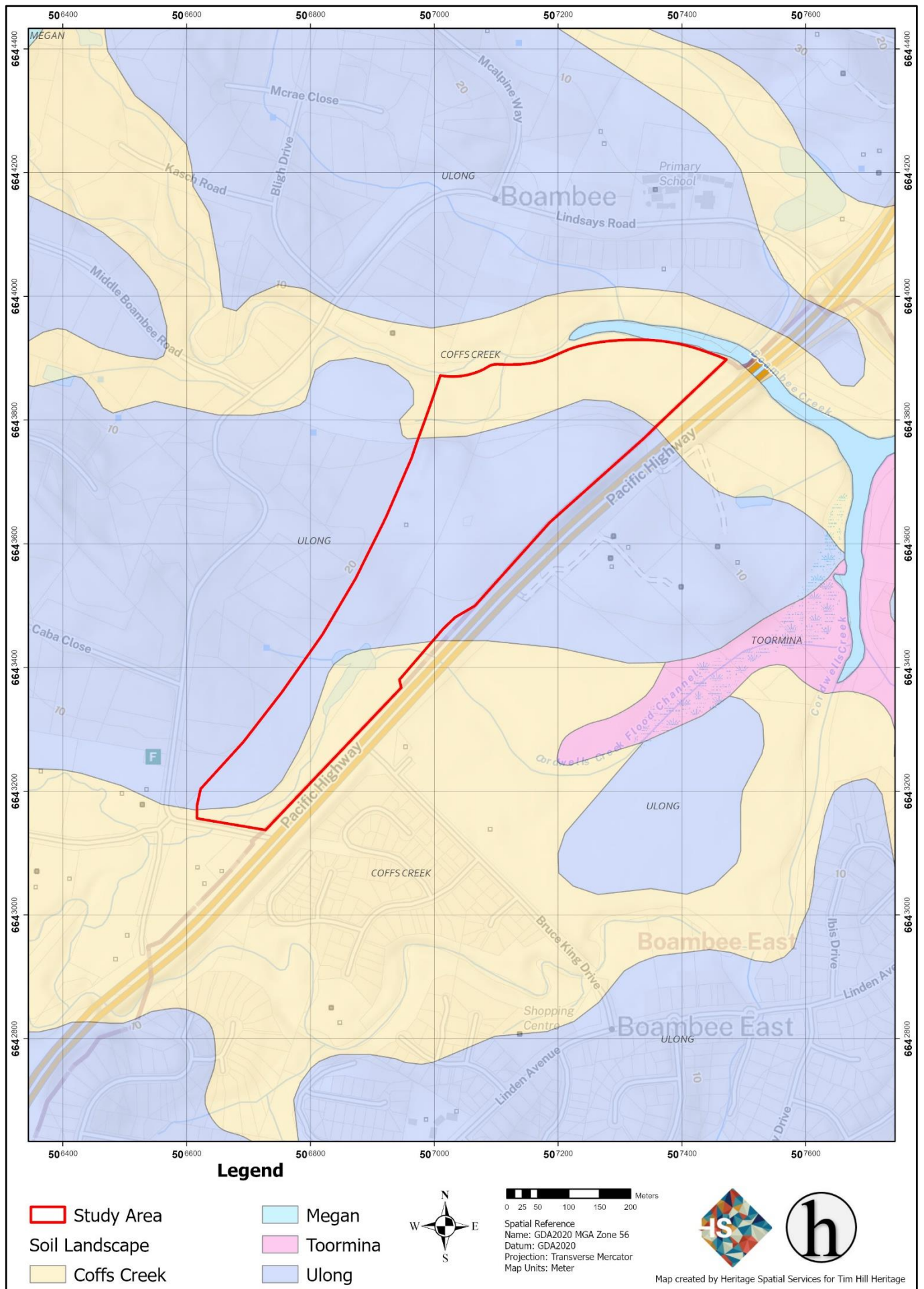


Figure 7: Lindsay Road -Soil landscape mapping (espade.nsw.gov.au)

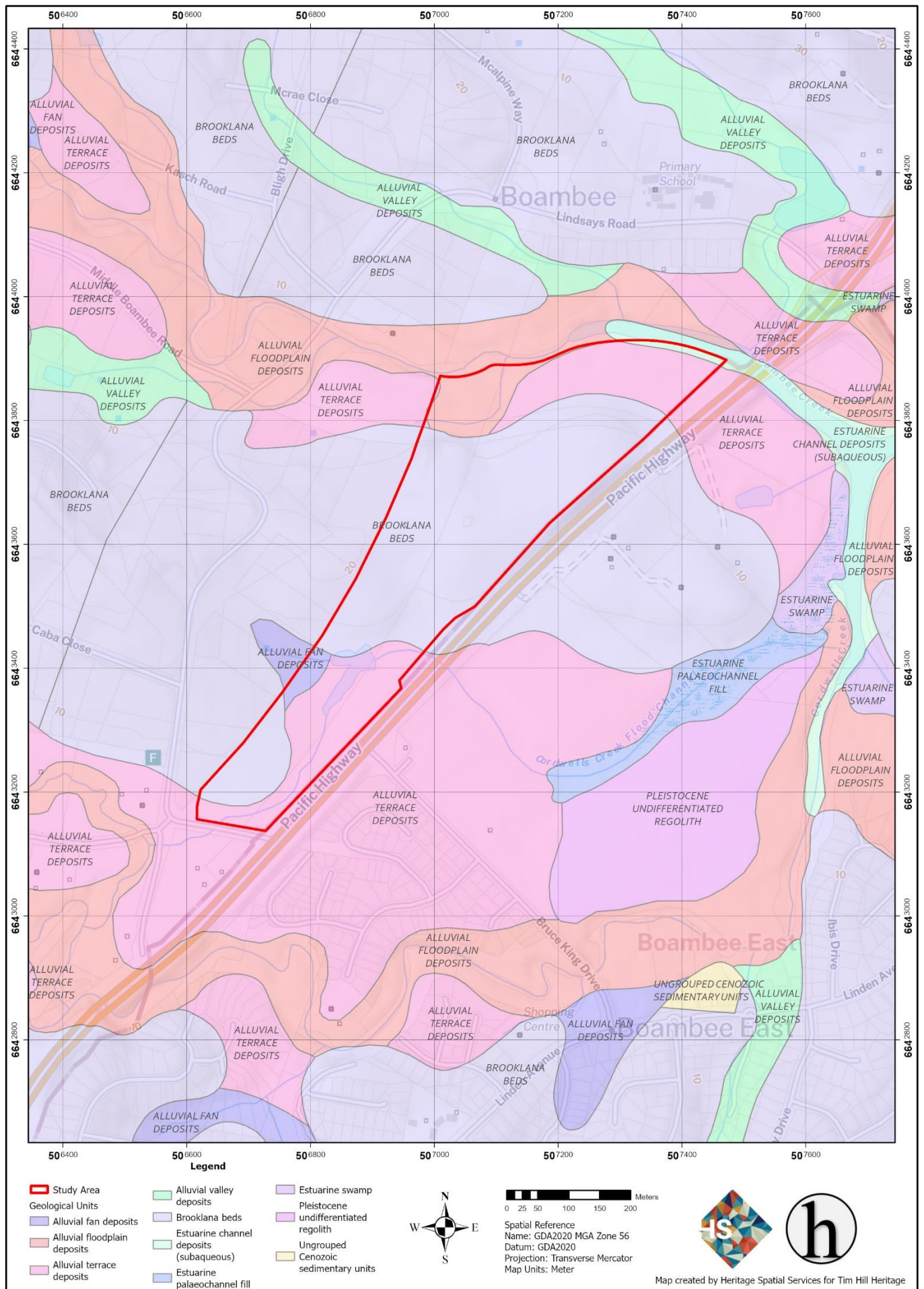


Figure 8: Lindsay's Road - Geological model (Geological Survey of NSW)

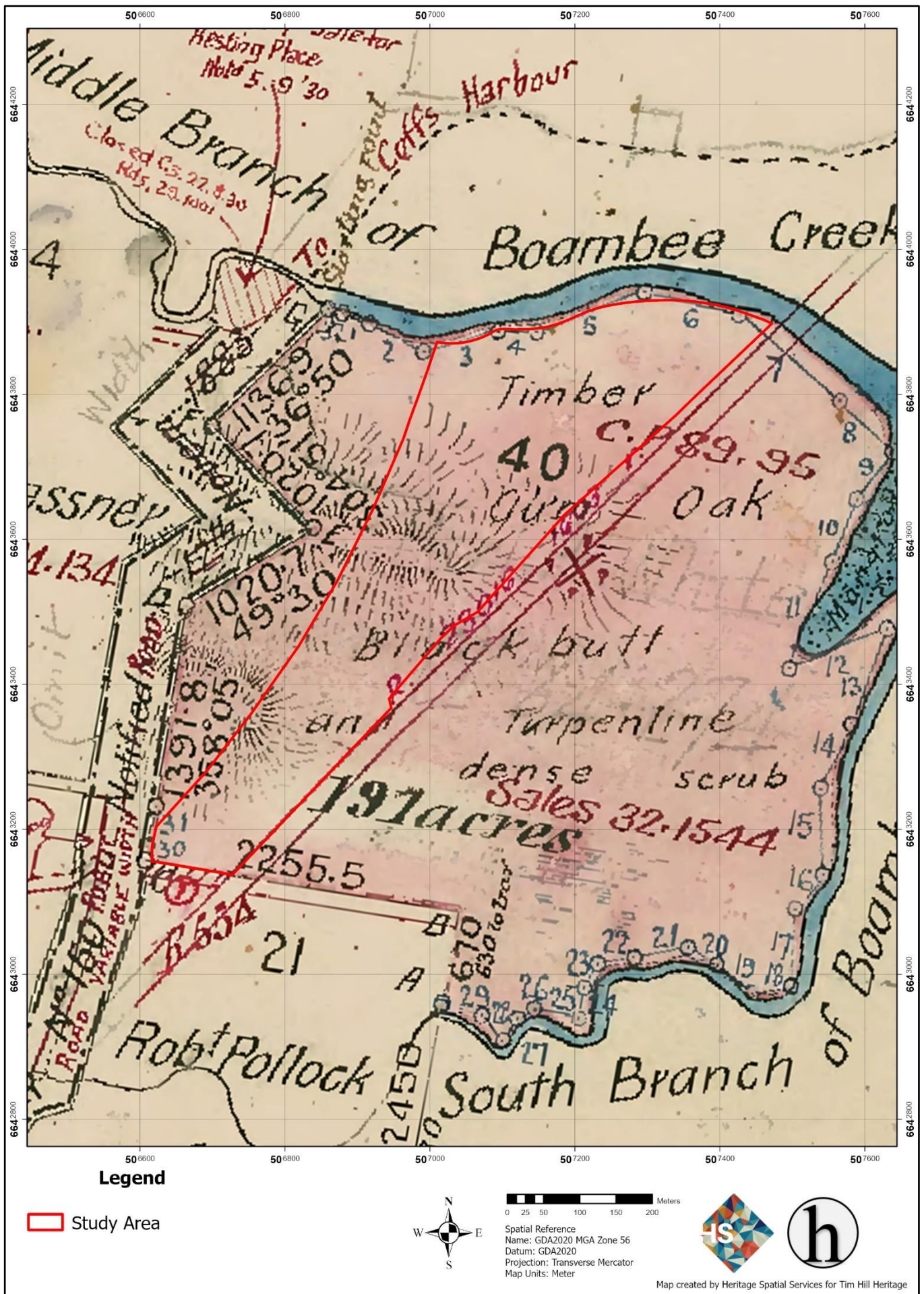


Figure 9: Lindsays Road - 1886 Crown Plan

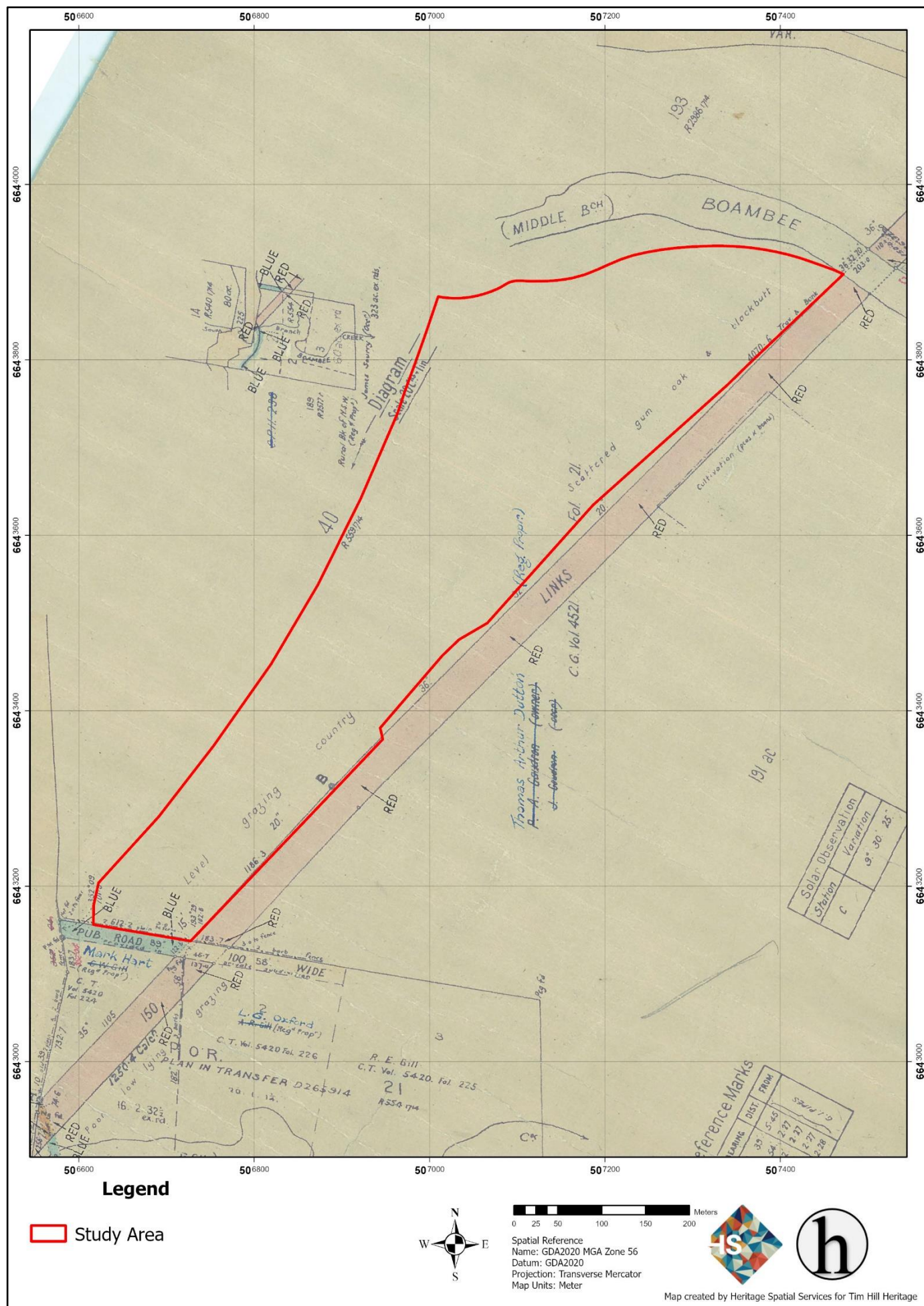


Figure 10: Lindsays Road - 1945 Crown Plan

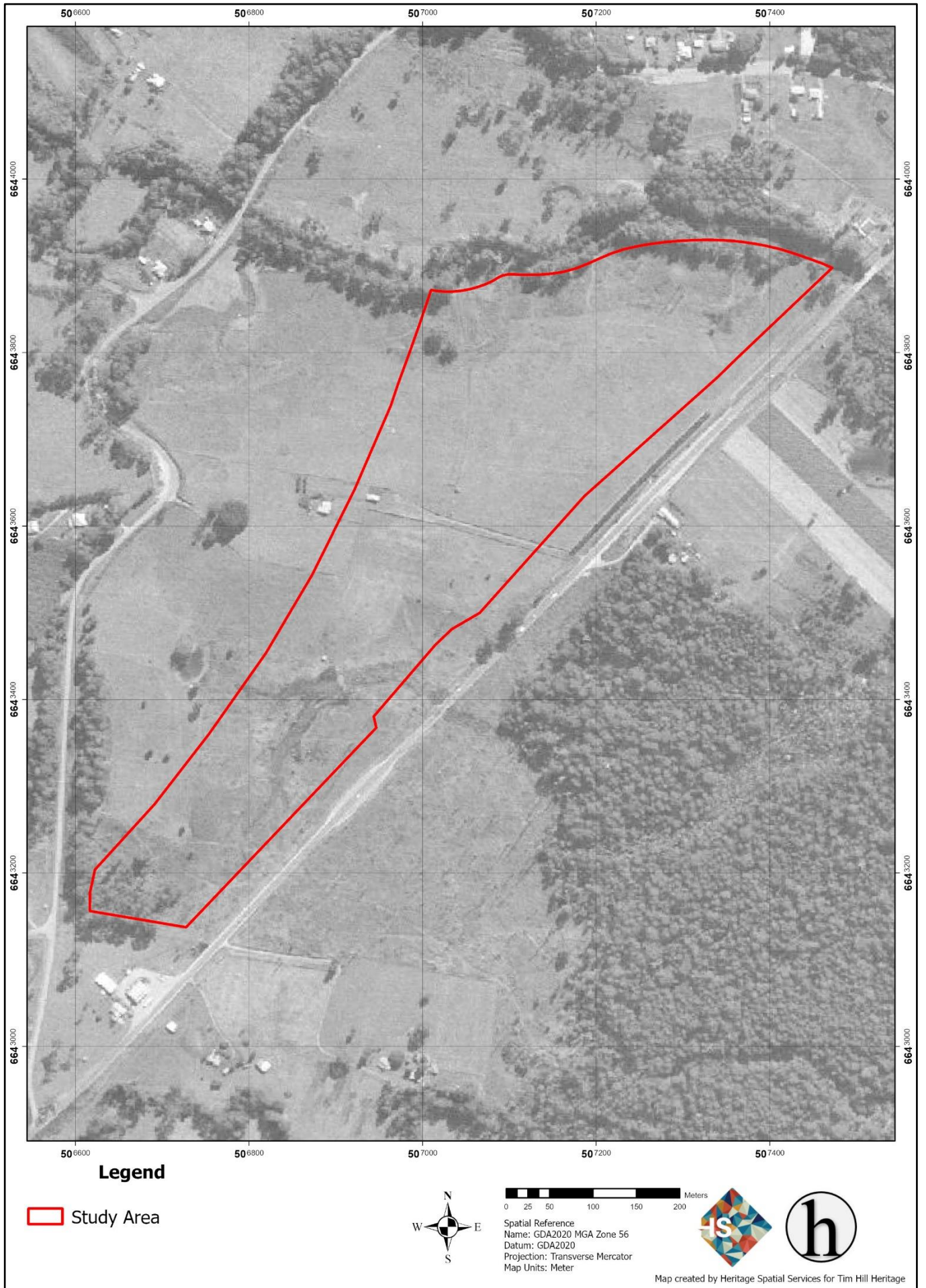


Figure 11: Lindsay's Road - 1974 aerial photo

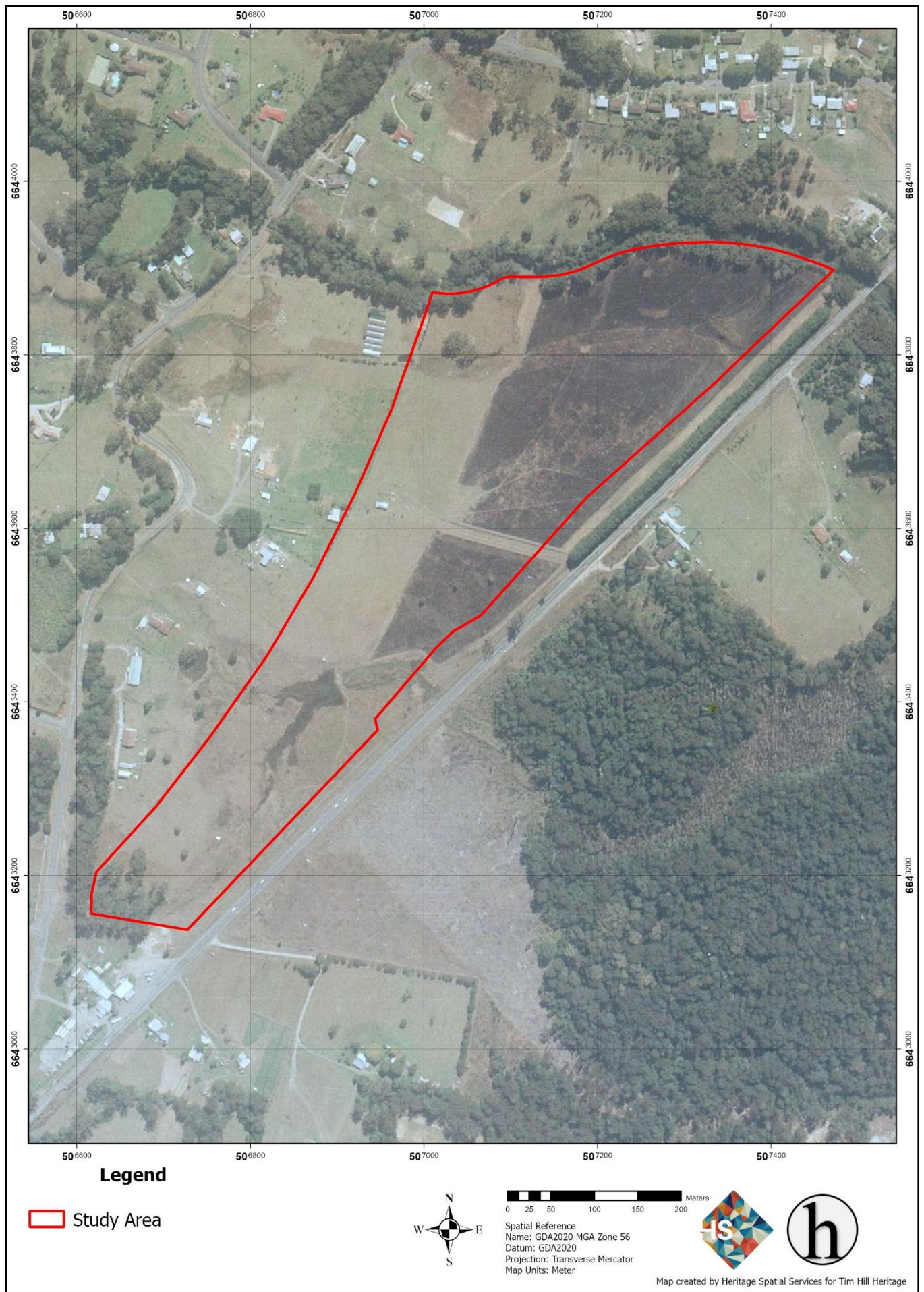


Figure 12: Lindsay's Road - 1988 aerial photo

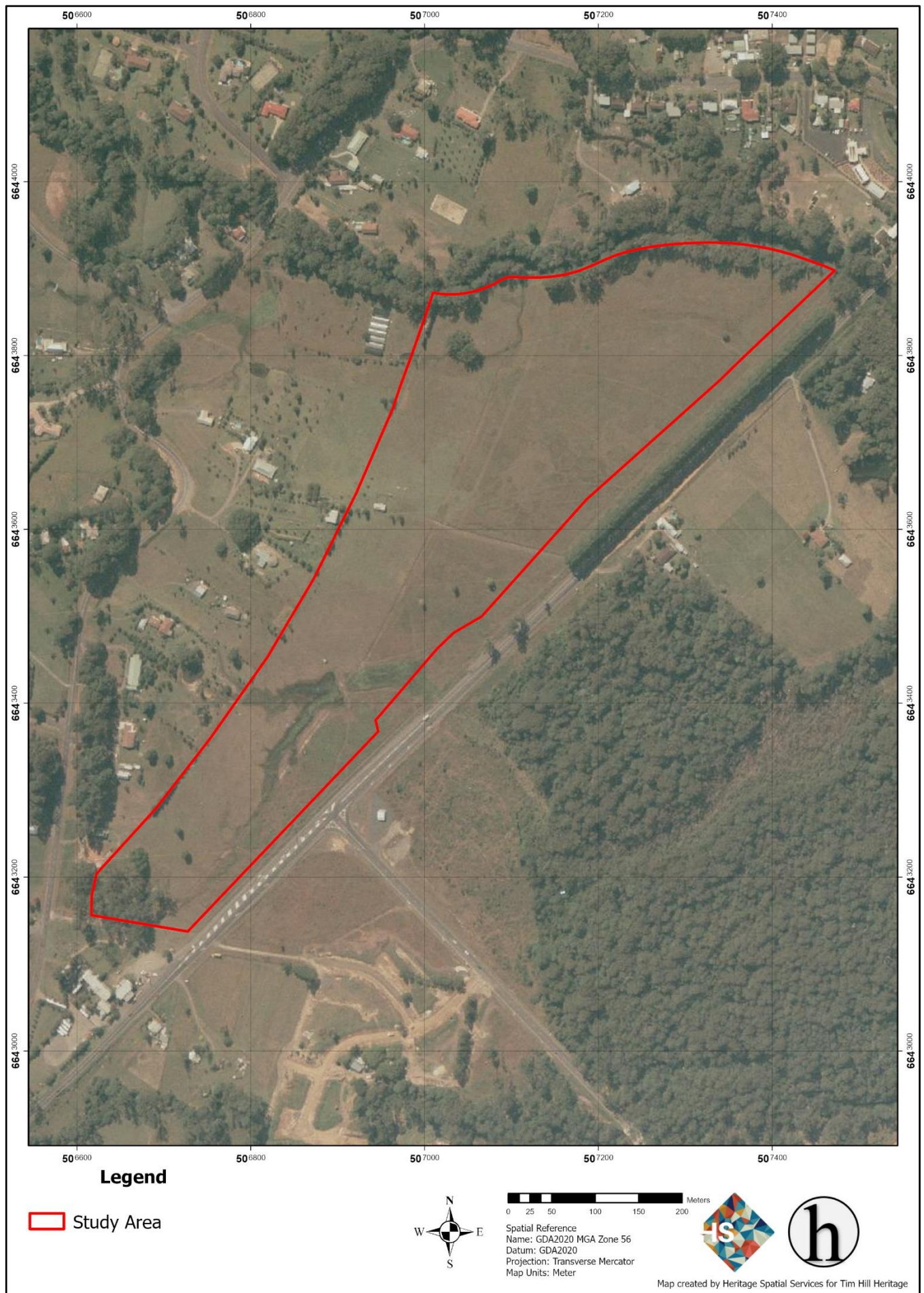


Figure 13: Lindsay's Road - 1993 aerial photo

2.5 Finding of the Desktop Study

The following comments summarise the findings of the desktop study:

- the Study Area includes a previously recorded Aboriginal stone artefact scatter- the Middle Boambee Creek 1 site is recorded on the southern bank of Middle Boambee Creek and is located within the 'C2 Environmental Conservation Zone'
- the site description of the Middle Boambee Creek 1 site notes that the site did not extend onto the spur line- the Fibre Optic Cable traverses the ridge crest south of Middle Boambee Creek and it is reasonable to proceed on the basis that the archaeological investigation covered the alignment over the Study Area
- spurs and ridge crests are noted by the Due Diligence Code of Practice as having an elevated potential to contain Aboriginal sites- the elevated ridge is the primary landform for the investigation as the creekbank will be excluded from future residential development
- a substantial portion of the Study Area is mapped as an area of 'Known Aboriginal Cultural Heritage' on the Coffs Harbour Aboriginal Cultural Heritage Management Plan- the extent of mapped 'known Aboriginal cultural heritage' does not reflect the description of the Middle Boambee Creek 1 site, the landforms identified by the Due Diligence Code of Practice or the disturbance history of the Study Area, and
- the Planning Proposal would reasonably require civil works across the ridge crest which have the potential to Harm Aboriginal objects should they occur within the topsoil layer.

Having consideration for the requirements of the Code of Practice a site inspection is required to verify the findings of the desktop study and make an informed decision on the Aboriginal objects would be present within the Study Area.

2.6 Field Survey: Aboriginal Cultural Heritage

2.6.1 Summary of Aboriginal Community Consultation

The *Aboriginal Cultural Heritage Consultation Requirement for Proponents* (DECCW 2010C) (ACHCRP) provides a guide for consultation with the Aboriginal community. The ACHCRP makes the following comment on the role of consultation in the cultural heritage assessment process (DECCW 2010C:iii):

The NPW Act provides specific protection for Aboriginal objects and Aboriginal places by providing offences for unauthorised harm. The NPW Act establishes the Director General of DECCW as the decision-maker for Aboriginal heritage impact permit (AHIP) applications. DECCW requires the effective consultation with Aboriginal people as a fundamental component of the AHIP assessment process and acknowledges that:

- Aboriginal people should have the right to maintain culture, language, knowledge and identity
- Aboriginal people should have the right to directly participate in matters that may affect their heritage

- Aboriginal people are the primary determinants of the cultural significance of their heritage.

This document focuses on the requirements for consultation with Aboriginal people as part of the heritage assessment process:

- to determine potential harm on Aboriginal cultural heritage from proposed activities
- that informs decision making for any application for an AHIP where it is determined harm cannot be avoided.

A key consideration is that any activity which has the potential to harm Aboriginal objects, whether is authorised an AHIP or a Code of Practice, must include a process of consultation with the Aboriginal community to understand the values of the place and site that cannot be assessed by standard archaeological methods, including the spiritual, cultural and historic significance in the Aboriginal cultural landscape of which the site forms a part. The following summarises the Aboriginal community consultation undertaken to inform the Due Diligence assessment (**Table 4** and **Appendix B**).

Table 4: Aboriginal community consultation summary

Date	Stakeholder	Method	Comment
4/9/24	Ian Brown (Coffs Harbour LALC)	Text	Confirmation of survey date.
4/9/24	Darren Skinner (Coffs Harbour LALC)	Email	Confirmation of survey date- included provision of background mapping.
5/9/2024	Ian Brown (Coffs Harbour LALC)	Site inspection	Completion of the site inspection

2.6.2 Assessment Methodology

The objectives of the site inspection included:

- inspection and identification of the Middle Boambee 1 site and surrounding creek bank
- inspection of the ridge crest including any vehicle tracks or exposures of bare earth which provide visual access to the soil profile
- consideration of ground disturbance to understand the archaeological potential of the Study Area, and
- consideration of archaeological assessment requirements for a future residential subdivision- specifically the requirement for archaeological excavation using shovel test pits.

The archaeological site inspection was undertaken by the following on 5 September 2024 (see **Figure 14-Figure 19**):

- Tim Hill- Heritage Management & Planning, and
- Uncle Ian Brown- Coffs Harbour & District LALC.



Figure 14: Uncle Ian Brown- inspection of the Middle Boambee Creek 1 site location



Figure 15: Middle Boambee Creek 1- Typically grass cover and vegetation along the creek bank



Figure 16: Inspection of the paddock edge of the ridgeline- looking north to Middle Boambee Creek



Figure 17: Inspection of the main access track along the ridge line- looking north



Figure 18: Inspection of the edge of the ridge crest- looking west to the dairy



Figure 19: Bare/ disturbed earth associated with the former farm access track- looking west to the dairy

2.6.3 Survey Results

The site inspection focussed on the lower slope above the Middle Boambee Creek 1 site which comprised the main access road and the ridge crest. As the Study Area comprises former farmland the site inspection was significantly constrained by vegetation (**Table 5**)

Table 5: Lindsays Road- Summary survey effectiveness

Landform	Survey Unit Area (m ²)	Visibility	Exposure	Effective coverage area (m ²)	Effective coverage %	No. of sites
Ridgecrest	2000	20	20	80	4	0
Mid-Slope	4000	10	10	40	1	0

The following statements summarise the outcomes of site inspection and consultation meeting:

- The artefacts from the Middle Boambee 1 site could not be relocated however the general location was identified as a 'good camping place' - the meeting identified several locations on the Coffs Coast where campsites were located on the first terrace above the creek/ at the top of tidal limit and it was considered that the creek was the most likely location for a 'campsite' with stone artefacts
- the 'historical campsite' noted in the AHIMS site record was not known to Uncle Ian- however it was noted that the entire creek bank would have been a good camping place and it was common for small 'fringe' camps to be used in the late 1800's and early 1900's
- no Aboriginal sites were identified on the ridge crest- there were some exposures of bare earth on the former driveway and current vehicle track
- the history of compaction of bio-turbation of soils from dairy farming and cropping were noted as these types of activities on topsoils typically move stone artefacts into the topsoil profile making them less visible for a pedestrian survey, and
- the history of historical stockpiling on the Study Area was discussed- the contours across the slope were consistent with stockpiled soil and the ridge crest had exposures of bedrock and clay which are indicative of topsoil removal- it is reasonable that material from the motorway upgrade would have been stockpiled across the ridgeline however this work post dates the 1993 aerial photo.

2.6.4 Requirement for Archaeological Excavation

The CoPAI requires that archaeological excavation should be undertaken under the following circumstances:

"sub-surface Aboriginal objects with potential conservation value have a high probability of being present in an area, and the area cannot be substantially avoided by the proposed activity"

When applied across north-eastern NSW, archaeological sites of conservation value would include those types of archaeological sites which are either rare or of deeper significance to the Aboriginal community, including burials, ceremonial sites such as stone arrangements and birthing places, rock art sites, shell middens, scarred or carved trees and historic sites associated with Aboriginal reserves or "fringe" camps.

The following comments are provided to inform this statement:

- the use of the elevated forests is typically associated with hunting and foraging which typically results in the discard of isolated finds and low density stone artefact scatters- based on the proximity to the Middle Boambee Creek 1 site it is likely that the ridge crest was also used as a site for travel or hunting
- stone artefacts would be the most likely type of site to occur on the ridge crest and would be located within the upper soil profile or just above the shale/ rocky subsoil layer- an appropriate excavation methodology for stone artefact scatters is shovel test pits,
- the potential for stone artefact scatters and isolated finds is primarily along the ridge crest which have not been subject to significant ground disturbance- geotechnical investigation would be useful to better understand the disturbance history of the ridgeline, particularly the stockpiling of fill from the Pacific Motorway upgrade,
- there is an overall low potential for stone artefacts on the mid slopes of the Study Area above Middle Boambee Creek and South Arm, and
- stone artefact scatters/ isolated artefacts are relatively common along the Coffs Coast and do not typically meet the threshold for conservation 'in-situ' - in the event of an unexpected find there are established precedents and methods to relocate and store artefacts within the Study Area while still retaining the cultural and scientific value of the sites.

3 CONCLUSIONS AND MANAGEMENT RECOMMENDATIONS

3.1 Assessment conclusions

The Due Diligence assessment has concluded that the likelihood that Aboriginal objects are located within the residential development area is restricted to the ridge crest- and specifically portions of the ridge crest which retain original topsoils and have not been subject to stockpiling of fill.

As any future ground disturbance arising from the large lot residential subdivision is conditional upon a Development Application under Part 4 of the EP&A Act additional archaeological excavation should be a condition of any future development application. For the purposes of the Planning Proposal, the current assessment has demonstrated that Aboriginal objects/ archaeological sites would not be a significant constraint to the future development of the Study Area as a residential area. Specifically, the known Aboriginal site, inclusive of the historical 'camp', are located on the creek bank and will be set aside as part of the conservation area.

The most likely Aboriginal archaeological site type within the Study Area is low-density stone artefact scatters/ isolated artefacts that occur up on the ridge crest- sites of this nature are typically associated with pathways and hunting areas. There are established precedents to manage these types of sites using a mix of regulatory, design and engineering solutions. Specifically, the Planning Proposal provides sufficient space to retain and permanently store artefacts and topsoils that contain artefacts, within the Study Area but away from the main residential development. An assessment in accordance with the CoPAI is a technical investigation that requires additional design and engineering studies that would typically be commissioned as part of a Development Application. This includes the comprehensive geotechnical investigations to inform the bulk earthworks on the ridge crest, the requirement for and layout of stormwater detention infrastructure and any land management requirements along Middle Boambee Creek, including conservation works in the vicinity of the Middle Boambee 1 archaeological site.

3.2 Recommendations

Recommendation 1: Aboriginal Objects Find Procedure

Works on the slopes and ridge crest where the original topsoil has been removed have an overall low potential to contain Aboriginal objects. Future works associated with the residential subdivision in these areas do not require additional archaeological investigation to determine the requirement for an AHIP. A unexpected finds procedure (below) is the standard management response for sites that may occur on the hillslopes and disturbed sections of the ridgeline:

- work in the surrounding area is to stop immediately and records are made of the finds via project incident reporting procedures
- a temporary fence is to be erected around the site and appropriate controls put in place to ensure that no additional ground disturbance happens in the vicinity of the find

- an appropriately qualified archaeological consultant and a representative of the Coffs Harbour and District LALC are to be engaged to identify the material and provide an initial assessment of the significance of the object and the likely nature and extent of any associated archaeological sites
- if the material is found to be of Aboriginal origin, the find must be reported on the AHIMS database
- in the event that the Aboriginal objects are considered to have been damaged or disturbed, the incident must be reported through the NSW Enviro Hotline, and
- works may only recommence after advice from Heritage NSW on the requirement for an AHIP or where design, engineer or construction measures are identified to mitigate further damage to the Aboriginal site.

Recommendation 2: Aboriginal Human Remains

Although it is unlikely that Aboriginal human remains will be located at any stage during earthworks within the Study Area, should this event arise it is recommended that all works must halt in the immediate area to prevent any further impacts to the remains. The site should be cordoned off and the remains themselves should be left untouched. The nearest police station (Coffs Harbour), Coffs Harbour and District LALC and the Heritage NSW (Parramatta) are all to be notified as soon as possible. If the remains are found to be of Aboriginal origin and the police do not wish to investigate the site for criminal activities, the Aboriginal community and the Heritage NSW should be consulted as to how the remains should be dealt with. Work may only resume after agreement is reached between all parties, provided it is in accordance with all parties' statutory obligations.

Recommendation 3: Additional archaeological and geotechnical investigations

The site inspection has determined that archaeological excavation is required for sections of the ridge crest which have not been subject to significance disturbance to determine the likelihood that the ridge retains Aboriginal objects. A archaeological investigation in accordance with the CoPAI is required prior to the lodgement of any future development applications to determine the requirement for an AHIP as a condition of consent. The archaeological investigation should be informed by a detailed geotechnical investigation to understand the disturbance history of the ridge crest, specifically the impact of stockpiling and agriculture on topsoils. In the event that the geotechnical investigation determines that the ridge is substantially disturbed, being disturbance which would compromise an archaeological investigation, this should be documented in the comprehensive archaeological report.

4 REFERENCES

Department of Environment, Climate Change and Water,

- 2010A *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW*
 2010B *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW*
 2010C *Aboriginal Cultural Heritage Consultation Requirements for Proponents in NSW*

Milford, H.B.

- 1991 *Soil Landscapes of the Coffs Harbour 1:100 000 Sheet - Department of Land and Water Conservation, Sydney.*
 Coffs Creek soil landscape
 <<https://www.environment.nsw.gov.au/Salis5app/resources/spade/reports/9537cc.pdf>>
 Ulong soil landscape
 <<https://www.environment.nsw.gov.au/Salis5app/resources/spade/reports/9537ul.pdf> >

NSW Spatial Collaboration Portal

- 1974 *Aerial photo*
 < https://portal.spatial.nsw.gov.au/download/historic/2140/2140_06_003.jp2.jpeg>
 1988 *Aerial photo*
 < https://portal.spatial.nsw.gov.au/download/historic/3675/3675_09_013.jp2.jpeg>
 1993 *Aerial photo*
 < https://portal.spatial.nsw.gov.au/download/historic/4198/4198_09_028.jp2.jpeg>

APPENDIX A: AHIMS EXTENSIVE SEARCH RESULTS



AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : TH233 Lindsays Road

Client Service ID : 926213

<u>SiteID</u>	<u>SiteName</u>	<u>Datum</u>	<u>Zone</u>	<u>Easting</u>	<u>Northing</u>	<u>Context</u>	<u>Site Status **</u>	<u>SiteFeatures</u>	<u>SiteTypes</u>	<u>Reports</u>
22-1-0063	Middle Bombace Creek 1	AGD	56	507050	6643750	Open site	Valid	Artefact : -	Open Camp Site	100991
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
		Mr.Peter Kuskie								

** 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 Heritage NSW should be notified

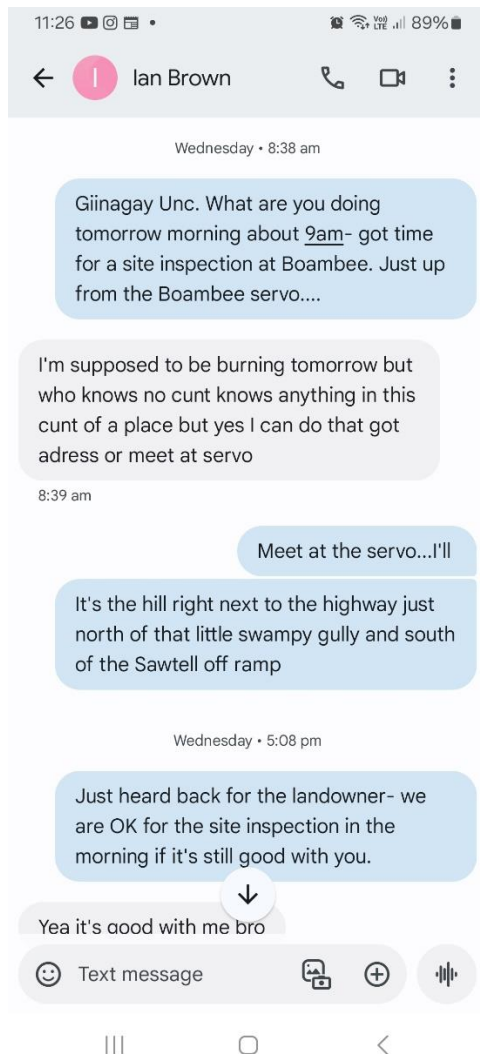
Report generated by AHIMS Web Service on 02/09/2024 for Tim Hill for the following area at Lot : 4, DP:DP1049350, Section : - with a Buffer of 50 meters.. Number of Aboriginal sites and Aboriginal objects found is 1

This information is not guaranteed to be free from error omission. Heritage NSW and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

Page 1 of 1

APPENDIX B- CONSULTATION WITH COFFS HARBOUR & DISTRICT LALC

4 September 2024- Text with Uncle Ian Brown



4 September 2024- Email notification to Coffs Harbour & District LALC

From: Tim Hill <timhill.heritage@gmail.com>

Sent: Wednesday, 4 September 2024 1:06 PM

To: Darren Skinner <programs@coffsharbourlalc.com.au>; invoices@finance.nsw.gov.au
<invoices@finance.nsw.gov.au>

Subject: ACH site inspection- Lindsays Road Boambee

Good afternoon Darren and Tim

I have been messaging Uncle Ian and I have a site inspection that needs to be completed at Lindsays Road, Boambee- ASAP. The site specifically relates to a stone artefact scatter recorded in the 1990's on Middle Boambee Creek- this has been picked up in the new CoCC AHMP mapping.

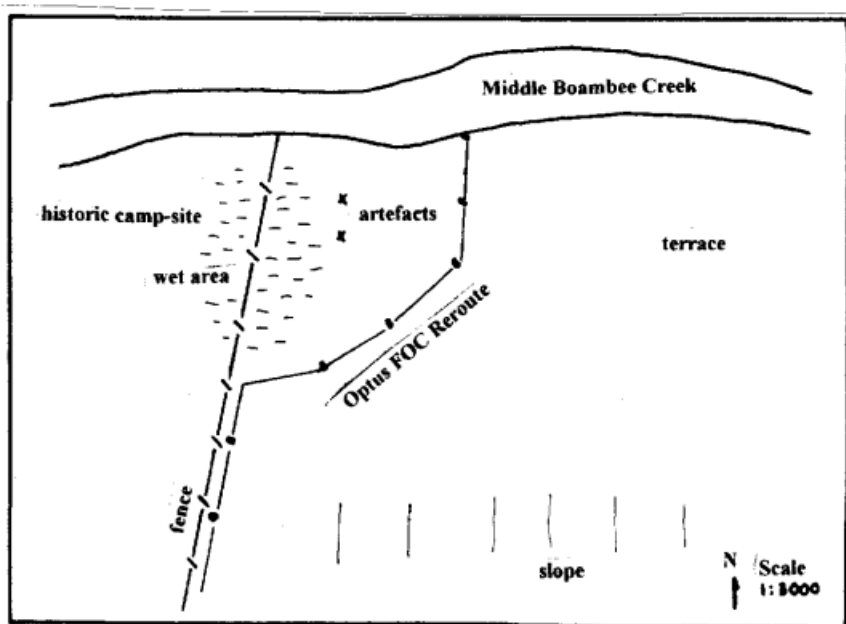
We are going to get it done tomorrow morning (Thursday 5th) at 9am. Inclusive of travel I am estimating we will be on the ground for 2 hours- Uncle Ian has mentioned the possibility of a cultural burn later in the day. I will work around that if needed.



Note state of preservation of site & contents. Do NOT dig, disturb, damage site or contents.

2 artefacts located in 40 m² area. No further artefacts could be located across terrace or spur line but local farmers have removed stones from paddock for many years.

1. volcanic flake 22 x 23 x 7 mm
2. volcanic broken flake 46 x 35 x 15 mm



Please give me a call if you have any questions.

Tim Hill

Heritage Management & Planning

0473 033 615

Detailed Environmental Site Assessment - Lots 4, 15, 101 & 102 Lindsays Road, Boambee



28 October 2024

For: Jinderpal Rai

Authored by: Strider Duerinckx



Ref	Ver	Date	Distribution
2223-049-03	A	28/10/24	Client, Planner

Table of Contents

1	Introduction.....	5
1.1	Objectives.....	5
1.2	Suitability to Undertake Works	5
2	Proposed Development.....	5
3	Scope of Work	5
4	Site Description	6
4.1	Site Identification	6
4.2	Location and Features	6
4.3	Surrounding Land Use	11
5	Geology, Hydrogeology and Topography.....	11
5.1	Topography	11
5.2	Geology.....	11
5.3	Soils.....	12
5.4	Hydrogeology	12
6	Site History	13
6.1	Mapped BP Land	13
6.2	Previous Environmental Investigations.....	13
6.3	Previous Ownership Records.....	14
6.4	Aerial Photographs	15
6.5	NSW EPA Records.....	16
6.6	Other Contaminating Activities	16
6.7	Adjacent Business.....	16
6.8	Summary of Site History.....	17
7	Potential Areas and Contaminants of Concern	17
8	Conceptual Site Model	18
9	Investigation Criteria	19
10	Sampling Program	20
10.1	Sampling Round 1.....	20
10.2	Sampling Round 2	20
11	Data Quality Objectives.....	20
12	Results	22
12.1	Sample Locations.....	22

13	Analytical Results.....	22
13.1	Discrete Analyses.....	22
13.2	Additional Analyses	23
13.2.1	Hotspot Delineation	23
14	Quality Assurance and Quality Control	23
14.1.1	Field Quality Control	23
14.1.2	Laboratory Quality Control	23
14.1.3	Data Quality Check.....	24
15	Discussion	24
16	Conclusions and Recommendations	25
17	References.....	25

Tables (in report)

Table 1: Historical Ownership	14
Table 2: Aerial Photograph Review	15
Table 3: Potential AEC and CoC	17
Table 4: Conceptual Site Model Pathways.....	18
Table 5. Data Quality Objectives	21

Tables (attached)

Table LR1	Summary of Round 1 Discrete Soil Analytical Results
Table LR2	Summary of Round 2 Soil Discrete Analytical Results
Table LR3	95% Upper Confidence Limits

Figures

Figure 1	Site Location
Figure 2	Proposed Development Layout
Figure 3	Site Layout
Figure 4	Sampling Locations
Figure 5	Hotspot Sampling Locations

Appendices

Appendix A Historical Titles

Appendix B Aerial Photographs

Appendix C Eurofins Laboratory Reports

1 Introduction

Earth Water Consulting Pty Limited (EWC) was engaged by Jinderpal Rai (the “Client”) to undertake a Preliminary Environmental Site Assessment (PESA) and subsequent detailed Environmental Site Assessment (DESA) of land with potential past contaminating activities at Lots 4, 15, 101 & 102 Lindsays Road, Boambee (the “Site”) (Figure 1).

1.1 Objectives

The objective of this investigation was to undertake an assessment of the property to ensure that potential soil contamination would not significantly limit the proposed residential land use.

1.2 Suitability to Undertake Works

Strider Duerinckx has project managed and signs off on this investigation. Strider is an environmental geologist with at least 25 years experience in contaminated sites investigations including numerous banana plantation assessments. Strider is a CEnvP (Site Contamination Specialist) accredited.

2 Proposed Development

It is understood that it is proposed to subdivide the property from four (4) lots into fifteen (15) lots of between 0.5-5.1ha R5 Large Lot Residential Parcels (Figure 2). Proposed Lots 1 and 15 will be 5.1ha and 5ha respectively and include new building entitlements and areas of C2 Environmental Conservation. Proposed Lots 2-14 will be 0.5-0.86ha and include new building entitlements.

3 Scope of Work

The assessment included:

- A desktop review, including
 - Historical aerial photographs and NSW EPA notices;
 - Previous ownership to at least 1950 and interviews if available with previous owners/employees;
 - Previous environmental assessments; and
 - A desktop review of topographical and geological conditions.
- A site walkover of the property to visually assess the current site layout and surface conditions;
- Collection of 6 check samples across former broadacre grazing areas and analysis for heavy metals and OCP/OPP pesticides;
- Collection of 4 discrete samples in the vicinity of an existing shed and analysis for a combination of TRH, BTEXN, PAH, OCP and OPP, and metals;
- Preparation of this report detailing the results of the desktop review and site walkover, analytical results in comparison to guidelines, and assessment of contamination risks,

conclusions regarding the contamination status of the Site in the vicinity of the proposed dwelling, and recommendations for further investigations (if required).

4 Site Description

4.1 Site Identification

The Site is known as Lot 4 of DP 1049350, Lot 15 of DP 861057 and Lots 101/102 of DP 732172, zoned R5 Large Lot Residential and C2 Environmental Conservation and is about 19.75ha in area.

4.2 Location and Features

The Site is located on the western side of the Pacific Motorway and to the east of Lindsays Road (Figure 1). The lots are dominated by a central, low hill crest which falls generally to the north and south.

The northern boundary is bordered by the riparian zone associated with the lower reaches of Boambee Creek, while the southern portion of the property falls gently to a marshland and the meandering course of Cordwell Creek Flood Channel. Approximately 23% of the lower lying northern section following Boambee Creek is mapped as flood prone, according to the CHCC 1 in 100 year flood extent modelling.

The Site is mostly cleared paddock, with sections of remnant native vegetation in the lower northern and southern areas. The only structures present on the property are a cement brick farm shed, located near the centre of the western boundary and a pump shed, located adjacent to the southern swampland (Figure 3). Two small grassy piles of old machinery and timber were observed to the NE and SE of the shed (<2m³) and a concrete stock trough is present to the east of the shed. The shed was observed to have chemical and fuel storage, and some lead roof flashing. A small 6m³ stockpile of soil, gravel and small asphalt pieces was observed between Proposed Lots 5 and 10 (Figure 3), NE of the shed.



Photograph 1. Looking northeast from Proposed Lot 6 across Proposed Lots 12-15, with the C2 riparian zone of Boambee Creek at the left of the picture.



Photograph 2. Looking southwest towards the southern swampland on Proposed Lot 1 across Proposed Lots 2, 7 and 8.



Photograph 3.
Rubbish pile
containing timber
and metal to the
southeast of the
shed.



Photograph 4.
Disused stock
trough located
towards the
eastern boundary
on Proposed Lot
10.



Photograph 5.
Chemical drums
stored at the
western end of
the shed.



Photograph 6. 44
gallon fuel drum
stored in the shed.



Photograph 7.
Shed roof
construction.



Photograph 8.
Looking southwest
across a rubbish
pile of old farm
implements and
timber towards the
shed.

4.3 Surrounding Land Use

The surrounding land use includes:

- To the east – the SP2 Pacific Highway zone; medium density R3 residential and R1 recreation area;
- To the west – R5 residential areas;
- To the north – Boambee Creek and C2 vegetation; and
- To the south – R2 rural landscape areas.

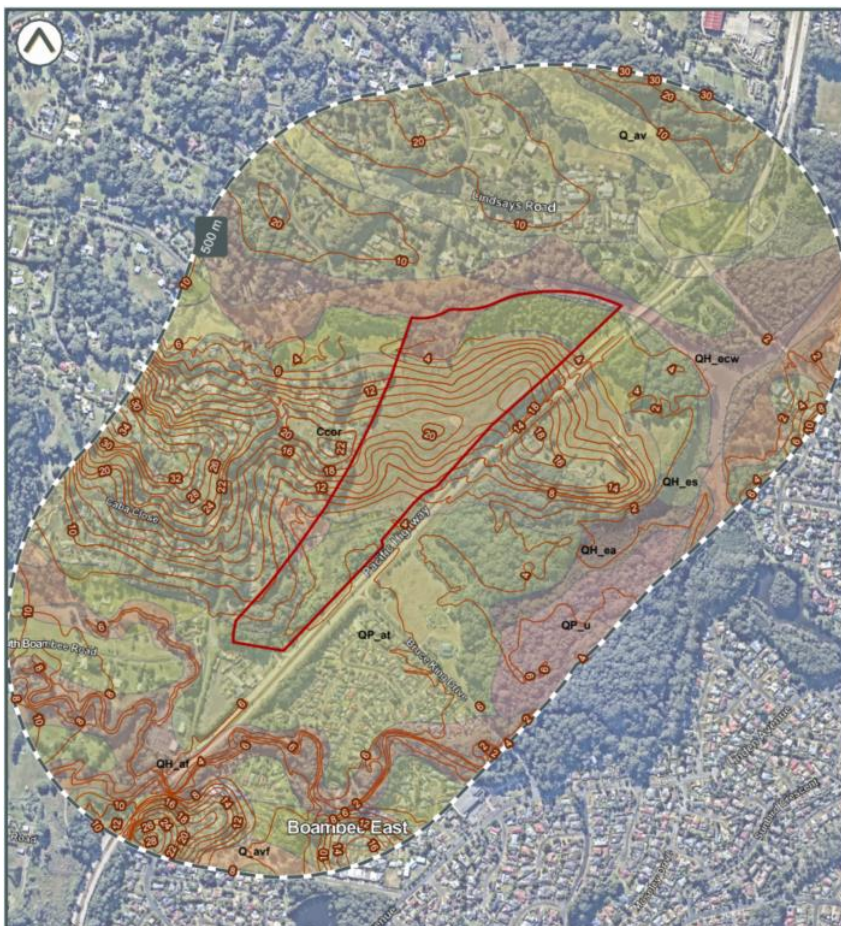
5 Geology, Hydrogeology and Topography

5.1 Topography

The property has a high central point of approximately 20m AHD at the hill crest sloping down to the northern flood plain of Boambee Creek at 2m AHD and to the southern swamp channel at 4m AHD.

5.2 Geology

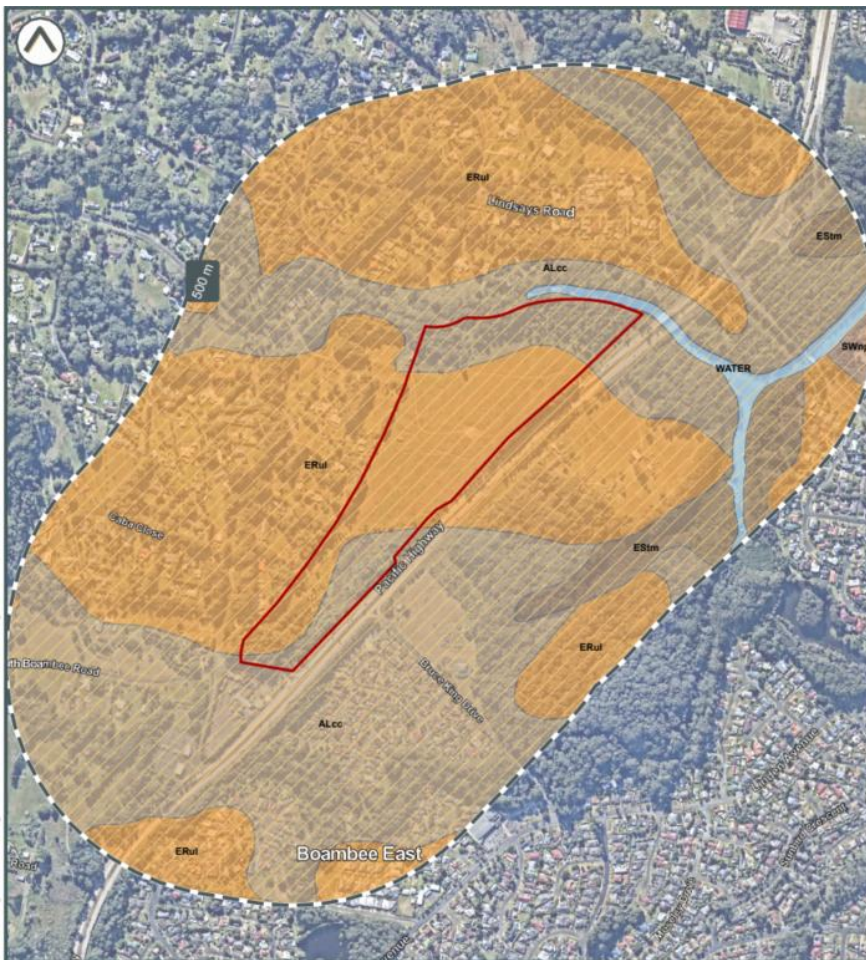
Based on the Land Insight property report, the majority of the proposed development area of the Site is underlain by the Brooklana beds (Ccor) of siliciclastic sedimentary rock, composed of thinly bedded siliceous mudstone and siltstone. The lower northern and southern areas outside the central development area are underlain by sections of Quaternary alluvial (QP_at) terrace deposits of clastic sediment and Holocene estuarine (QH_ecw) channel deposits of clastic sediment.



Photograph 9. Mapped geology with target property boundary in red.

5.3 Soils

Information from the Land Insight property report indicates that the higher elevations of the property are underlain by soils of the Ulong (ERul) Soil Landscape, which is an erosional landscape of undulating to rolling low hills on Late Carboniferous metasediments of the Coffs Harbour association in the Coast Range and Gleniffer-Bonville Hills. The lower northern and southern portions of the property are underlain by the Coffs Creek (ALcc) Soil Landscape, which is an alluvial landscape of level to gently undulating floodplains, inset floodplains and terraces on Quaternary alluvium in the lower catchments of coastal streams draining the Gleniffer-Bonville Hills.

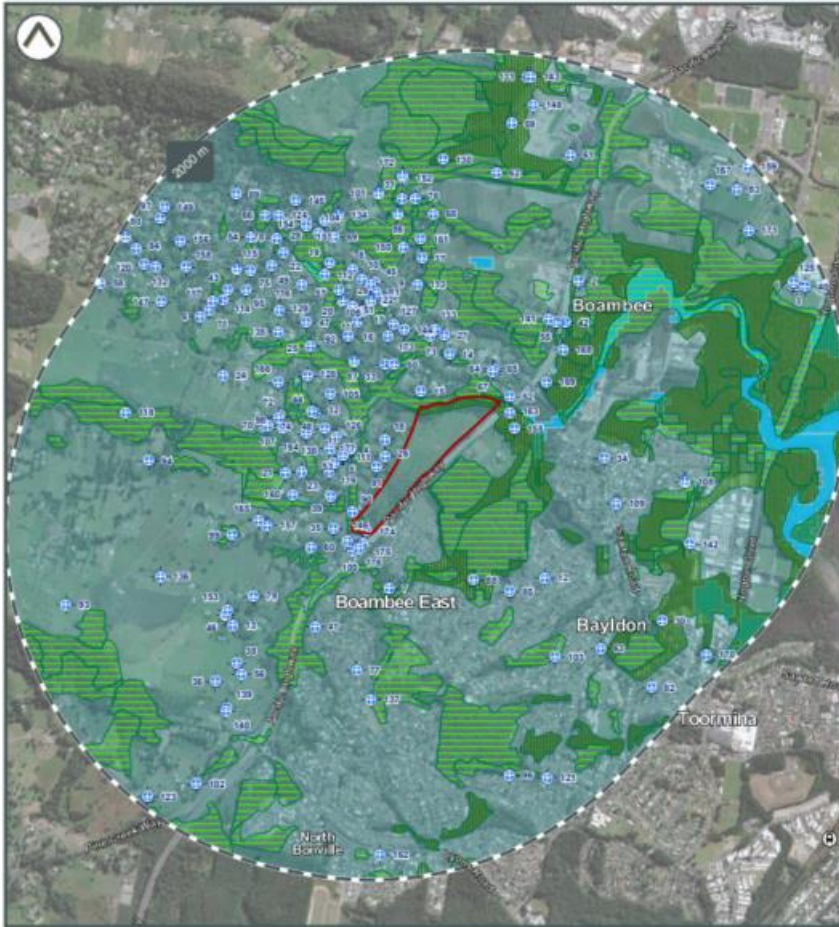


Photograph 10. Mapped Soils with target property boundary in red.

5.4 Hydrogeology

The regional aquifer is mapped as a fractured or fissured extensive aquifers with low to moderate productivity.

Numerous bores are located in the vicinity of the Site, with one licensed monitoring bore (GW307400) located on the Site at the southern end of the property. This bore was drilled in 2012 to 4m depth and is licensed for monitoring purposes only. Other bores located adjacent to the property include domestic and agricultural bores ranging in drilled depth from 15-60m. Given the infill development proposed, groundwater consumption is not expected.



Photograph 11. Mapped hydrology constraints.

6 Site History

6.1 Mapped BP Land

A review of the Coffs Harbour City Council LEP mapping indicates that the site is not listed as Banana Contaminated Land.

6.2 Previous Environmental Investigations

A Preliminary Stockpile Contamination Assessment was conducted on the site by Whitehead & Associates (2016). The investigation aimed to provide an indication of contamination presence in an overburden stockpile generated during the Pacific Highway upgrade.

The stockpile was located at the northwest corner of the property and was estimated by landform shape to be around 4,700m² in area and about 14,000m³ in volume (Figure 3).

Samples were collected on a judgmental basis from five boreholes drilled to 1.2m depth across the stockpile, with selected samples analysed at an independent laboratory NATA accredited for heavy metals, OCP/PCB pesticides, PAH and TRH/BTEXN hydrocarbons, and asbestos.

In summary, the comparison of soil concentrations to the investigation criteria indicated that:

- Concentrations of TRH, BTEXN, OCP, PCB and PAH were reported below the laboratory PQLS and NEPM threshold levels in all samples analysed;
- Asbestos was not identified in the samples analysed; and

- Concentrations of heavy metals were either reported above the laboratory PQLs but below the HIL A and EIL for all samples analysed, or below the laboratory PQL.

Based on this the stockpile was assessed to remain onsite and be suitable for residential landuse.

Photograph 12. View of former highway stockpile looking South from the NW corner.



6.3 Previous Ownership Records

A search of historical owners was undertaken of the Site. The results are summarised in **Table 1**, and the results are included in Appendix A.

Table 1: Historical Ownership

Date	Detail
10.02.1914 (1914 to 1939)	William John Robinson (Farmer)
05.04.1939 (1939 to 1944)	Peter Anthony Gaudron (Farmer)
10.06.1944 (1944 to 1965)	Thomas Arthur Dutton (Farmer)
22.12.1965 (1965 to 1975)	Ethel Mary Dutton (Feme Sole)
01.12.1975 (1975 to 1984)	David Pierre Dutton (Labourer) Mare Louise Luck (Married Woman) (Section 93 Application not investigated)
12.03.1984 (1984 to 1988)	Permanent Trustee Company Limited
13.12.1988 (1988 to 1992)	Loc-TeX International Pty. Limited (In Liquidation)
10.11.1992 (1992 to 2000)	The Council of the City of Coffs Harbour
22.12.2000 (2000 to 2014)	Roads and Traffic Authority of NSW (Acquired for the purpose of the Road Act, 1993) Now Roads and Maritime Services
02.12.2014 (2014 to Date)	# Jinderpal Singh Rai # Mohinder Kaur Rai

6.4 Aerial Photographs

A review of aerial photographs from 1942-2024 are presented in **Table 2**, and the aerials are included in Appendix B.

Table 2: Aerial Photograph Review

Year	Site Details	Adjacent Properties
1942	Extensive clearing across the Site with no structures present. No evidence of horticultural production.	Cleared areas of farmland and patches of remnant native vegetation in all directions around the Site. Some dwellings along Lindsays Road to the west.
1954	Further clearing is evident, and a dam is present in the Cordwell Creek flood channel at the southern end of the property. A dwelling has been constructed at the centre of the western boundary and the existing shed is present to the east of the western boundary. Some small outbuildings are present to the east of the shed. A driveway crosses the property from east to west (Figure 3).	Further clearing has occurred in surrounding farmland. The Pacific Highway has been constructed along the eastern border, linked to the property by a driveway. Some orchard cultivation is evident to the south of the Site.
1964	As per 1954. North south fence line visible in the centre of the Site east of the main shed.	Further horticultural and agricultural expansion on surrounding properties.
1973	As per 1964.	Residential expansion at the northern end of Lindsays Road, Boambee East and industrial development on the western side of the Pacific Highway in the north.
1980	As per 1973.	As per 1973.
1984	As per 1980. The fence line and small outhouse (horse stable?) is not present.	Further residential expansion along the northern portion of Lindsays Road and to the east of the Pacific Highway.
1989	As per 1984 except controlled burning has occurred across the northeastern section of the property.	Residential development has increased on all surrounding properties. Sealed roads are evident and agricultural grazing and cultivation are reduced.
1994	As per 1989.	As per 1989 except most agricultural activities have ceased on surrounding properties. Residential expansion in all directions.
2004 (Google)	A disturbed area is visible in the northwestern portion of the Site that matches with the identified stockpile generated by highway duplication. A ring track is present to the east of this stockpile possibly used by the haulage trucks dropping off the material.	As per 1994. The highway duplication has been completed.
2009	As per 1994 except scattered vegetation regrowth has occurred across the Site and the driveway has been discontinued due to the highway duplication,	Residential development increased on surrounding properties. Pacific Highway dual carriageway has been constructed to the east of the Site.

Year	Site Details	Adjacent Properties
2013	As per 2009.	Further subdivision of properties to the east and northeast.
2018	As per 2013. Some disturbance of the stockpile is evident and filling of the proposed access road towards Lindsays Road is evident.	Further subdivision and residential expansion in the north, west and south.
2020	As per 2018.	As per 2018.
2024	Further regrowth of vegetation at the lower northern and southern sections of the Site.	As per 2020.

6.5 NSW EPA Records

A search of the NSW EPA's contaminated land record revealed no investigation or remediation notices have been issued on the Site for contamination or 'significant risk of harm' under Section 58 of the Contaminated Land Management Act 1997.

The BP Boambee service station 264m to the northeast of the Site is registered as contaminated land. A second registered contamination site, the Lindsay Bros transport depot is located 498m to the north of the Site.

A search of the public register under Section 308 of the Protection of the Environment Operations Act indicated that surrendered licenses have been held for potentially contaminating activities on the Site and adjacent properties.

There is a surrendered licence held by CPB Contractors Pty Ltd related to the Pacific Highway road construction at the eastern boundary of the Site. A second surrendered licence was held by Lindsay Brothers Management Pty Ltd for miscellaneous licensed discharge to waters located approximately 499m to the north of the Site.

6.6 Other Contaminating Activities

A review of the Land Insight collated database indicates that Site is not known to have been nor located adjacent to any known Defence sites, former gasworks, PFAS contaminated, loose fill asbestos insulation registered, dry cleaners, fire rescue, gas terminals, active mines or quarries, derelict mines, power stations, electrical substations, telephone exchanges, active or historical waste management facilities (landfills) or wastewater treatment facilities.

A search of the NSW Department of Primary Industries cattle dip site locator indicated that no cattle tick dips were located on or adjacent to the Site.

Liberty Boambee is a liquid fuel petrol station which operates at 752 Pacific Highway, around 420m south of the proposed residential development extents.

A former brickworks is noted to have operated between 1958 and early 1960 around 223m east of the Site.

6.7 Adjacent Business

A search of business directory records from 1965 to 2015 indicates that no advertising businesses have operated out of the Site, however, various businesses have operated out of adjacent properties.

6.8 Summary of Site History

Based on the historical review it is concluded that the Site was owned by farmers and their families from 1914 to 1975. In 1984 the property title passed to the Permanent Trustee Company Ltd, until being sold to Loc-Tex International Pty Ltd. Coffs Harbour City Council bought the property in 1992, then Roads and Traffic Authority in 2000 for the highway duplication. The existing owner purchased the Site in 2014.

Land clearing occurred during the 1940's and the construction of the adjacent dwelling and shed in the 1950's. It is unclear when the dwelling and shed were separate into separate lots, possibly in the late 1980s. Since the 1950s the Site appears to have been utilised for mainly cattle grazing or horse agistment use. During ownership of the Site by the RTA a substantial stockpile was placed in the northwestern corner in around 2004. The stockpile was subsequently lowered in 1round 2018 with the soil used to buildup the future subdivision road in off Lindsays Road.

7 Potential Areas and Contaminants of Concern

Based on the site history and a walkover, Areas of Environmental Concern (AECs) and associated Contaminants of Concern (CoC) were identified for the Site. These are presented in Table 3.

Table 3: Potential AEC and CoC

AEC	Potential Contaminating Activity	CoC	Likelihood of Contamination	Comment
1	Runoff and spray drift from horticultural activities.	OCP (Aldrin, dieldrin and DDT), OPP and heavy metals (As, Cd, Cr, Cu, Ni, Pb and Zn)	Low	CoC based on NSW EPA (2004) Market Garden Guidelines.
2	Potential hotspot associated with machinery refueling.	TRH, PAH, BTEXN	Low - Moderate	44-gallon fuel drum with hand pump stored in shed. Shed has concrete floor.
3	Potential hotspot at the existing shed related to chemical storage and building material leaching.	OCP (Aldrin, dieldrin and DDT), OPP, heavy metals (As, Cd, Ni, Pb and Zn).	Low - Moderate	Chemical drum storage at shed location.
Notes OCP = Organochlorine Pesticides TRH = Total Recoverable Hydrocarbons PAH = Polycyclic Aromatic Hydrocarbons BTEXN = Benzene, Ethylbenzene, Cumene, m&p-Xylenes, o-Xylene, Styrene, Toluene, Xylenes (Total)*, Naphthalene				

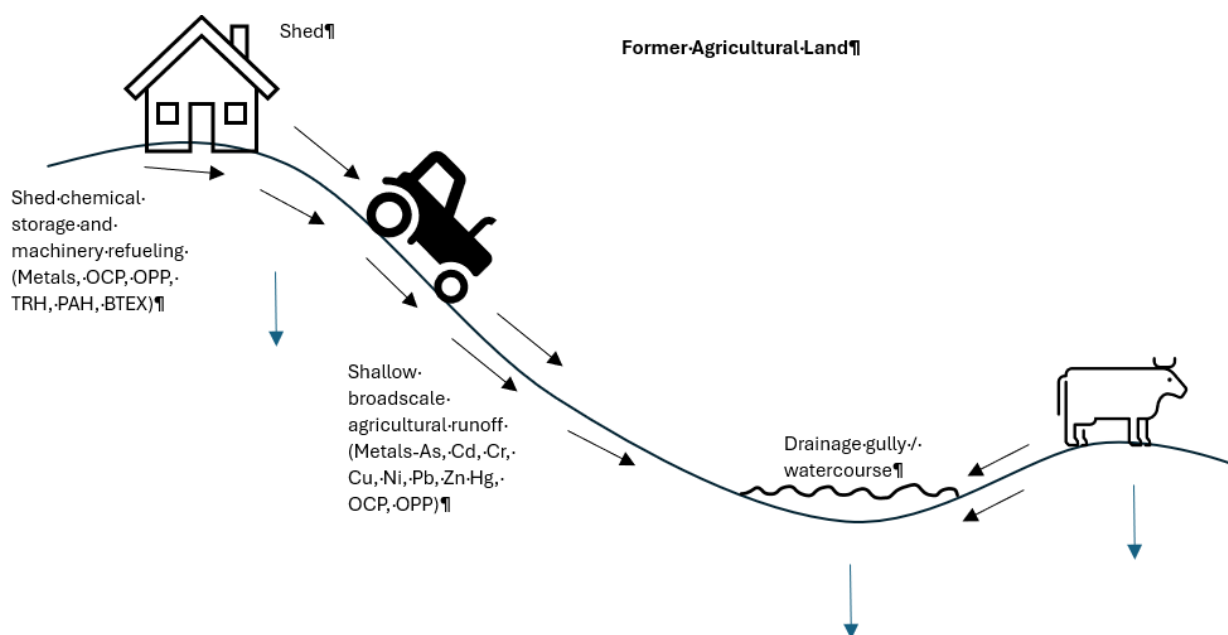
8 Conceptual Site Model

The Conceptual Site Model (CSM) for the proposed development area is presented in Table 4.

Table 4: Conceptual Site Model Pathways

Element	Sub-Element	Comment
Mechanism of Contamination		Near surface inorganic and organic contaminants may be present from former farming practices located in the proposed development area. With rainfall, surface runoff could occur downslope.
Potentially Affected Media	Soil	Yes, if present and disturbed.
	Groundwater	Groundwater is not expected until >15m depth on the ridgeline but could be located at ~6mm depth in the lower lying southern portion of the Site. Groundwater impacts are not expected.
	Surface Water	Boambee Creek borders the northern boundary and the Cordwell Creek Floodway crosses the southern portion of the Site, however, significant contamination is not expected.
	Indoor	Volatile contamination is generally not expected at the Site.
	Ambient Air	Significant volatile contamination is generally not expected at the Site.
	Human	The primary human receptors are long term residents with soil contact and ingestion.
Receptors	Ecological	If widespread contamination is present in surface soils, some migration to the downslope drainage could have occurred.
	Potential	Given proposed residential usage, future exposure routes are possible.
Exposure Pathways	Complete	Complete human or environmental exposure routes have not been identified at this time.

Photograph 13. Conceptual Site Model



9 Investigation Criteria

The soil investigation levels were adopted from the NSW DEC (2005) and the NEPM (2013) Guidelines. These are comparable to health-based investigation levels for residential sites with access to soil for home grown vegetables at less than the 10% of the daily intake, which are provided in NEPM (NEPC 2013) Guidelines.

The National Environmental Protection (Assessment of Site Contamination) Amendment Measure 1999 was amended in 2013 (NEPC 2013) and has been accepted for use in NSW by the NSW EPA.

NEPM 2013 presents Health based Investigation levels (HIL) for different land uses (e.g., industrial/commercial, residential, recreational open space etc.) as well as provisional Ecological Investigation Levels (EIL), Ecological Screening Levels (ESL), Health Screening Levels (HSL) and Management Limits (ML).

The HILs, HSLs and MLs were developed from significant review of toxicological data and risk assessment modelling undertaken and originally published by the National Environmental Protection Council (NEPC) in the NEPM 1999 document.

"The HILs are scientifically based, generic assessment criteria to be used in the first stage (Tier 1) of an assessment of potential risks to human health from chronic exposure to contaminants. They are intentionally conservative and are based on a reasonable worst-case scenario".

"HILs are investigation or screening levels, and are not clean-up or response levels, nor are they desirable soil quality criteria. They are intended to be used to trigger consideration of an appropriate site-specific risk-based approach or appropriate risk-based management options when they are exceeded". (NEPC 2013 Schedule B1 p4).

As the Site is proposed for use as residential, the adopted screening/investigation levels for the Site are for "HIL A".

NSW DECC (2006) guidelines provided interim EILs for phytotoxicity, typically used to assess impacts to vegetation as sensitive receptors, but these were acknowledged to be interim and generics and where possible should be modified for the soil type and receptor. The DECC Guidelines recognise the significant limitations of phytotoxicity criteria because of the impact of soil characteristic and species parameters on plant growth. The NEPM 2013 provides revised EIL for common heavy metals including arsenic, chromium III, copper, lead, nickel, mercury and zinc. The approach for deriving EILs for heavy metals is to combine background concentrations (i.e., naturally occurring) with an added contaminant limit (ACL), that is $EIL = background + ACL$. Preliminary EILs have been adopted for the Site based on assumed background conditions. The investigation criteria for the Site are included in the attached summary Tables LR1-LR2.

10 Sampling Program

10.1 Sampling Round 1

The sampling program was developed for the objectives of the investigation. S-5.2.1 of NSW EPA (2022) Contaminated Land Guidelines allow for targeted or judgmental sampling of a site based on the investigator's knowledge of the probable distribution of contaminants and in conjunction with a CSM. Given the low probability of contamination based on historical reviews and information from previous investigations (WA 2016), six check samples were collected on a judgmental basis from across the Site to assess broadscale surface contamination.

The existing shed is identified as a potential hotspot. Samples were at targeted locations surrounding the structure to assess for runoff from chemical drums and a fuel storage drum, plus leaching off the roofing materials.

Samples were collected at a depth of 0-100mm into laboratory supplied glass jars with Teflon lids, with all samples forwarded under Chain of Custody conditions at Eurofins Laboratory for analysis.

All samples were analysed for OCP, OPP, arsenic, cadmium, chromium, copper, lead, nickel, mercury and zinc. Sample SH-3 was further analysed for PAH, TRH and BTEXN.

10.2 Sampling Round 2

Round 1 sampling in the vicinity of the shed revealed levels of Arsenic and Lead in excess of the Investigation Criteria at Sample SH-2. In accordance with DEC (2005) and EPA (2022) a 5m systematic sampling grid was selected to determine the linear and vertical extents of the possible hotspot. 8 surface samples were collected at 0-100mm depth and 8 samples were collected at depths of 150-300mm and 300-500mm depth and analysed for Arsenic and Lead.

11 Data Quality Objectives

In determining the type, quantity and quality of data needed to support decisions relating to the environmental condition of the Site, EWC undertook a seven-step process to develop the DQOs in accordance with NSW EPA (2017). This step-by-step approach defined the criteria for data collection design, including when, where, how many, and how to collect samples or

measurements, as well as limits on the tolerable decision error. The DQOs are presented in Table 5.

Table 5. Data Quality Objectives

DQO	Description	Solution
Environmental Problem	Residential redevelopment.	Undertake desktop review and environmental sampling.
Decisions Required	Is the Site suitable for the proposed residential redevelopment?	Historical review, development of CSM and sampling plan for detailed ESA investigations
Inputs Required	Historical information obtained in this investigation. Sampling and analysis and then 95% UCLs assessed to confirm contamination status.	Sampling in accordance with the sampling plan.
Study Boundaries	The boundary of investigation area is the R5 development area.	Figure 1.
Decision Rule	All analytical must be compared to the adopted investigation criteria Appropriate field QA/QC techniques should be employed. Appropriate Laboratory QA/QC techniques and methods are employed	The investigation criteria are presented in this report. Field QA/QC will be considered sufficient if: -All field works are undertaken to industry standards including use of laboratory supplied jars, disposable latex gloves between each sample, equipment decontamination between each sample collection. Laboratory QA/QC will be considered sufficient if: -All laboratory analyses are undertaken using NATA registered methods and reports are appropriately signed; -Laboratory quality assurance analyses are undertaken and reported favourably in the analytical reporting. If the analytical results, field QA/QC or laboratory QA/QC do not meet the DQO criteria then additional investigations may be required, or limits placed on the dataset.
Limits on Decision Errors	Statistical analysis of the investigation dataset is required where appropriate	The Site will be deemed suitable for the proposed residential landuse without further investigations or remediation if: The 95% UCL of the respective contaminants are less than the investigation criteria; or

DQO	Description	Solution
	Field QA/QC should be within acceptable error limits. Laboratory QA/QC should be within acceptable error limits.	Any single sample result does not exceed the investigation criteria by 2.5 times. The 95% UCL is the statistical parameter that can also be used to characterise the investigation dataset when comparing to HIL derived criteria. The 95% UCL is based on a 95% probability that the average concentration of contaminants do not exceed the respective adopted validation criteria. The 95% UCL is based on a 5% probability that a Type 1 error has been made whereby a site is validated when it is still contaminated (false negative). No limits. Laboratory QA/QC will be considered sufficient if they meet internal laboratory reporting requirements. If the investigation results, field QA/QC or laboratory QA/QC do not meet the DQO criteria then additional investigations may be required, or limits placed on the dataset.
Data Optimisation	The most resource effective sampling and analyses are undertaken to meet the DQOs	Based on the developed CSM discrete samples are considered appropriate to limit masking of potential hotspots.

12 Results

12.1 Sample Locations

All samples encountered natural topsoils. No fill materials were encountered.

During sampling no odiferous or discoloured soils were noted.

13 Analytical Results

13.1 Discrete Analyses

The sampling locations are presented in Figure 4. The laboratory report is included in Appendix C and the soil analytical results are summarised in the attached Table LR1.

Comparison of discrete sample results to the investigation criteria indicated that:

- Concentrations of TRH, BTEXN, PAH, OCPs and OPPs were reported below the laboratory Limit of Reporting (LOR) for all samples analysed;

- Concentrations of Cadmium, Chromium, Copper, Mercury and Nickel were reported below the Investigation Criteria for all samples analysed.
- Concentrations of Cadmium, Mercury and Nickel were reported below the laboratory LOR in the majority of samples analysed;
- Concentrations of Arsenic were reported below the Investigation Criteria for all samples analysed except for SH-2, which reported Arsenic at 620mg/kg. The Investigation Criteria for Arsenic is 100mg/kg.
- Concentrations of Lead were reported below the Investigation Criteria for all samples analysed except for SH-2, which reported 990mg/kg, which is above the HIL of 300mg/kg but below the EIL of 1,100mg/kg;
- Concentrations of Zinc were reported below the Investigation Criteria for all samples analysed except SH-1, SH-2 and SH-3 which reported Zinc below the HIL of 7,400mg/kg though above the EIL of 210mg/kg; and
- Elevated Arsenic, Copper Lead, and/or Zinc were present in multiple samples collected from the shed margin.

13.2 Additional Analyses

13.2.1 Hotspot Delineation

In order to assess the linear and vertical extents of Arsenic and Lead in surface soils around sample SH-2 to the west of the shed 8 surface samples were collected on a 5m grid (H1 – H8). H1 was collected as a repeat of sample SH-2. To assess the vertical extents of the Arsenic and Lead, four of the sample locations (H1, H3, H5 and H7) included sample collection from 150-300mm and 300-500mm depth. The analytical results are included in Table LR2. In summary:

- Concentrations of Arsenic and Lead were recorded below the EIL and HIL Investigation Criteria in all samples analysed; and
- All sample concentrations were reported close to the laboratory LOR and within expected background concentrations.

14 Quality Assurance and Quality Control

14.1.1 Field Quality Control

Environmental sampling activities were based on industry accepted standard practices.

The sampling equipment was decontaminated between sampling locations by washing with detergent and rinsing with clean water. A new pair of disposable gloves was used when handling each soil sample. Samples were collected in laboratory supplied jars and shipped in a chilled esky to the laboratory.

14.1.2 Laboratory Quality Control

Primary samples were submitted to Eurofins Laboratory, which is a national laboratory that undertakes analyses to NATA accredited analytical methodologies and participates in NATA endorsed laboratory round robin analyses. Laboratory Quality Control included testing and reporting of reagent blanks, laboratory control samples (LCS), matrix spikes and surrogate spikes, and laboratory duplicates to assess laboratory quality control.

The laboratory quality assurance results are included within the laboratory reports attached in Appendix C. No exceptions to the laboratory quality control reportable limits were noted.

14.1.3 Data Quality Check

The quality assurance and quality control of the field and laboratory methods is considered sufficiently robust for the investigation undertaken. Given this it is concluded that the analytical results dataset reliably represents soil concentrations in the field as sampled.

15 Discussion

The desktop review and site observations indicate that the property has been primarily used for broadscale grazing activities from 1942-2004. The acquisition of the property by the RTA in 2000 led to areas of the property being used for overburden storage during the highway construction in the mid 2000s. By 2009 the property was essentially unused with vegetation regrowth occurring.

An approximately 14,000m³ soil stockpile was left onsite by the RTA. Previous contamination testing confirmed the stockpile to be composed of soil only and suitable for residential landuse. This stockpile appears to have been relocated onsite in ~2018 to provide for site access off Lindsays Road.

Two small farming waste stockpiles containing farming wood and wire are present to the NE and SE of the shed, and a 6m³ stockpile of roadbase gravel and bitumen is present to the east. The former stockpiles pose physical and aesthetic issues for future residential occupation and will require removal offsite. The latter stockpile poses a contamination risk (bitumen) if spread onsite in an uncontrolled manner. As such it should be relocated into the future access road corridor or waste classified and disposed offsite to a licensed facility.

The samples collected from the margins of the shed contained elevated Arsenic, Copper, Lead and Zinc, with one sample (SH-2) located on the western side reported with elevated Arsenic and Lead (620mg/kg and 990mg/kg respectively) well above the Investigation Criteria. Concentrations of Zinc were also reported above the EIL in three of the samples (SH-1, SH-2 and SH-3). A second round of delineation sampling around SH-2 were reported with concentrations of Arsenic and Lead well below the Investigation Criteria and at expected background concentrations in surface samples and at depth to 500mm. This includes a resampling at the original SH-2 location. The results of the original and resampling suggest that some leaching of building materials (lead flashing and zinc from G.I. products) has occurred around the shed margin.

This is common in older structures, and though the original zinc has been reported above the EIL in three samples, the area surrounding the shed has a strong vegetative groundcover, the nearest waterway is located at >200m distance, and groundwater is not a receptor of concern, ecological impacts are not considered relevant.

The elevated Arsenic and Lead above the HILs in SH-2 though are problematic. The concentrations are >2.5 times the HIL which indicates a potential hotspot. Arsenic isn't common as a leaching byproduct from building materials, and an alternative anthropogenic source is envisaged, that of termite treatment at the shed or spillage of chemicals utilised for weed control (arsenic pentoxide) in historical farming. 95% Upper Confidence Limit (95% UCL) calculations have been undertaken (Table LR3) and confirm that including SH-2 the 95% UCL of Arsenic and lead are well

above the Investigation Criteria (2844mg/kg v 100mg/kg, and 1455mg/kg v 300mg/kg respectively). Excluding results of SH-2 the 95% UCLs are well below the Investigation Criteria. Given this a hotspot of Arsenic and Lead on the western side of the shed has been identified in surface soils that requires remediation. A Remedial Action Plan (RAP) must be developed to manage the Arsenic and Lead hotspot of <25m² footprint.

16 Conclusions and Recommendations

Based on the desktop review, detailed sampling program and investigation, it is concluded that historical usage of the property has not resulted in broadscale contamination of the Site. As such, except for a small hotspot, the Site is considered suitable for the proposed residential R5 redevelopment.

A RAP will be required to manage a small Arsenic and Lead hotspot of <25m² footprint in the surface soils on the western side of the existing shed.

17 References

- Coffs Harbour City Council. 2017. Contaminated Land Management Policy
- Coffs Harbour City Council. 2018. Contaminated Land Management Procedure
- Coffs Harbour City Council Local Environmental Plan 2013.
- DEC. 2005. Guidelines for Assessing Former Orchards and Market Gardens.
- NEPC. 2013. National Environment Protection (Assessment of Site Contamination) Measure. Schedule B1-Schedule B1 Guideline on Investigation Levels For Soil and Groundwater. National Environment Protection Council.
- NSW EPA. 2022. Sampling Design Part 1 – Application (Contaminated Land Guidelines).
- Whitehead & Associates. 2016. Preliminary Stockpile Contamination Assessment for Lindsays Road, Boambee. Ref: 1647 240516sd, dated 24 May 2016.

TABLES

Table LR1: Summary of Round 1 Soil Discrete Analytical Results

Sample ID	Units	LOR	Investigation Criteria					S-1	S-2	S-3	S-4	S-5	S-6	SH-1	SH-2	SH-3	SH-4	
Date Collected		Eurofins	NSW EPA	NEPM				5/09/2024										
Depth Collected				BP	HIL (A)	EIL	ESL(A)	HSL (A)	0-100	0-100	0-100	0-100	0-100	0-100	0-100	0-100	0-100	
% Moisture	%	1	-	-	-	-	-	-	18	12	7.9	31	25	26	24	31	29	26
Heavy Metals																		
Arsenic	mg/kg	2	100	100	100	-	-	-	4.9	40	15	4.6	3	4.1	21	620	4.3	4.5
Cadmium	mg/kg	0.4	-	20	-	-	-	-	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	0.8	< 0.4	0.7	< 0.4
Chromium	mg/kg	5	-	100	480	-	-	-	8.6	21	14	7.4	6.7	8.9	13	15	12	9.7
Copper	mg/kg	5	-	6000	140	-	-	-	10	19	33	8.7	19	14	66	110	41	22
Lead	mg/kg	5	300	300	1100	-	-	-	18	56	31	14	15	27	140	990	130	39
Mercury	mg/kg	0.1	-	40		-	-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.3	< 0.1	< 0.1
Nickel	mg/kg	5	-	400	55	-	-	-	< 5	5	10	< 5	< 5	< 5	< 5	5	< 5	< 5
Zinc	mg/kg	5	-	7400	210	-	-	-	23	32	65	19	18	31	320	310	1800	140
Total Recoverable Hydrocarbons																		
Naphthalene	mg/kg	0.5	-	-	-	-	-	5	-	-	-	-	-	-	-	-	< 0.5	-
TRH C6-C10 less BTEX (F1)	mg/kg	20	-	-	-	180	50		-	-	-	-	-	-	-	-	< 20	-
TRH >C10-C16 less Naphthalene (F2)	mg/kg	50	-	-	-	120	280		-	-	-	-	-	-	-	-	<50	-
TRH >C16-C34	mg/kg	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<100	-
TRH >C34-C40	mg/kg	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<100	-
TRH >C10-C40 (total)*	mg/kg	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<100	-
BTEX																		
Benzene	mg/kg	0.1	-	-	-	65	0.7		-	-	-	-	-	-	-	-	< 0.1	-
Ethylbenzene	mg/kg	0.1	-	-	-	125	-		-	-	-	-	-	-	-	-	< 0.1	-
m&p-Xylenes	mg/kg	0.2	-	-	-				-	-	-	-	-	-	-	-	< 0.2	-
o-Xylene	mg/kg	0.1	-	-	-				-	-	-	-	-	-	-	-	< 0.1	-
Toluene	mg/kg	0.1	-	-	-	105	480		-	-	-	-	-	-	-	-	< 0.1	-
Xylenes - Total*	mg/kg	0.3	-	-	-	45	110		-	-	-	-	-	-	-	-	< 0.3	-
Organochlorine Pesticides																		
4,4'-DDD	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
4,4'-DDE	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
4,4'-DDT	mg/kg	0.05	50	-	180	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
a-BHC	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Aldrin	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Aldrin and Dieldrin (Total)*	mg/kg	0.05	10	6	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
b-BHC	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Chlordanes - Total	mg/kg	0.1	-	50	-	-	-	-	< 0.1	< 1	< 1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1	< 1
d-BHC	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
DDT + DDE + DDD (Total)*	mg/kg	0.05	-	240	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Dieldrin	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Endosulfan I	mg/kg	0.05	-	270	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Endosulfan II	mg/kg	0.05	-		-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Endosulfan sulphate	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Endrin	mg/kg	0.05	-	10	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Endrin aldehyde	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Endrin ketone	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
g-BHC (Lindane)	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Heptachlor	mg/kg	0.05	-	6	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Heptachlor epoxide	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Hexachlorobenzene (HCB)	mg/kg	0.05	-	10	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Methoxychlor	mg/kg	0.05	-	300	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Toxaphene	mg/kg	0.1	-	20	-	-	-	-	< 0.5	< 10	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 10
Organophosphorus Pesticides																		
Azinphos-methyl	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Bolstar	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Chlorfenvinphos	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Chlorpyrifos	mg/kg	0.2	-	160	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Chlorpyrifos-methyl	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Coumaphos	mg/kg	2	-	-	-	-	-	-	< 2	< 5	< 5	< 2	< 2	< 2	< 2	< 2	< 5	< 5
Demeton-O	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Demeton-S	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Diazinon	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Dichlorvos	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Dimethoate	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Disulfoton	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
EPN	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Ethion	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Ethoprop	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Ethyl parathion	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Fenitrothion	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Fensulfothion	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Fenthion	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Malathion	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Merphos	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Methyl parathion	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Mevinphos	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Monocrotophos	mg/kg	2	-	-	-	-	-	-	< 2	< 5	< 5	< 2	< 2	< 2	< 2	< 2	< 5	< 5
Naled	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Omethoate	mg/kg	2	-	-	-	-	-	-	< 2	< 5	< 5	< 2	< 2	< 2	< 2	< 2	< 5	< 5
Phorate	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Pirimiphos-methyl	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0					

Table LR1: Summary of Round 1 Soil Discrete Analytical Results

Sample ID	Units	LOR	Investigation Criteria					S-1	S-2	S-3	S-4	S-5	S-6	SH-1	SH-2	SH-3	SH-4
Date Collected		Eurofins	NSW EPA	NEPM				5/09/2024									
Depth Collected			BP	HIL (A)	EIL	ESL(A)	HSL (A)	0-100	0-100	0-100	0-100	0-100	0-100	0-100	0-100	0-100	0-100
Tokuthion	mg/kg	0.2	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Trichloronate	mg/kg	0.2	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Polycyclic Aromatic Hydrocarbons																	
Acenaphthene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Acenaphthylene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Anthracene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Benz(a)anthracene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Benzo(a)pyrene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Benzo(a)pyrene TEQ (lower bound) *	mg/kg	0.5	-	3	-	1.4	-	-	-	-	-	-	-	-	-	< 0.5	-
Benzo(b&j)fluoranthene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Benzo(g,h,i)perylene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Benzo(k)fluoranthene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Chrysene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Dibenz(a,h)anthracene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Fluoranthene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Fluorene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Indeno(1.2.3-cd)pyrene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Naphthalene	mg/kg	0.5	-	-	-	-	5	-	-	-	-	-	-	-	-	< 0.5	-
Phenanthrene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Pyrene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Total PAH*	mg/kg	0.5	-	300	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-

Notes

Indicates sample concentration exceeds HILA investigation criteria value

Indicates sample concentration exceeds HIL Ainvestigation criteria value by >250%

Indicates sample concentration exceeds EIL

Table LR2: Summary of Round 2 Soil Discrete Analytical Results

Sample ID	Units	LOR	Investigation Criteria					H1-S	H1-M	H1-D	H2	H3-S	H3-M	H3-D	H4	H5-S	H5-M	H5-D
Date Collec		Eurofins	NSW EPA	NEPM				10/10/2024										
Depth Colle			BP	HIL (A)	EIL	ESL(A)	HSL (A)	0-150	150-300	300-500	0-100	0-150	150-300	300-500	0-100	0-150	150-300	300-500
% Moisture	%	1	-	-	-	-	-	25	21	20	30	30	19	24	26	25	22	23
Heavy Metals																		
Arsenic	mg/kg	2	100	100	100	-	-	4.3	2.7	3.4	2.9	4.2	6.1	3.6	4.2	4.1	4.5	5.2
Lead	mg/kg	5	300	300	1100	-	-	28	13	15	39	21	8.2	11	17	14	13	13

Notes

Indicates sample concentration exceeds investigation criteria value

Indicates sample concentration exceeds investigation criteria value by >250%

Table LR2: Summary of Round 2 Soil Discrete Analytical Results

Sample ID	Units	LOR	Investigation Criteria					H6	H7-S	H7-M	H7-D	H8
Date Collec		Eurofins	NSW EPA	NEPM								
Depth Colle			BP	HIL (A)	EIL	ESL(A)	HSL (A)	0-100	0-150	150-300	300-500	0-100
% Moisture	%	1	-	-	-	-	-	34	26	20	19	31
Heavy Metals												
Arsenic	mg/kg	2	100	100	100	-	-	3.6	3	3.5	3.2	11
Lead	mg/kg	5	300	300	1100	-	-	18	17	12	9.7	47

Notes

 Indicates sample concentration exceeds investigation criteria value

 Indicates sample concentration exceeds investigation criteria value by >250%

Table LR3: 95% Upper Confidence Limits

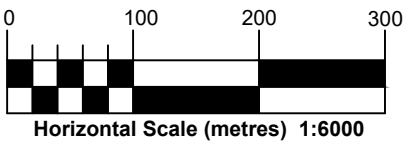
Sample ID		LOR	Investigation Criteria					SH-1	SH-2	SH-3	SH-4	H1-S	H2	H3-S	H4	H5-S	H6	H7-S
Date Collec			NSW EPA	NEPM				5/09/2024				10/10/2024						
Depth Colle	Units	Eurofins	BP	HIL (A)	EIL	ESL(A)	HSL (A)	0-100	0-100	0-100	0-100	0-150	0-100	0-150	0-100	0-150	0-100	0-150
% Moisture	%	1	-	-	-	-	-	24	31	29	26	25	30	30	26	25	34	26
Heavy Metals																		
Arsenic	mg/kg	2	100	100	100	-	-	21	620	4.3	4.5	4.3	2.9	4.2	4.2	4.1	3.6	3
	mg/kg						Ln	3.0	6.4	1.5	1.5	1.5	1.1	1.4	1.4	1.4	1.3	1.1
Lead	mg/kg	5	300	300	1100	-	-	140	990	130	39	28	39	21	17	14	18	17
	mg/kg						Ln	4.9	6.9	4.9	3.7	3.3	3.7	3.0	2.8	2.6	2.9	2.8

Sample ID		LOR	Investigation Criteria					SH-1	SH-2 (Excl)	SH-3	SH-4	H1-S	H2	H3-S	H4	H5-S	H6	H7-S
Date Collec			NSW EPA	NEPM				5/09/2024				10/10/2024						
Depth Colle	Units	Eurofins	BP	HIL (A)	EIL	ESL(A)	HSL (A)	0-100	0-100	0-100	0-100	0-150	0-100	0-150	0-100	0-150	0-100	0-150
% Moisture	%	1	-	-	-	-	-	24		29	26	25	30	30	26	25	34	26
Heavy Metals																		
Arsenic	mg/kg	2	100	100	100	-	-	21		4.3	4.5	4.3	2.9	4.2	4.2	4.1	3.6	3
	mg/kg						Ln	3.0		1.5	1.5	1.5	1.1	1.4	1.4	1.4	1.3	1.1
Lead	mg/kg	5	300	300	1100	-	-	140		130	39	28	39	21	17	14	18	17
	mg/kg						Ln	4.9		4.9	3.7	3.3	3.7	3.0	2.8	2.6	2.9	2.8

Table LR3: 95% Upper Confidence Limits

[illegible][illegible]

FIGURES



LEGEND

- Property Boundary
- Contour (10m)

- Drainage Alignment
- - - Study Boundary
- Existing Building



TITLE Site Location

FIGURE Figure 1

SHEET 1 OF 1

ISSUE A

PROJECT
DESA for Lots 4, 15,
101 & 102 Lindsays
Road, Boambee

CLIENT
Jinderpal Rai

AUTHOR

SD

DATE

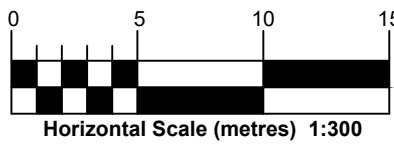
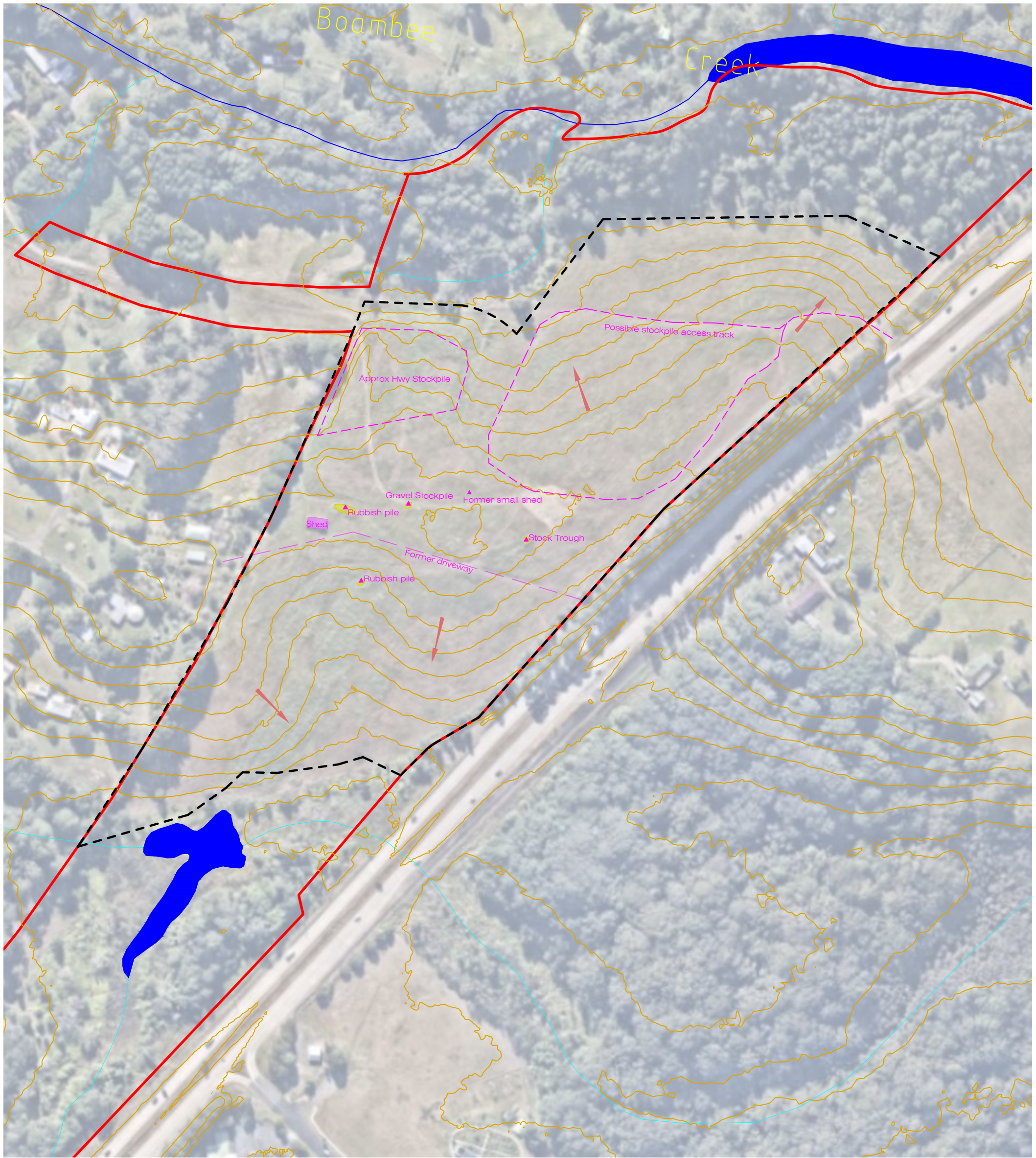
22/10/24

SCALE

1:6000

PROJECT

2223-049

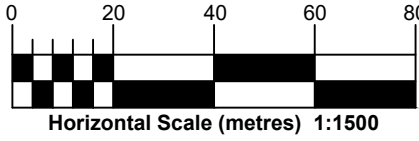
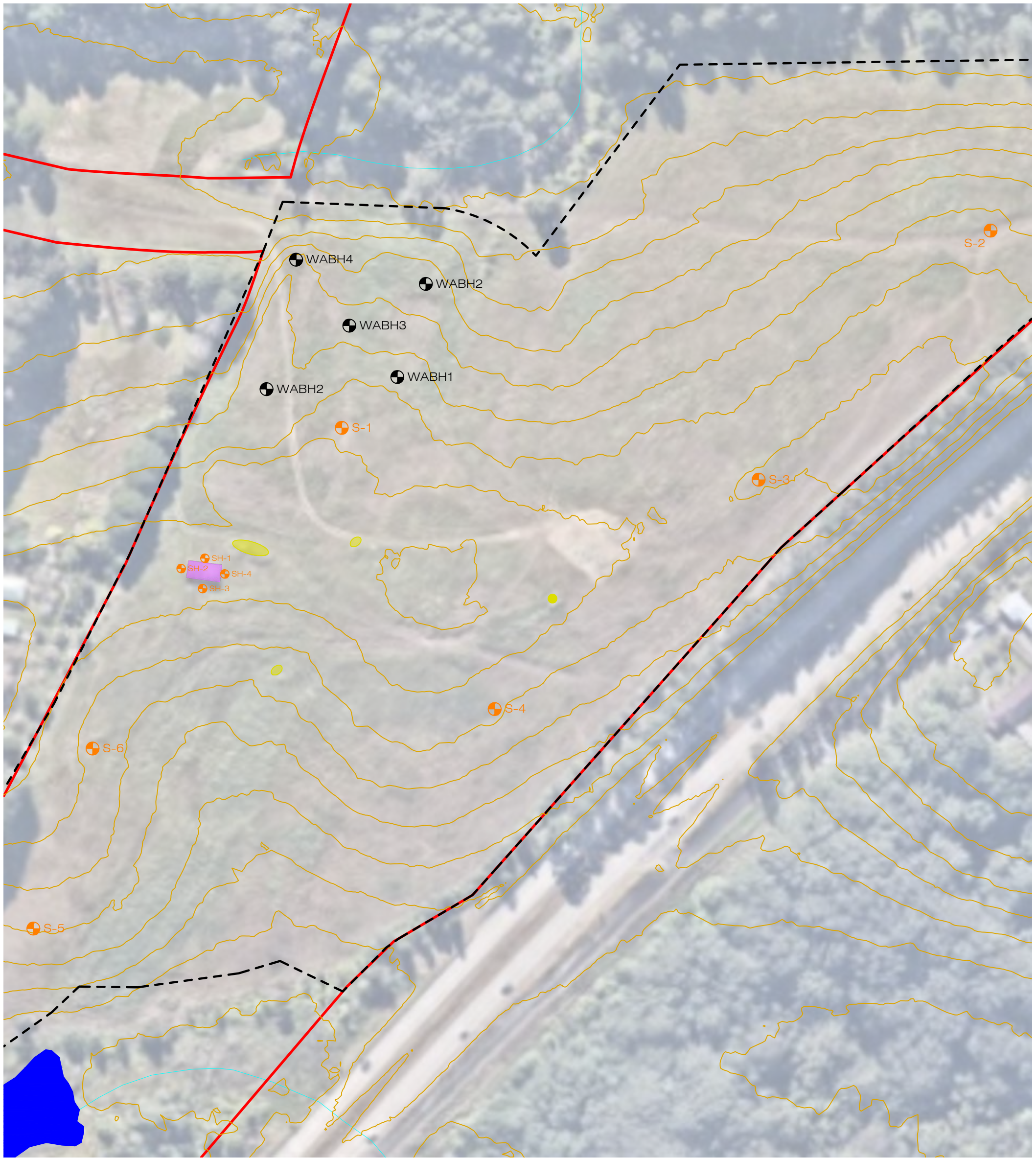


- LEGEND**
- Property Boundary
 - Contour Line (2m)
 - Drainage Alignment

- Existing Shed
- Site Feature



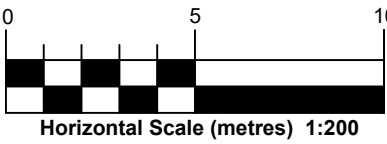
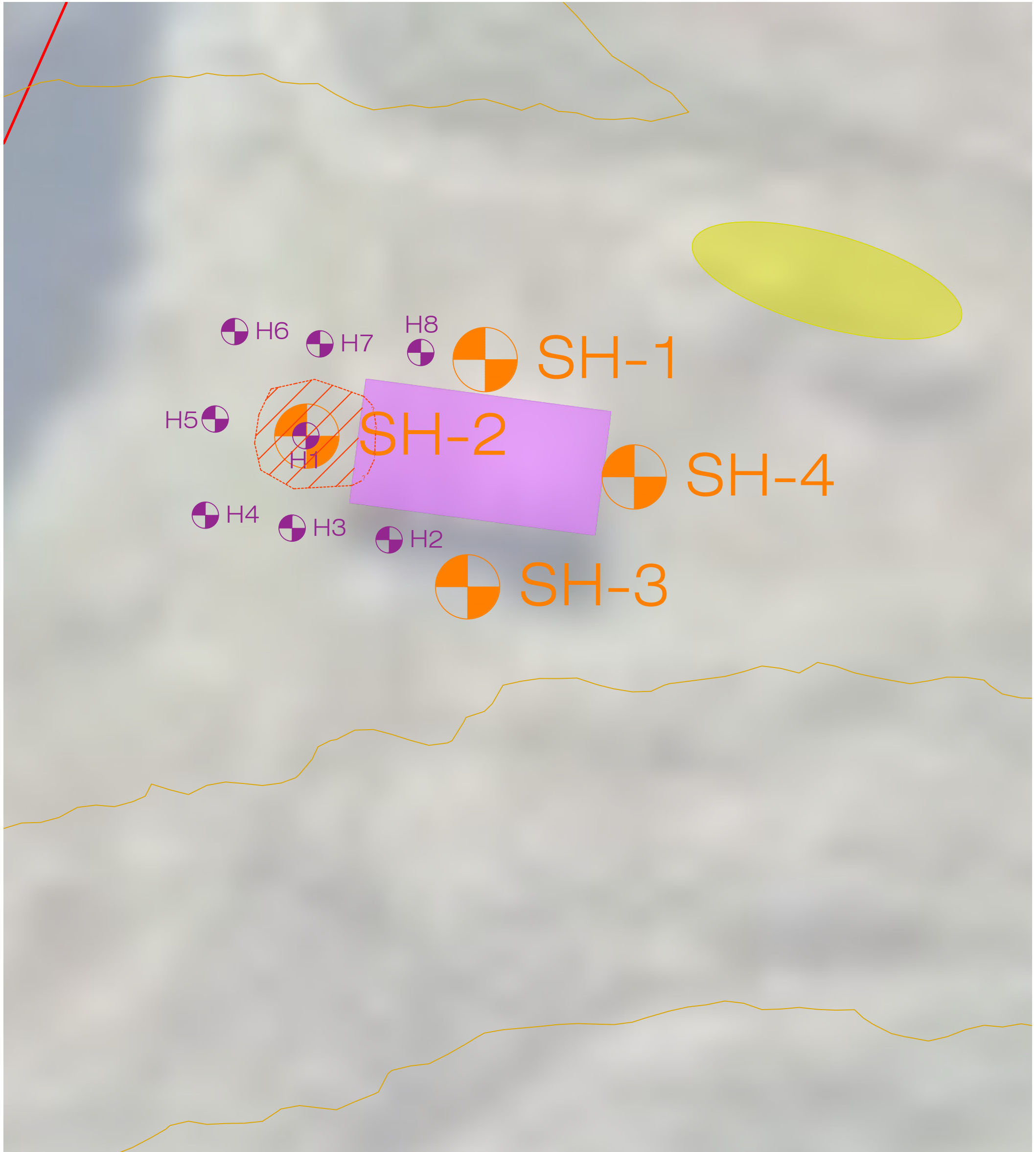
TITLE Site Layout		FIGURE Figure 3	
PROJECT DESA for Lots 4, 15, 101 & 102 Lindsays Road, Boambee		SHEET 1 OF 1	ISSUE A
AUTHOR SD		DATE 22/10/24	PROJECT 2223-049
		SCALE 1:300	



LEGEND	
	Property Boundary
	Contour Line (2m)
	Drainage Alignment
	Existing Shed
	Prev Stockpile BH
	EWC Samples



TITLE Sampling Locations		FIGURE Figure 4	
		SHEET 1 OF 1	ISSUE A
PROJECT DESA for Lots 4, 15, 101 & 102 Lindsays Road, Boambee		CLIENT Jinderpal Rai	
AUTHOR SD	DATE 22/10/24	SCALE 1:1500	PROJECT 2223-049

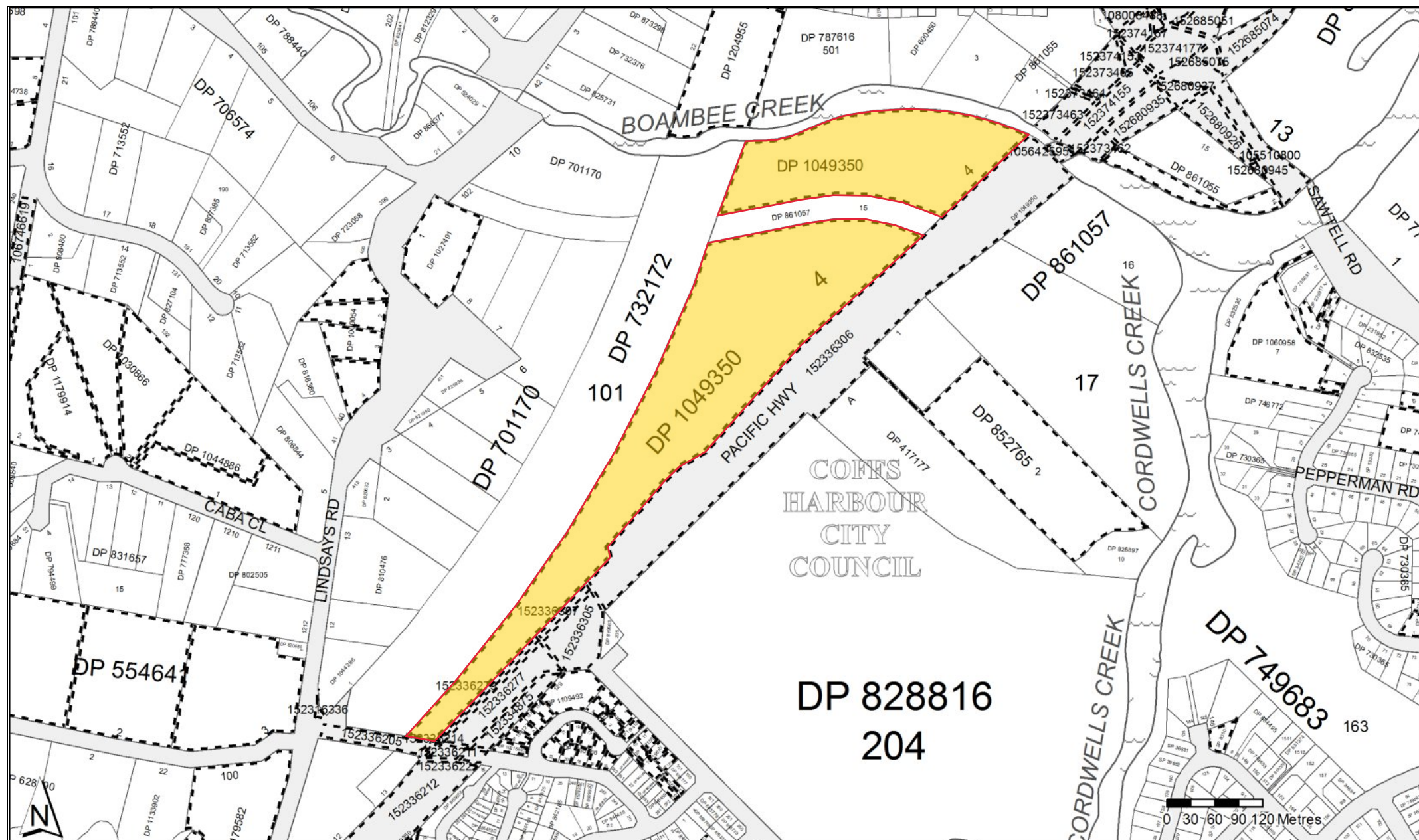


LEGEND	
	Property Boundary
	Contour Line (2m)
	Drainage Alignment
	Existing Shed
	EWC Sample Round 1
	EWC Sample Round 2
	Recommended Remedial Extents



PROJECT DESA for Lots 4, 15, 101 & 102 Lindsays Road, Boambee		TITLE Hotspot Sampling Locations	
		FIGURE Figure 3	
AUTHOR SD		SHEET 1 OF 1	ISSUE A
		CLIENT Jinderpal Rai	
DATE 22/10/24		SCALE 1:200	PROJECT 2223-049

APPENDIX A



MANAGER, PROPERTY ASSETS

AUTHORISED OFFICER
ROADS AND TRAFFIC AUTHORITY

Crown Lands Office Approval

PLAN APPROVED Authorised Officer

Local District: _____
 Paper No. _____
 Field Book No. pages

Subdivision Certificate

~~I certify that the provisions of s.19(1) of the Environmental Planning and Assessment Act 1979 have been notified in relation to the proposed~~

Insert "subdivision" or "new (code)" of 10/1/1961

* Authorized Person/Owner of Motorway / Authorized Certification.

Congeni dulcor-iv

Date of endorsement:

Subjiriz, na Cuzcuz (na tr.)

File No.:

When the plan is to be lodged electronically in the Land Title Office, it should include a signature in an electronic or digital format.

approved by the Registrar-General.

* இலக்கண அறிவுரைகள் - 12 பக்கங்களில்

SURVEYOR'S REFERENCE: WBS H/36578/SI CHECKLIST

WARNING : CREASING OR FOLDING WILL LEAD TO REJECTION

HR0 FILE M4416 R.T.A. FILE = IG/110.11/2

R.T.A. PLAN: 0010 IIC 55 2720

Registered:  12.3.2003

Title System: TOERENS

Purpose:	ROADS ACT, 1993
-----------------	-----------------

Ref. Map: Y 0035-3[#] # #
COFFS HARBOUR. SH. 103 & 104

Lost Plan: DP 861056#

PLAN OF LAND TO BE ACQUIRED
FOR THE PURPOSES OF THE ROADS
ACT, 1993.

Lengths are in metres. Reduction Ratio 1:2000

L.G.A.: COFFS HARBOUR CITY

Suburb: BOAMBÉE

Parish: BONVILLE

County: RALEIGH

This is sheet 1 of my plan in 3 sheets.
(Delete if inapplicable).

DAVID JOHN WHITTON
of ROADS & TRAFFIC AUTHORITY N.S.W.
a surveyor registered under the Surveyors Act 1929,
certify that the survey represented in this plan is accurate,
has been made in accordance with the Surveyors (Practice)
Regulation 2001 and was completed on: 30 APRIL 2002
The survey is ADJUTANT to
specifically the land actually surveyed or specify any land
shown in the plan that is not the subject of the survey)

Signature: *J. Whitten* Dated 19-11-02
 Surveyor: registered under the Surveyors Act 1979

Return line : "X" "Y" (SHEET 3)
 Type : *thick/Plastic*

Plans used in preparation of survey / compilation

DP 258697	DP 787951	DP 820816
DP 263893	DP 789211	DP 847574
DP 47117	DP 825897	DP 852958
DP 776229	DP 819563	DP 861056

PANEL FOR USE ONLY for statements of intention to dedicate public roads or to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants.

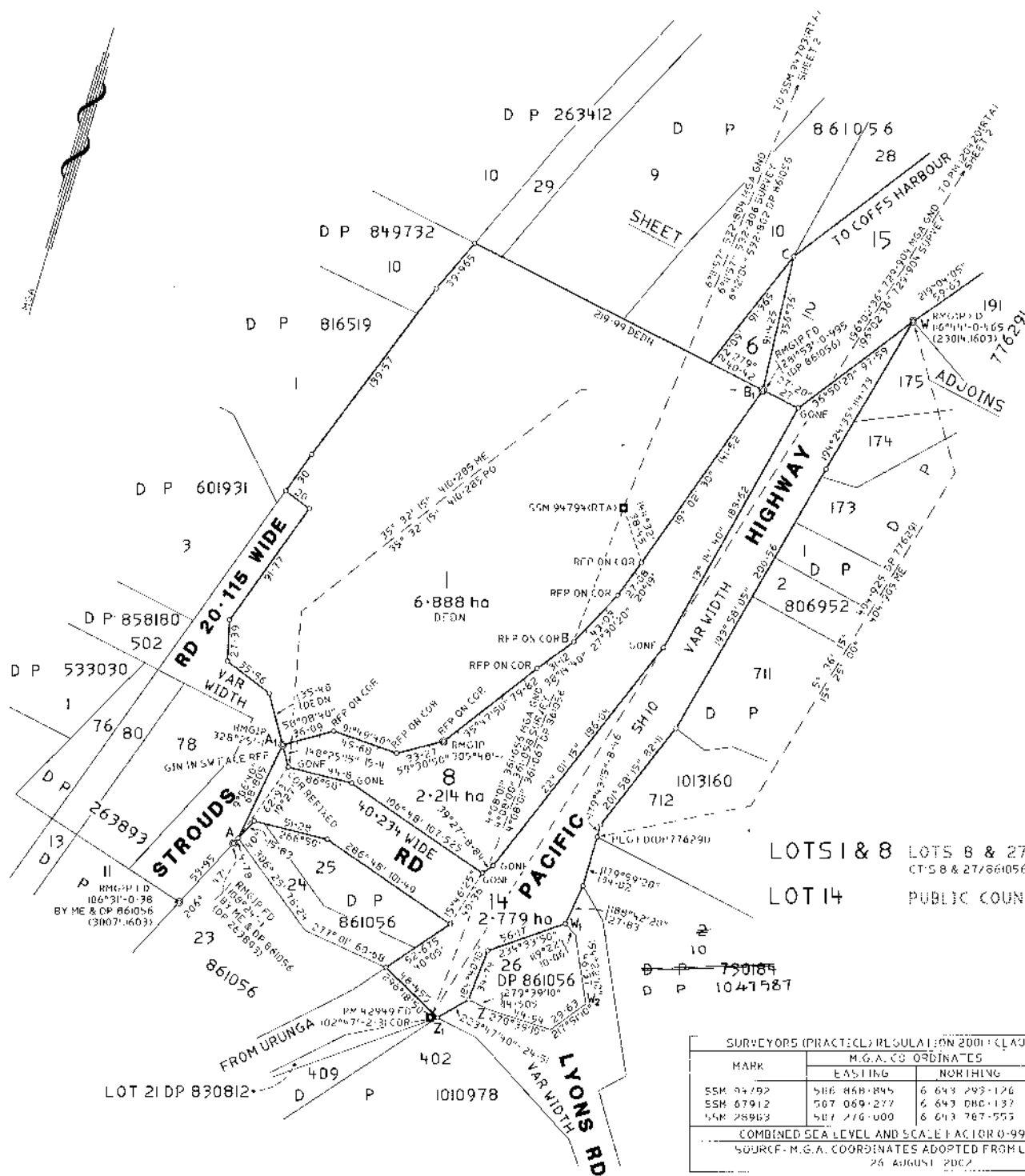
LOTS 8 TO 17 INCL. LOTS 24, 25, 26, 28 &
29 DP 863046; LOTS 21, 22, 24, 25, 26, 27 &
30 DP 861057; AND LOTS 103, 104, 105 &
106 DP 847574 ARE REQUIRED FOR
CONTROLLED ACCESS ROAD UNDER
SECTION 49 OF THE ROADS ACT 1997.

ACCESS WILL BE RESTRICTED ACROSS THE BOUNDARY MARKED A₁-H-S₁-C-D; O₁-E-E₁-F-F₁-G; G₁-H-R₁-V-J-K-K₁-L-L₁-M; M₁-N-N₁-P; P₁-Q-Q₁-R₁-S₁-S₁-T₁-U; U₁-V-W-W₁-Xs AND Z-Z₁.

LOTS 18, 19 & 20 ARE REQUIRED FOR ROAD
AND AFTER CONSTRUCTION WILL BE
DEDICATED AS PUBLIC ROAD UNDER
SECTION 0 OF THE ROADS ACT, 1993.

CONTINUED ON SHEET 2

APPROVED: 
M. HOWARD, MANAGER
PROPRITY SERVICES, NORTHERN
ROADS AND TRAFFIC AUTHORITY NSW

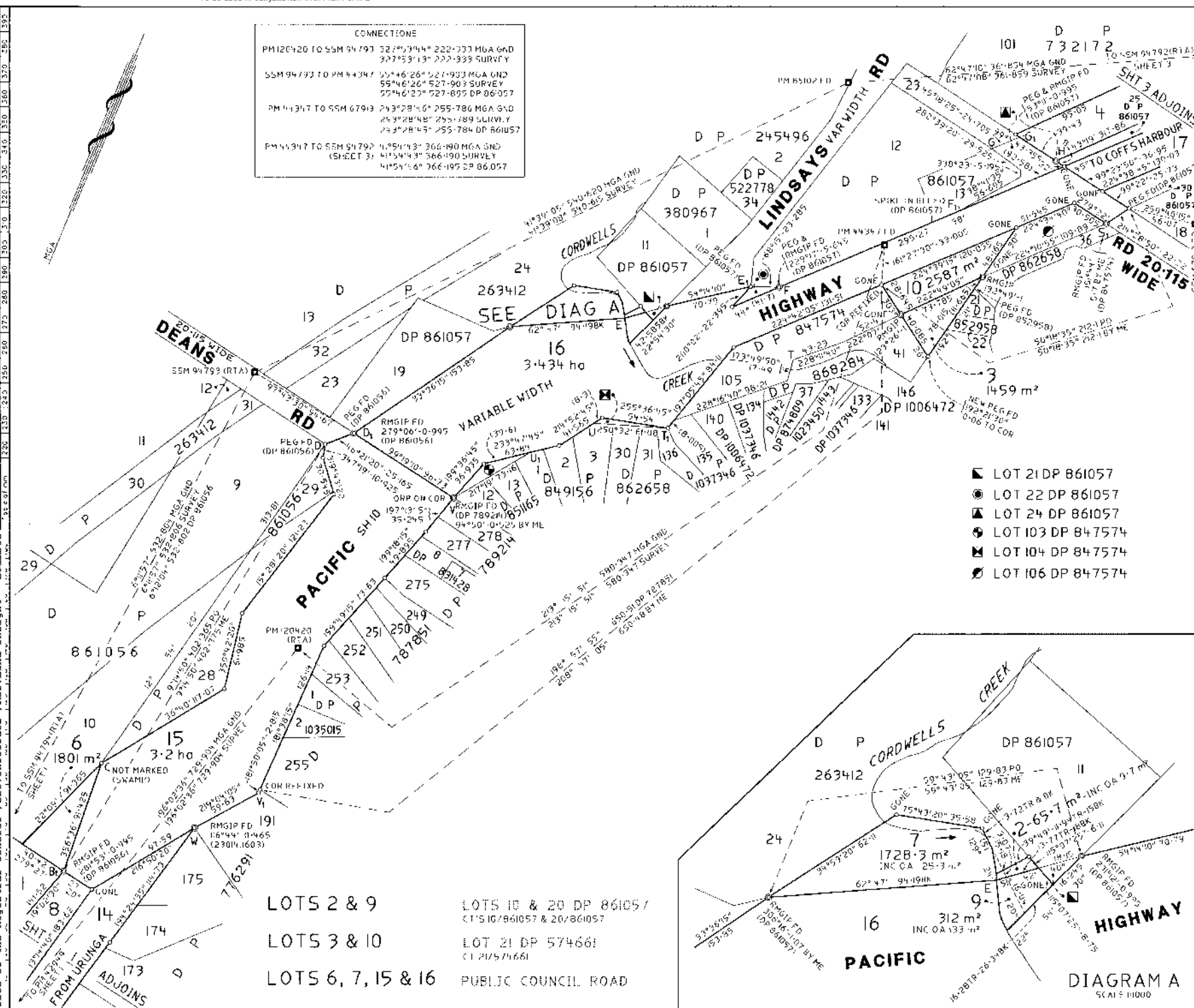


SURVEY OFS (PRACTICE) REGULATIONS 2001 (CLAUSE 32.2)					
MARK	M.G.A. COORDINATES		ZONE	CL	ORI
	EASTING	NORTHING			
SSM 37492	566 888.845	6 643 297.126	56	8	2
SSM 67912	567 069.277	6 643 680.137	56	8	2
SSM 28963	567 216.000	6 643 787.553	56	8	2

COMBINED SEA LEVEL AND SCALE FACTOR 0.99960

SOURCE: M.G.A. COORDINATES ADOPTED FROM L.I.C. ON

26 AUGUST 2002



DP1049350

Registered: 12.3.2003

This is sheet 2 of my plan in 3 sheets
dated 30 APRIL 2002Signature: [Signature] Dated 19-11-02
Surveyor registered under Surveyors Act, 1928.This is sheet 2 of the plan of streets
covered by Subdivision Certificate No. 1049350 ofAuthorized Person/General Manager/Accredited Certifier...
Delete whichever is applicable

L.G.A.: COFFS HARBOUR CITY

Suburb: BOAMBEE

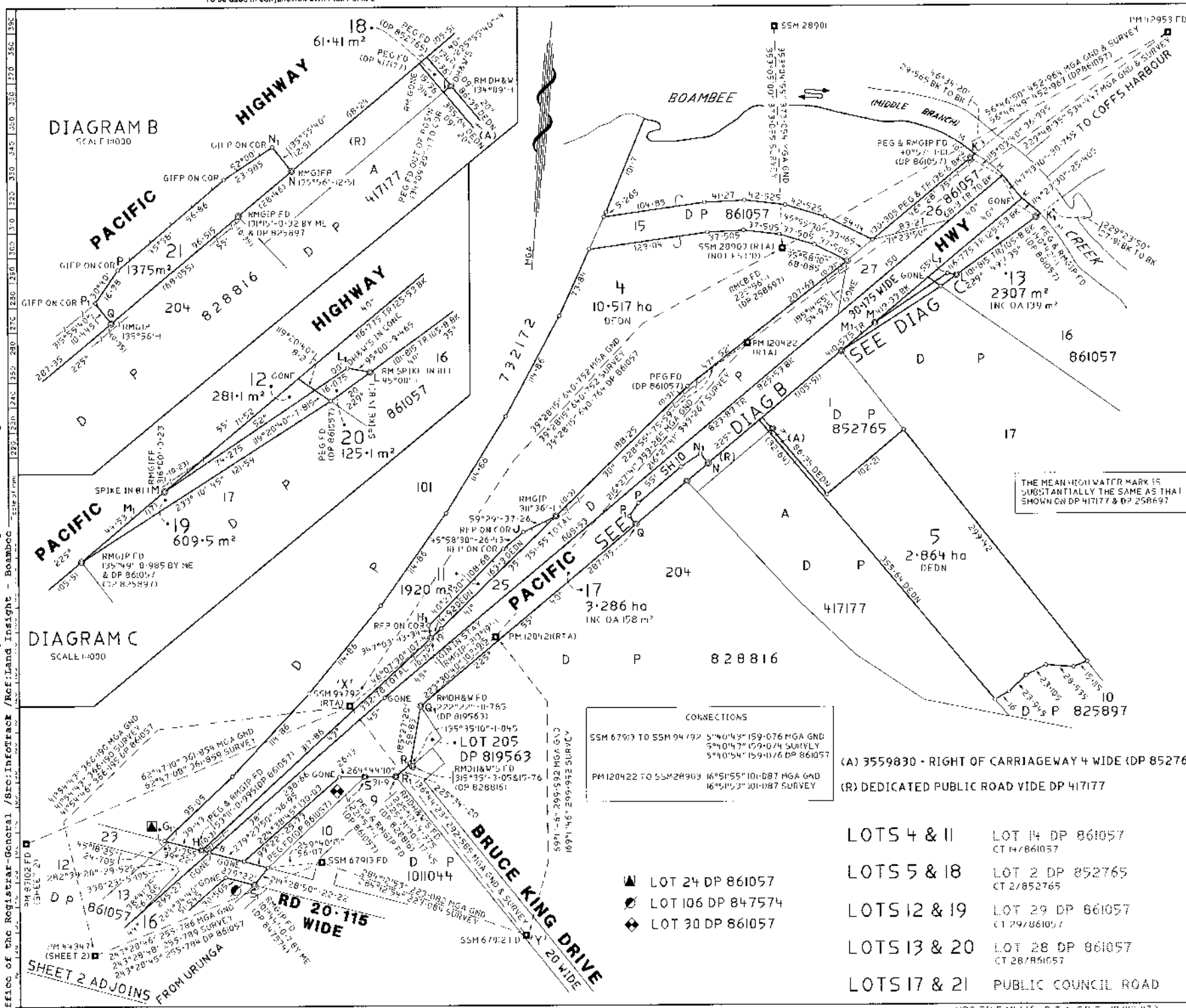
Parish: BONVILLE

County: RALEIGH

For use where a space is insufficient in any point on Plan Form 2

LOT 861057
29014.1643
30873.1603LOTS 1 & 8 SUPERSEDE LOTS 8 & 27
DP 861056.LOTS 2 & 9 SUPERSEDE LOTS 2 & 10
DP 861057.LOTS 6 & 1 (HILLING UNNCESSARY ROAD
ARE PROPOSED TO BE CLOSED.

Lengths in metres. Reduced Ratio 1:2000



DP1049350

Registered: 12.3.2003

This sheet 3 of my plan is 3 sheets
dated 30 APRIL 2002Signature: [Signature] Dated 19-11-02
Surveyor registered under Surveyors Act, 1928.This is sheet 3 of the plan of 3 sheets
covered by Subdivision Certificate No. 1
of* Authorised Person/General Manager/ Accredited Certifier...
* Delete whichever is inapplicable

L.G.A.: COFFS HARBOUR CITY

Suburb: BOAMBEE

Parish: BONVILLE

County: RALEIGH

For use where space is insufficient in any panel on Plan Form 2

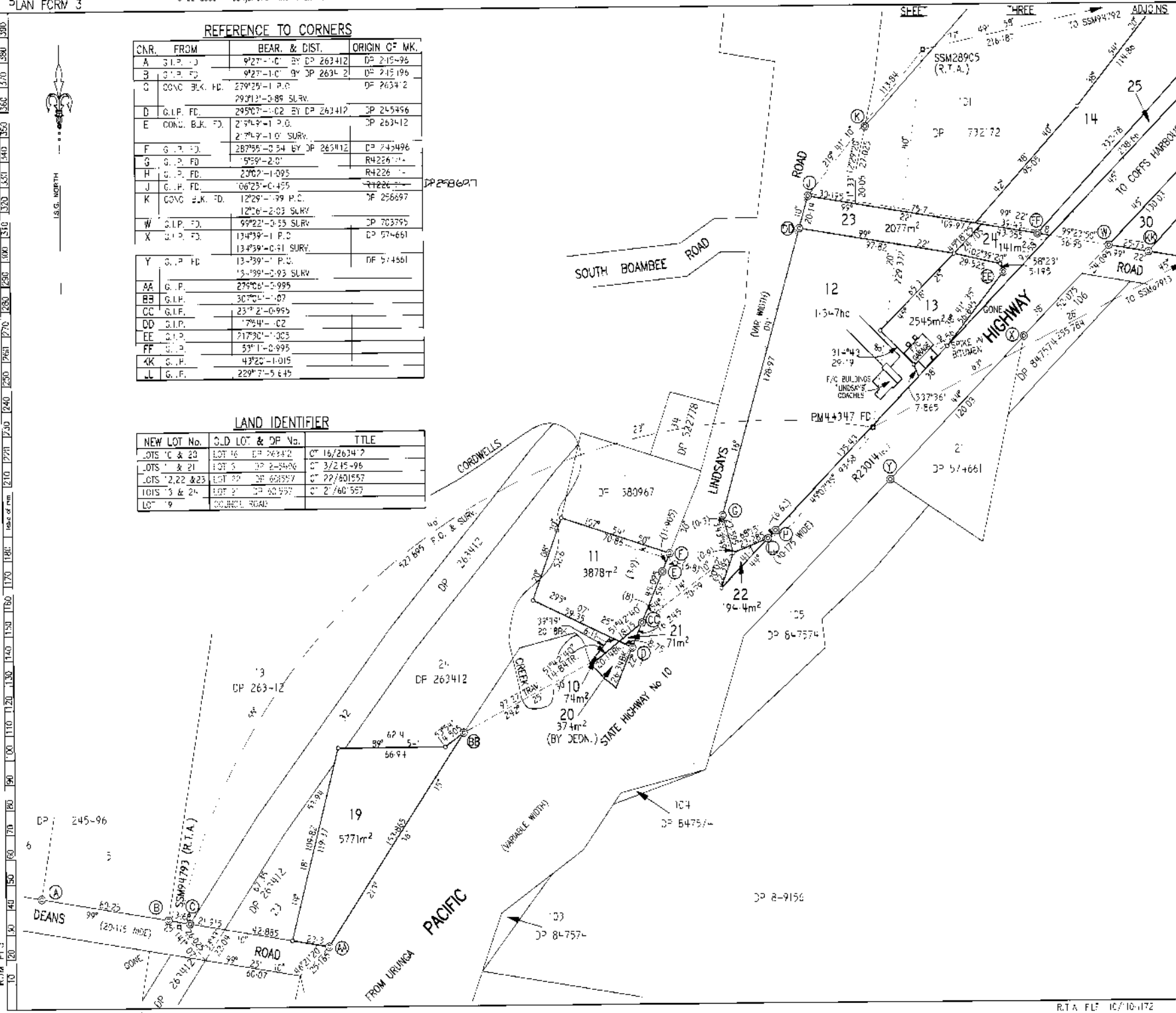
Lengths are in metres. Reduction Ratio 1:500

REFERENCE TO CORNERS

CNR.	FROM	BEAR. & DIST.	ORIGIN OF MK.
A	S.I.P. FD	9°27'-10" BY DP 263412	DP 245-96
B	S.I.P. FD	9°27'-10" BY DP 263412	DP 245-96
C	CONC. B.L. FD	279°25'-1 P.O.	DP 263412
D	G.I.P. FD	295°07'-102 BY DP 263412	DP 245-96
E	CONC. B.L. FD	2°34'-1 P.O.	DP 263412
F	G.I.P. FD	287°55'-3.54 BY DP 263412	DP 245-96
G	G.I.P. FD	9°59'-2.0	RH226-14
H	G.I.P. FD	220°2'-1.095	RH226-14
J	G.I.P. FD	106°23'-0.455	RH226-14
K	CONC. B.L. FD	12°29'-1.99 P.O.	DP 256697
W	S.I.P. FD	99°22'-0.55 SURV.	DP 703795
X	S.I.P. FD	134°39'-1 P.O.	DP 574661
		134°39'-0.51 SURV.	
Y	G.I.P. FD	13°39'-1 P.O.	DP 574661
		134°39'-0.53 SURV.	
AA	G.I.P. FD	279°06'-0.995	
BB	G.I.P. FD	30°50'-1.07	
CC	G.I.P. FD	23°2'-0.995	
DD	G.I.P. FD	7°54'-102	
EE	G.I.P. FD	217°30'-1.023	
FF	G.I.P. FD	53°1'-0.995	
KK	G.I.P. FD	43°20'-1.015	
LL	G.I.P. FD	229°7'-5.645	

LAND IDENTIFIER

NEW LOT No.	C.D. LOT & DP No.	TITLE
LOTS 10 & 20	LOT 10 DP 263412	OT 16/263412
LOTS 11 & 21	LOT 11 DP 263412	OT 3/245-96
LOTS 22 & 23	LOT 22 DP 603557	OT 22/603557
LOTS 24 & 25	LOT 24 DP 603557	OT 2/603557
LOT 9	CORRECTION ROAD	



DP 861057

Registered 18.8.1996

This is sheet 2 of my plan in 4 sheets
 Completed on 18.08.1996

21/6/96
 (Signature)
 Surveyor Registered under Surveyors Act 1923

This is sheet 2 of the plan of sheets
 covered by my Certificate no.

(Signature)
 General Manager/Authorised Person

For use where space is insufficient in any panel of
 Plan Form 2

LGA: COFFS HARBOUR CITY

LOCALITY: BOAMBEE

PARISH: BONVILLE

COUNTY: RALEIGH

Lengths in metres. Reduction Ratio 1:1500

୧୫.୫.୧୯୯୬

(Signature) *[Signature]* 21/6/96
 Supervisor concerned under Supervisory Act 1982

(Signature).....
For and on behalf of Authorised Person

COUNTY: RALEIGH

CNR.	FROM	BEAR. & D.S.T.	ORIGIN OF M.
L	G.P. FD.	215° 7' - 0.455	R230° 6' 48.3
T	G.H. & W. FD.	222° 41' - 11.5 P.O. 222° 22' - 11.785 S.W.	P 919563
U	C.H. & W. FD.	22317' - 4.375 S.W. & 2253° 130' - 7.530 P.28/59	JP 5288' 6
V	G.P. FD.	13.49° - 0.5 P.O. 13.49° - 0.17 S.W.	P 793795
W	G.P. FD.	99° 22' - 0.56 P.O. 99° 22' - 0.55 S.W.	JP 793795
Z	J.H. & W. FD.	5536° - 6.505 & 17.255	JP 842185
EE	G.P.	22157 - 1.005 217° 9' 0	
FF	G.P.	531° - 0.995	
JJ	G.P.	22157° - 1	
KK	G.P.	4320° - 1.015	

NEW LOT No.	OLD LOT & DP No.	TITLE
LOTS 14 25 & 26	LOT 100 DP 732172	CT 100/732172
LOTS 18 & 30	LOT 4 DP 558769	CT 6/858769

REFERENCE TO CORNERS

CNR.	FROM	BEAR. & D.ST.	ORIGIN OF MK.
L	G.P. FD.	215° 7' - 0.455	R230'6" SURV.
T	G.H. & W. FD.	222° 14' - 11.5 P.O.	CP 819563
U	G.H. & W. FD.	223° 17' - 4.775 SURV. & 223° 13' - 7.530 CP 819563	CP 8288'6
V	G.P. FD.	13° 13' - 0.5 P.O.	CP 703795
W	G.P. FD.	13° 13' - 0.17 SURV. & 13° 13' - 0.56 P.O.	CP 703795
Z	G.H. & W. FD.	59° 22' - 0.55 SURV. & 59° 22' - 0.56 P.O.	CP 842185
EE	G.P.	221° 57' - 1.005 CP 819563	
FF	G.P.	53° 11' - 0.995	
JJ	G.P.	221° 57' - 1	
KK	G.P.	43° 20' - 1.015	

LAND IDENTIFIER

NEW LOT No.	O.D. LOT & DP No.	TITLE
OTS 1425 & 28	OT 105 CP 752172	OT 103/732172
OTS 8 & 30	OT 6 CP 858769	OT 6/858769

—Plan Drawing only to appear in this space

P. J. A. & E. 0/10.172

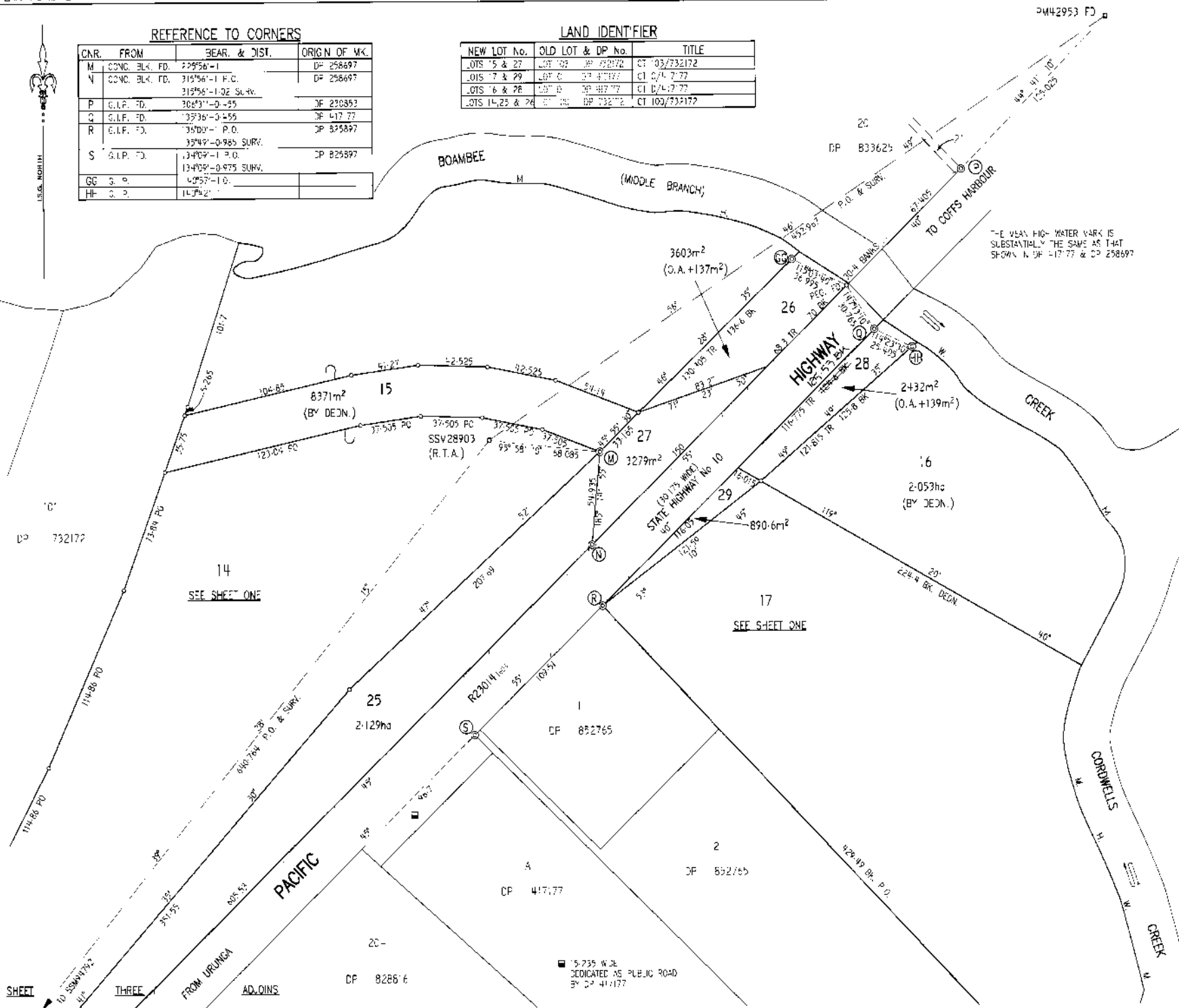
lengths in metres Resolution Ratio 1:500

REFERENCE TO CORNERS

CNR.	FROM	BEAR. & DIST.	ORIGIN OF MK.
M	CONC. BLK. FD.	229°56'-1"	DP 258697
N	CONC. BLK. FD.	315°56'-1" P.O.	DP 258697
		315°56'-1" 0.2 SL. 40.	
P	G.L.P. FD.	306°31'-0"-55"	DP 230353
Q	G.L.P. FD.	33°36'-3"-55"	DP 417.77
R	G.L.P. FD.	35°00'-1" P.O.	DP 825897
		35°42'-0" 985 SURV.	
S	G.L.P. FD.	34°00'-1" P.O.	DP 825897
		134°00'-0" 975 SURV.	
GC	G.P.	40°57'-1" 0.	
HF	G.P.	142°42'-1" 0.	

LAND IDENTIFIER

NEW LOT No.	OLD LOT & DP No.	TITLE
LOTS 5 & 27	LOT 32 DP 826172	CT 103/732172
LOTS 7 & 29	LOT 6 DP 417177	CT 6/417.77
LOTS 6 & 28	LOT 8 DP 417177	CT 6/417.77
LOTS 14, 25 & 26	LOT 10 DP 732172	CT 103/732172



DP 861057

Registered 8-8-1996

This is sheet 4 of my plan of 4 sheets
Completed on 21/5/96

(Signature) 21/5/96

This is sheet 4 of the plan of 4 sheets
covers by my Certificate No.

(Signature) Deputy Manager/Authorised Person

To use where space is insufficient for any part of
Plan Form 2

LGA COFFS HARBOUR CITY

LOCALITY: BOAMBEE

PARISH: BONVILLE

COUNTY: RALEIGH

Lengths in metres. Reduction Ratio 1:1500

Signatures and stamps

Council Clerk's Certificate

I hereby certify that:-

(a) the requirements of the Local Government Act, 1919 (other than the requirements for the application of rates), and

(b) the requirements of section 348 of the Metropolitan Water, Sewerage and Drainage Act, 1924, as amended (except District Water, Sewerage, and Drainage Act, 1925, as amended)

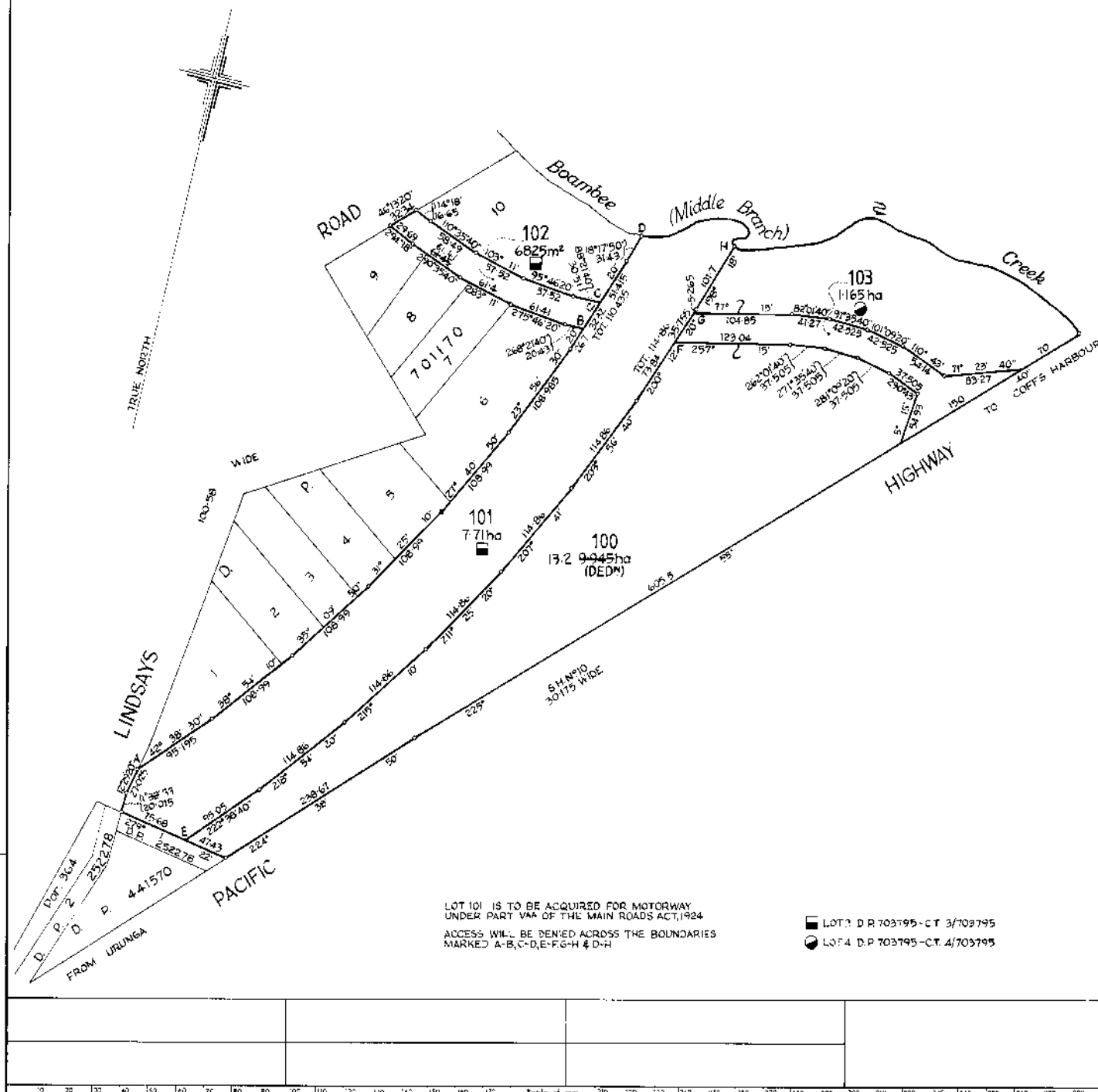
have been complied with by the applicant in relation to the proposed "new road", "subdivision" or "consolidation" (as the case may be).

Signature: _____ Date: _____

Council Clerk

*This plan or certificate to be deleted where the application is only for a consolidated lot or the opening of a new road or where the land to be subdivided is wholly outside the area of jurisdiction of the Metropolitan Water, Sewerage and Drainage Board and the Public District Water Board

*Delete if inoperative



LOT 101 IS TO BE ACQUIRED FOR MOTORWAY UNDER PART VIA OF THE MAIN ROADS ACT, 1924

ACCESS WILL BE DENIED ACROSS THE BOUNDARIES MARKED A-B, C-D, E-F, G-H & D-H

LOT 1 D.P. 703795-CT 3/703795

LOT 4 D.P. 703795-CT 4/703795

DP 732172

Reg. No. 3-4-1986

C.A.

Title System: TORRENS

Purpose: ACQUISITION (NOT CURRENT PLAN AT REG. SEC. 12.7 AA LGA)

Ref. Map: Y0035-3 COFFS HARBOUR SHD 102 & 104

Loc. Map: D.P. 703795 (D.P. 258697)

PLAN OF LAND TO BE ACQUIRED FOR THE PURPOSES OF THE MAIN ROADS ACT, 1924.

Representation: 1:3000

Lengths are in metres

Shire: COFFS HARBOUR

Locality: BOAMBEE

Parish: BONVILLE

County: RALEIGH

This is a plan of land to be acquired for the purposes of the Main Roads Act, 1924.

PETER SAMUEL
DEPARTMENT OF MAIN ROADS, NSW

PLANNED MOTORWAY, THE MAIN ROADS ACT, 1924

PLAN COMPILED FROM D.P. 703795 & D.P. 258697

Surveyed by Peter Samuel 17-1-86

Surveyed by Peter Samuel 17-1-86

Surveyed by Peter Samuel 17-1-86

LOT 101 IS TO BE ACQUIRED FOR MOTORWAY UNDER PART VIA OF THE MAIN ROADS ACT, 1924.

ACCESS WILL BE DENIED ACROSS THE BOUNDARIES MARKED A-B, C-D, E-F, G-H & D-H.

LOTS 102 & 103 ARE REQUIRED FOR ROAD AND AFTER ACQUISITION AND REMOVAL OF IMPROVEMENTS WILL ULTIMATELY BE DECLARED PUBLIC ROAD.

APPROVED: *P. Samuel*

FOR DEPUTY REGIONAL SURVEYOR AND PROPERTY OFFICER, DEPARTMENT OF MAIN ROADS.



SEARCH DATE

19/9/2024 12:14PM

FOLIO: 11/701170

First Title(s): VOL 4521 FOL 21

Prior Title(s): VOL 7097 FOL 32

Recorded	Number	Type of Instrument	C.T. Issue
11/4/1984	DP701170	DEPOSITED PLAN	FOLIO CREATED EDITION 1
25/7/1984	DP703795	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***



SEARCH DATE

19/9/2024 12:14PM

FOLIO: 100/732172

First Title(s): VOL 4521 FOL 21

Prior Title(s): 4/703795

Recorded	Number	Type of Instrument	C.T. Issue
4/4/1986	DP732172	DEPOSITED PLAN	LOT RECORDED FOLIO NOT CREATED
22/5/1987	W852501	TRANSFER	FOLIO CREATED EDITION 1
6/10/1987	X122131	CAVEAT	
12/10/1987	X135021	WITHDRAWAL OF CAVEAT	
12/10/1987	X135022	CAVEAT	
29/10/1987	X175100	WITHDRAWAL OF CAVEAT	
13/12/1988	Y49996	TRANSFER	EDITION 2
20/9/1989	Y568285	MORTGAGE	
20/9/1989	Y568286	REQUEST	EDITION 3
10/7/1990	Y783556	VARIATION OF MORTGAGE	EDITION 4
10/1/1991	Z416500	CAVEAT	
13/6/1991	Z707176	WITHDRAWAL OF CAVEAT	
19/12/1991	E144366	CAVEAT	
13/8/1992	E678358	DEPARTMENTAL DEALING	EDITION 5
10/11/1992	E888053	WITHDRAWAL OF CAVEAT	
10/11/1992	E888054	DISCHARGE OF MORTGAGE	
10/11/1992	E888055	TRANSFER	EDITION 6
8/8/1996	DP861057	DEPOSITED PLAN	
14/3/2001	7383962	REQUEST	FOLIO CANCELLED

*** END OF SEARCH ***

RP 13A

STAMP DUTY



W852501

TRANSFER **(INCLUDING EASEMENT/COVENANTS)**

REAL PROPERTY ACT, 1900
 (See Instructions for Completion on back of form)

CB	1 of 1	X
\$ 47	C	R111

DESCRIPTION OF LAND
 Note (a)

LAND being transferred		
Torrens Title Reference	If Part Only, Delete Whole and Give Details	Location
Folio Identifier 3/703795 Folio Identifier 4/703795	WHOLE Part being Lot 103 in Deposited Plan 732172	Parish of Bonville County of Raleigh

TENEMENTS PANEL
 Note (b)
 This panel also to be completed for covenants by transferor

Servient Tenement (Land burdened by easement)		Dominant Tenement (Land benefited by easement)	
Torrens Title Reference	Torrens Title Reference	Torrens Title Reference	Torrens Title Reference
	SEE ANNEXURE HERETO		

TRANSFEROR
 Note (c)

PERMANENT TRUSTEE COMPANY LIMITED	OFFICE USE ONLY N
-----------------------------------	----------------------

Note (d)

(the abovenamed TRANSFEROR) hereby acknowledges receipt of the consideration of \$ 220,000.00 and transfers an estate in fee simple in the land being transferred above described to the TRANSFEREE

TRANSFEREE
 Note (e)

THE COMMISSIONER FOR MAIN ROADS of 309 Castlereagh Street, Sydney	OFFICE USE ONLY OVER
---	-------------------------

TENANCY
 Note (e)

as joint tenants/tenants in common

PRIOR ENCUMBRANCES
 Note (f)

subject to the following PRIOR ENCUMBRANCES 1. 2. 3.

Note (g)

AND the TRANSFEROR:-

- (i) GRANTS RESERVES as set out in SCHEDULE ONE hereto
- (ii) COVENANTS with the TRANSFEREE as set out in SCHEDULE TWO hereto

Note (g)

AND the TRANSFEREE COVENANTS with the TRANSFEROR as set out in SCHEDULE THREE hereto

DATE OF TRANSFER

We hereby certify this dealing to be correct for the purposes of the Real Property Act, 1900.

PERMANENT TRUSTEE COMPANY LIMITED by its Attorneys who state they have no notice of the registration of the Power of Attorney dated 27.4 June 1979 Registered Number 829 Book 3175 and by its executors in this document.

EXECUTION
 Note (h)

Signed in my presence by the Transferor who is personally known to me.

[Signature] SIGNED in my presence by the TRANSFEREE PERMANENT TRUSTEE COMPANY LIMITED by its attorneys *[Signature]*
 Name of Witness (BLOCK LETTERS) Pamela Hall David Gault & Duncan Lovelock
 who are personally known to me.
 Address and occupation of Witness 25 O'Connell St Sydney Secretary

Note (h)

SIGNED BY:

Signed in my presence by the Transferor who is personally known to me.

T. Mac, Legal Officer,
 Department of Main Roads in the presence of: *[Signature]*
 SIGNED by the COMMISSIONER FOR MAIN ROADS by his delegate CHRISTOPHER MICHAEL GUY CLARK
 Address and occupation of Witness 309 CASTLEREAGH STREET SYDNEY - NSW

TO BE COMPLETED BY LODGING PARTY
 Notes (i) and (j)

LODGED BY Legal Branch Department of Main Roads 309 Castlereagh Street SYDNEY NSW 2000 DX 13 SYDNEY Pps: 10/110.1419 CC:IMR Tel 218 6910 Delivery Box Number 556X		LOCATION OF DOCUMENTS CT OTHER ☒ ☐ Herewith. In R.G.O. with 9275 10/2 Produced by	
Extra Fee Checked by <i>[Signature]</i>	REGISTERED 22 MAY 1987 Registrar General	OVER	

EXECUTED PURSUANT TO DELEGATION
 BOOK 8694 NO 180

RP 13A

SCHEDULE ONE HEREINBEFORE REFERRED TO

Notes (k) and (l)

The Transferor hereby grants/reserves

SCHEDULE TWO HEREINBEFORE REFERRED TO

Notes (m) and (l)
Also complete
tenements panel on
front of form

The Transferor hereby covenants with

AND THE TRANSFEROR COVENANTS WITH THE TRANSFEREE and with the Council
of the Shire of Coffs Harbour for the benefit of the dominant tenement
and so as to bind and burden the servient tenement in the manner set
forth in the Memorandum filed in the Land Titles Office as number
W362898 which provisions are deemed to be incorporated herein.

THIS IS THE ANNEXURE REFERRED TO IN THE TRANSFER MADE BETWEEN
PERMANENT TRUSTEE COMPANY LIMITED AND THE COMMISSIONER FOR MAIN ROADS

Servient Tenement
(Land burdened by easement)

Dominant Tenement
(Land benefited by easement)

Torrens Title Reference

Torrens Title Reference

Folio Identifier 2/701170
Whole

Folio Identifier 3/703795
Part being Lot 101 in Deposited
Plan 732172

~~Folio Identifier 3/701170~~
Whole

Folio Identifier 4/701170
Whole

~~Folio Identifier 6/701170~~
Whole

Folio Identifier 4/703795
Part being Lot 100 in
Deposited Plan 732172.

SIGNED in my presence by the said PERMANENT
TRUSTEE COMPANY LIMITED by its directors
David Gaunt & Duncan Lovelock
who are personally known to me.

PERMANENT TRUSTEE COMPANY LIMITED By the Attorneys who
state they have no notice of the execution of the above of
Attorney dated 21st June 1998 being the 1st of 478 Book
3375 who they execute this document.

Witness:

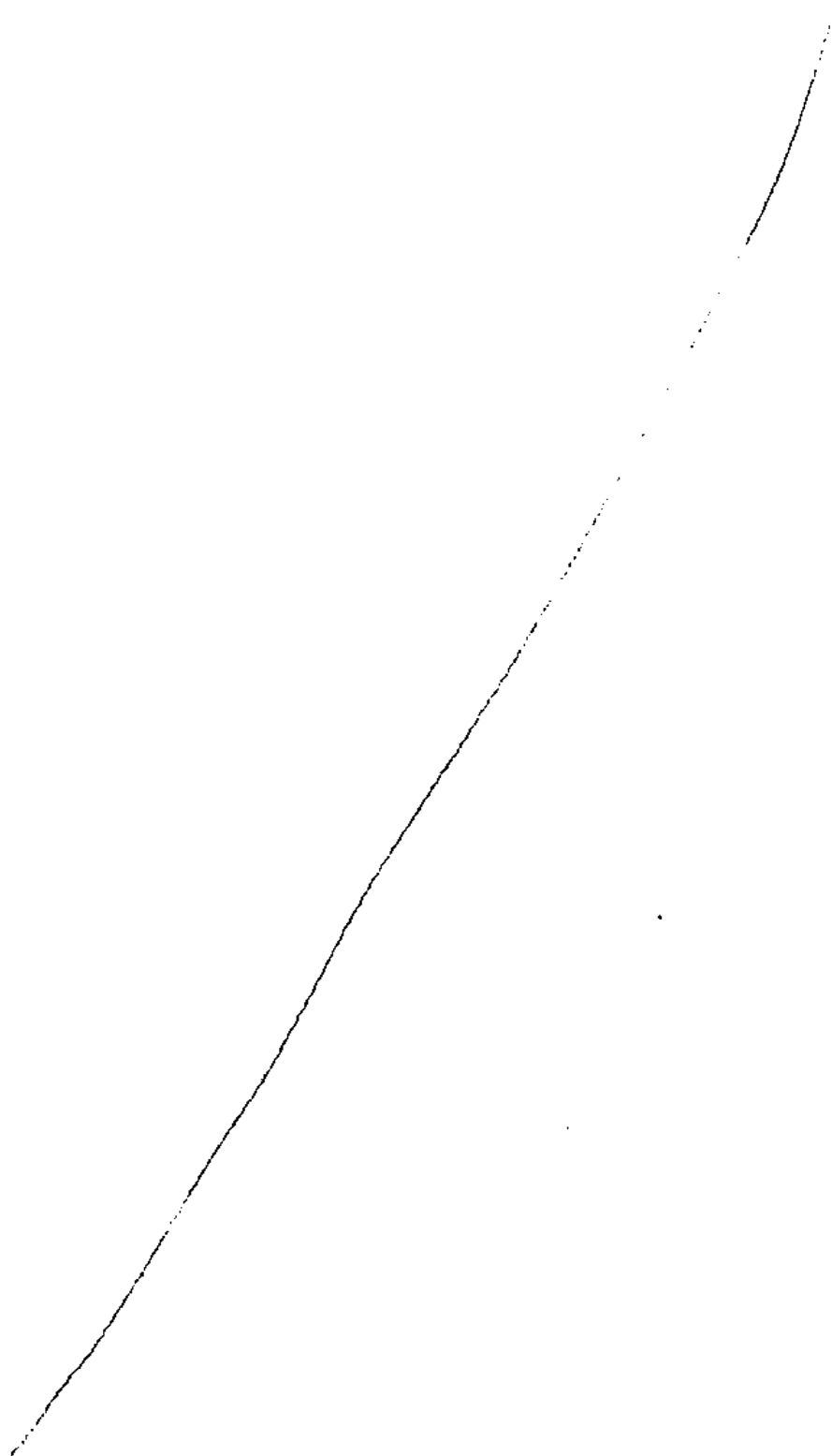
Pamela Hall
25 O'Connell St
Sydney

Secretary

GROUP 'A'

GROUP 'B'

(For continuation of SCHEDULE(S) see annexure(s) hereto)



SCHEDULE THREE HEREINBEFORE REFERRED TO

Notes (ii) and (i) The Transferee hereby covenants with

RP 20A



KP13

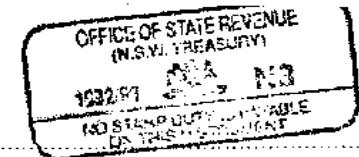


TRANSFER
Real Property Act, 1900



E
888055 0

Office:



(A) **LAND TRANSFERRED**

Show no more than 20 References to Title.
If appropriate, specify the share transferred.

IDENTIFIER 100/732172

(B) **LODGED BY**

L.T.O. Box

Name, Address or DX and Telephone

MURRAY & BACKHOUSE
SOLICITORS
51 GRAFTON ST
COFFS HARBOUR 2460
DX 7551 CH PH (066) 523 666
327P

REFERENCE (max. 15 characters):

L - Loc-TeX

(C) **TRANSFEROR**

LOC-TEX INTERNATIONAL PTY. LIMITED

(RECEIVER APPOINTED) (IN LIQUIDATION)

\$300,000.00

(D) acknowledges receipt of the consideration of

and as regards the land specified above transfers to the transferee an estate in fee simple

(E) subject to the following **ENCUMBRANCES**

1. 2. 3.

(F) **TRANSFEEE**



THE COUNCIL OF THE CITY OF COFFS HARBOUR

as joint tenants/tenants in common

(H) We certify this dealing correct for the purposes of the Real Property Act, 1900.

DATE OF EXECUTION *10th September, 1992*

Signed in my presence by the transferor who is personally known to me,
by its receiver James Morrison Millar pursuant to
appointment registered No 8 Book 3814

[Signature]
Signature of Witness

Robert E. Hunt
Name of Witness (BLOCK LETTERS)

698 Port Hacking Rd, Caringbah
Address of Witness

[Signature]
Signature of Transferor

JAMES M MILLAR- RECEIVER

Signed in my presence by the transferee who is personally known to me.

Signature of Witness

Name of Witness (BLOCK LETTERS)

Address of Witness

[Signature] **P.K. CRANE**
Signature of Transferee

Solicitor for the Transferee



NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE

19/9/2024 12:05PM

FOLIO: 14/861057

First Title(s): VOL 4521 FOL 21
Prior Title(s): 7/613875 101/617140
100/732172 100/856741
211/864611

Recorded	Number	Type of Instrument	C.T. Issue
9/8/1996	DP861057	DEPOSITED PLAN	LOT RECORDED FOLIO NOT CREATED
14/3/2001	7383962	REQUEST	FOLIO CREATED EDITION 1
13/3/2003	DP1049350	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

Licence: 10V/0559/96
Edition: 9901

REQUEST
New South Wales
Real Property Act 1900

Land Titles Office use only

7383962U



(A) STAMP DUTY

If applicable. Office of State Revenue use only

(B) LAND

Torrens Title
SEE ANNEXURE "B"

(C) REGISTERED
DEALING

Number
Torrens Title

(D) LODGED BY

LTO Box 556X	Name, Address or DX and Telephone Roads and Traffic Authority of NSW DX 13 SYDNEY Telephone 92186482 (Mr Milanoli) Reference (optional): FPP M4277	CODE RA
------------------------	---	-------------------

(E) **APPLICANT**

ROADS AND TRAFFIC AUTHORITY OF NSW

(F) **NATURE OF
REQUEST**

Application to Record
COMPULSORY ACQUISITION
Real Property Act, 1900 - Section 31A(3)

(G) TEXT OF
REQUEST

THE APPLICANT, as a consequence of the notice of compulsory acquisition published in **Government Gazette No 168 of 22 December, 2000, page 13851**, a true copy of which is Annexure "A" hereto, requests the Registrar General to:

1. make such recordings in the register as may be necessary to give effect to the compulsory acquisition as far as it relates to the land referred in Annexure "B";
2. create a new folio of the register for each Lot referred to in Annexure "B"; and
3. issue a certificate of title for Lot 14 DP 861057.
(Certificate of Titles not to issue for the other Lots listed in Annexure "B").

NOTE:

⊕ New Certificate of Titles should be free of any notations regarding road proposals.

(H) Certified correct for the purposes of the Real Property Act 1900. DATE: **1 February 2001**
Signed in my presence by the applicant who is personally known to me.

Signature of witness:

T. Milanoli
THOMAS MILANOLI

Signature of applicant:

D. Kloboschy **EB sm 8**
D. KLOBOSCHY

Name of witness:

Address of witness:

RTA SYDNEY

MANAGER STATUTORY PROCESSES
EXECUTED PURSUANT TO DELEGATION
BOOK 4238 NO 360

All handwriting must be in block capitals.
A set of notes on this form (97-11R-2)
is available from the Land Titles Office.

Checked by (LTO use):
101/617140 21/864611
22/17/613874
100836741

Nos Forwarded to —

FOR LOT 14 DP 861057. LOGGING PARTY ADVISED 08/01/03

7383962

ANNEXURE "A"

THIS IS THE ANNEXURE "A" REFERRED TO IN THE REQUEST MADE UNDER THE
REAL PROPERTY ACT, 1900 BY THE ROADS AND TRAFFIC AUTHORITY OF NEW SOUTH WALES

Extract from N S W Government Gazette No 168 of 22 December, 2000, page 13851

ROADS ACT 1993

LAND ACQUISITION (JUST TERMS COMPENSATION) ACT 1991

Notice of Compulsory Acquisition of Land at Boambee in
the Coffs Harbour City Council area

The Roads and Traffic Authority of New South Wales by its
delegate declares, with the approval of His Excellency the
Governor, that the land described in the schedule below is
acquired by compulsory process under the provisions of the
Land Acquisition (Just Terms Compensation) Act 1991 for
the purposes of the Roads Act 1993.

D J LORSCHY

Manager Statutory Processes
Roads and Traffic Authority of New South Wales

SCHEDULE

All those pieces or parcels of land situated in the Coffs
Harbour City Council area, Parish of Bonville, and County
of Raleigh, shown as:

Lots 14, 25 and 26 Deposited Plan 861057, being the whole
of the land in Certificate of Title 100/732172;

Lot 16 Deposited Plan 861055, being part of the land in
Certificate of Title 101/617140;

Lot 11 Deposited Plan 1016932, being part of the land in
Certificate of Title 211/864611;

Lot 3 Deposited Plan 861864, being part of the land in
Certificate of Title 7/613875; and

Lot 4 Deposited Plan 861864, being part of the land in
Certificate of Title 100/856741, excluding from the
acquisition of Lot 4 the right of way 10.06 wide created by
Dealing F595744 and the right of carriageway 10.06 wide
created by Deposited Plan 583824.

The land is said to be in the possession of Coffs Harbour
City Council.

(RTA Papers FPP M4277; RO 10/110.1583)



7383962

ANNEXURE "B"

THIS IS THE ANNEXURE "B" REFERRED TO IN THE REQUEST MADE UNDER THE
REAL PROPERTY ACT, 1900 BY THE ROADS AND TRAFFIC AUTHORITY OF NEW SOUTH WALES

<u>LAND</u>		<u>TORRENS TITLE REFERENCE</u>
LOT	DEPOSITED PLAN	
14	861057	Part of the land in Certificate of Title 100/732172
25	861057	Part of the land in Certificate of Title 100/732172
26	861057	Part of the land in Certificate of Title 100/732172
16	861055	Part of the land in Certificate of Title 101/617140
11	1016932	Part of the land in Certificate of Title 211/864611
3	861864	Part of the land in Certificate of Title 7/613875
4	861864	Part of the land in Certificate of Title 100/856741

Handwritten signature:
J. Milanoli



SEARCH DATE

19/9/2024 12:02PM

FOLIO: 4/1049350

First Title(s): VOL 4521 FOL 21

Prior Title(s): 14/861057

Recorded	Number	Type of Instrument	C.T. Issue
13/3/2003	DP1049350	DEPOSITED PLAN	FOLIO CREATED EDITION 1
6/8/2014	AI792544	RESTRICTION ON USE OF LAND BY/VESTED IN PRESCRIBED AUTHORITY	EDITION 2
2/12/2014	AJ81984	TRANSFER	
2/12/2014	AJ81985	MORTGAGE	EDITION 3
1/9/2018	AN678863	DEPARTMENTAL DEALING	EDITION 4 CORD ISSUED

*** END OF SEARCH ***

Form: 011
Licence: 05-11-638
Licensee: Softdocs
MBT Lawyers

TRANSFER
New South Wales
Real Property Act 1900



AJ81984S

PRIVACY NOTE: Section 31B of the Real Property Act 1900 (RP Act) authorises the Registrar-General to collect the information required by this form for the establishment and maintenance of the Real Property Act Register. Section 96B RP Act requires that the Register is made available to any person for search upon payment of a fee, if any.

STAMP DUTY

Office of State Revenue use only

Office of State Revenue (NSW)	
Client No: 2001373	3954
Duty: \$10.00	Trans No: 7875193-001
Asst details:	

(A) TORRENS TITLE

101/732172, 102/732172, 4/1049350 and 15/861057

(B) LODGED BY

Document Collection Box	Name, Address or DX, Telephone, and Customer Account Number if any	CODES
49R	LLPN: ANZ BANK 126043B C/- SAI GLOBAL Property DX 885 SYDNEY C2 9210 0700	T TW
	Reference (optional): 43041010-Rai	

(C) TRANSFEROR

ROADS AND MARITIME SERVICES ABN 76 236 371 088

(D) CONSIDERATION The transferor acknowledges receipt of the consideration of \$ 950,000.00 and as regards the land
(E) ESTATE specified above transfers to the transferee an estate in fee simple.

(F) SHARE TRANSFERRED

WHOLE

(G) Encumbrances (if applicable):

(H) TRANSFEE

JINDERPAL SINGH RAI and MOHINDER KAUR RAI

(I) TENANCY: Joint Tenants

DATE

(J) I certify I am an eligible witness and that the authorised officer of the transferor signed this dealing in my presence.
{See note* below}

Signature of witness:

Name of witness:

Address of witness:

Robert Scott
ROBERT SCOTT
101 MILLER STREET
NORTH SYDNEY
NSW 2060.

Certified correct for the purposes of the Real Property Act 1900 by the authorised officer named below.

EXECUTED BY MANAGER, PROPERTY SALES &
LEASING PURSUANT TO DELEGATION
BOOK 4623 No. 148

Signature of authorised officer:

Authorised officer's name: GLEN BLAIR

Authority of officer:

Signing on behalf of: ROADS AND MARITIME SERVICES
ABN 76 236 371 088

Certified correct for the purposes of the Real Property Act 1900 by the person whose signature appears below.

Signature:

Signatory's name: Stacey Maree Price

Capacity: Licensed Conveyancer for the transferee

(K) The transferee's conveyancer certifies that the eNOS data relevant to this dealing has been submitted and stored under eNOS ID No. 716020 Full Name: Stacey Maree Price Signature:

* s117 RP Act requires that you must have known the signatory for more than 12 months or have sighted identifying documentation.



FOLIO: 4/1049350

SEARCH DATE	TIME	EDITION NO	DATE
19/9/2024	11:59 AM	4	1/9/2018

LAND

LOT 4 IN DEPOSITED PLAN 1049350

AT BOAMBEE

LOCAL GOVERNMENT AREA COFFS HARBOUR

PARISH OF BONVILLE COUNTY OF RALEIGH

TITLE DIAGRAM DP1049350

FIRST SCHEDULE

JINDERPAL SINGH RAI

MOHINDER KAUR RAI

AS JOINT TENANTS

(T AJ81984)

SECOND SCHEDULE (3 NOTIFICATIONS)

- 1 LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE CROWN GRANT(S)
- 2 AI792544 RESTRICTION(S) ON THE USE OF LAND
- 3 AJ81985 MORTGAGE TO AUSTRALIA AND NEW ZEALAND BANKING GROUP LIMITED

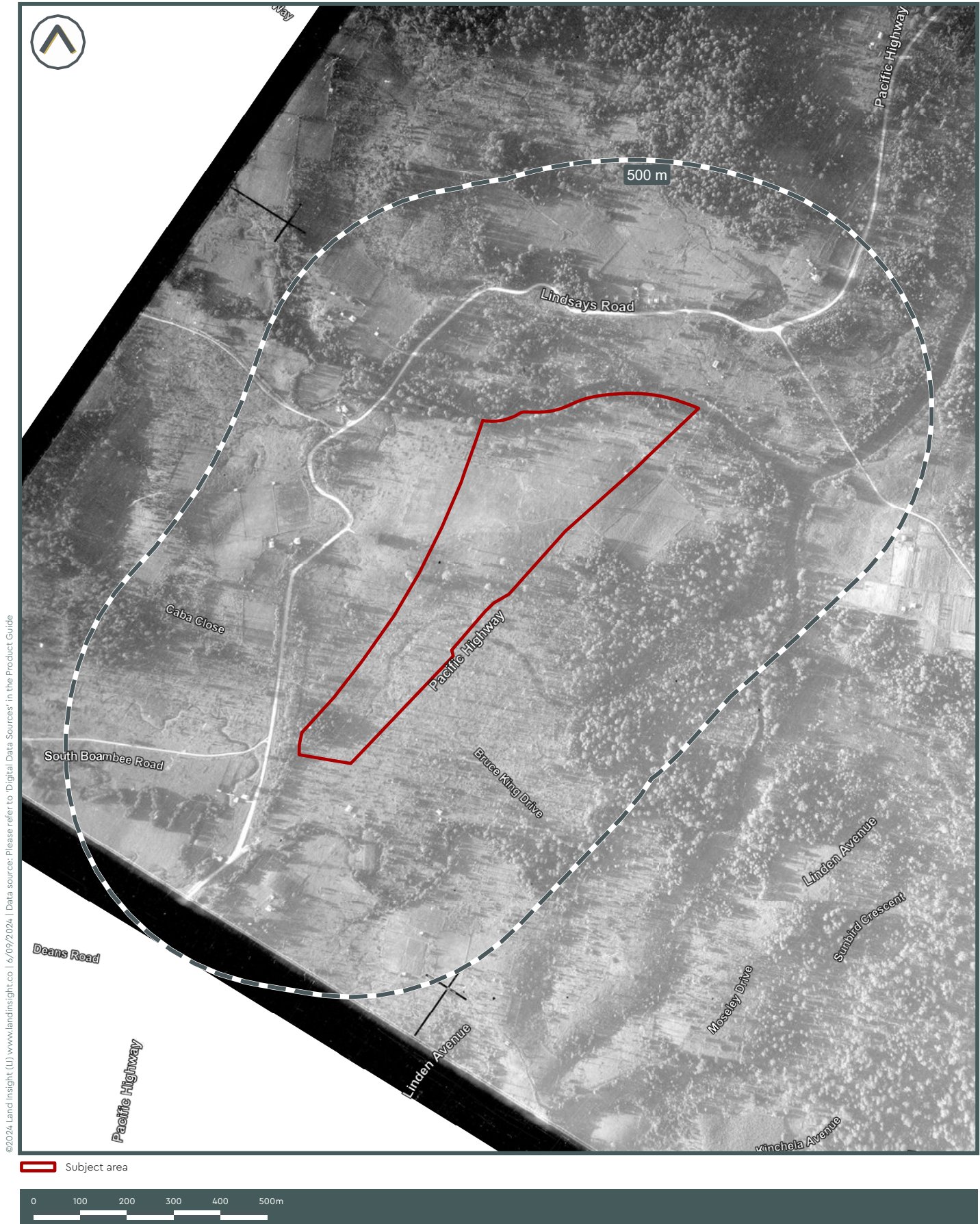
NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

APPENDIX B

Historic Aerial Photograph - 1942



Historic Aerial Photograph - 1954



Subject area



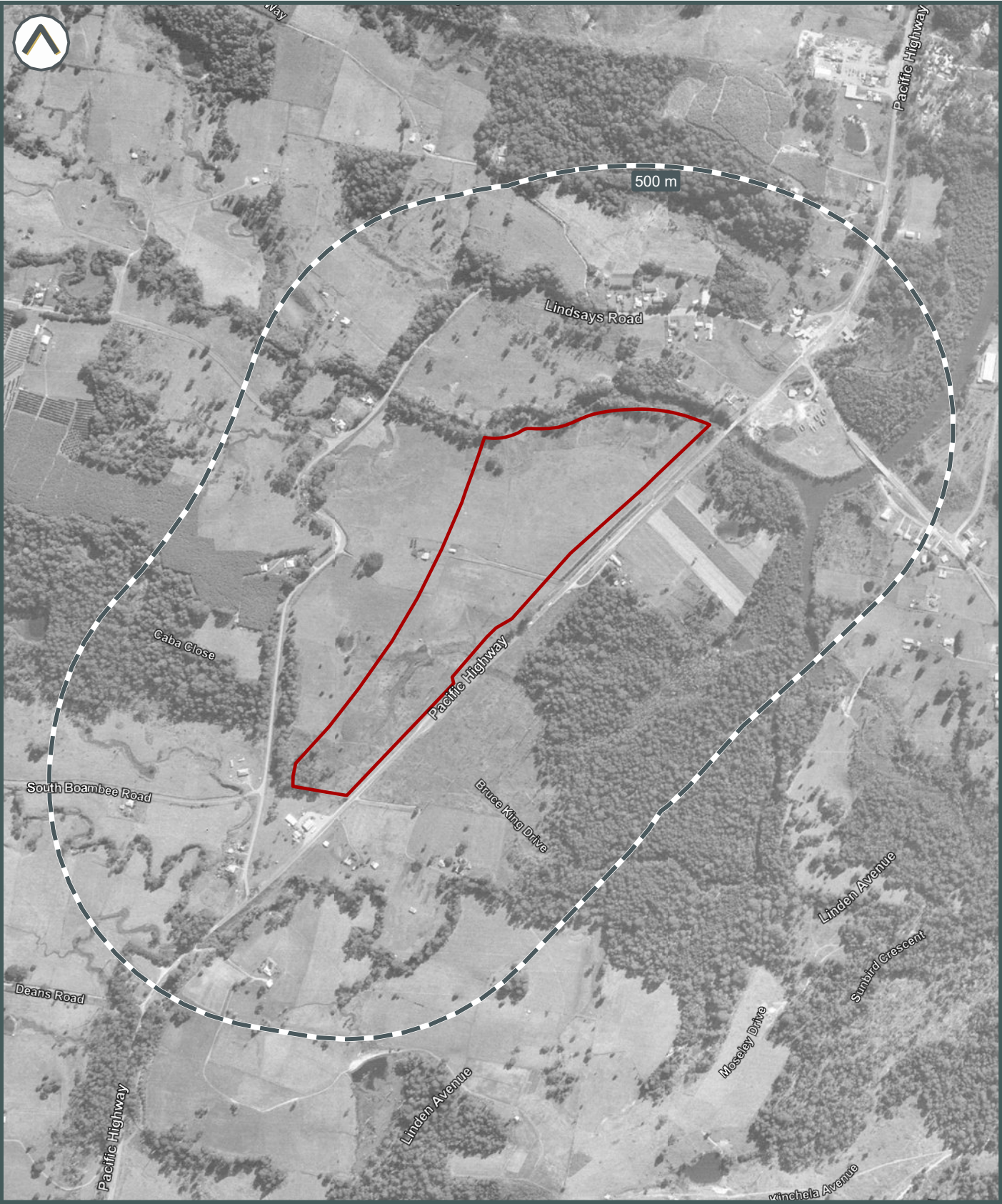
Historic Aerial Photograph - 1964



Subject area



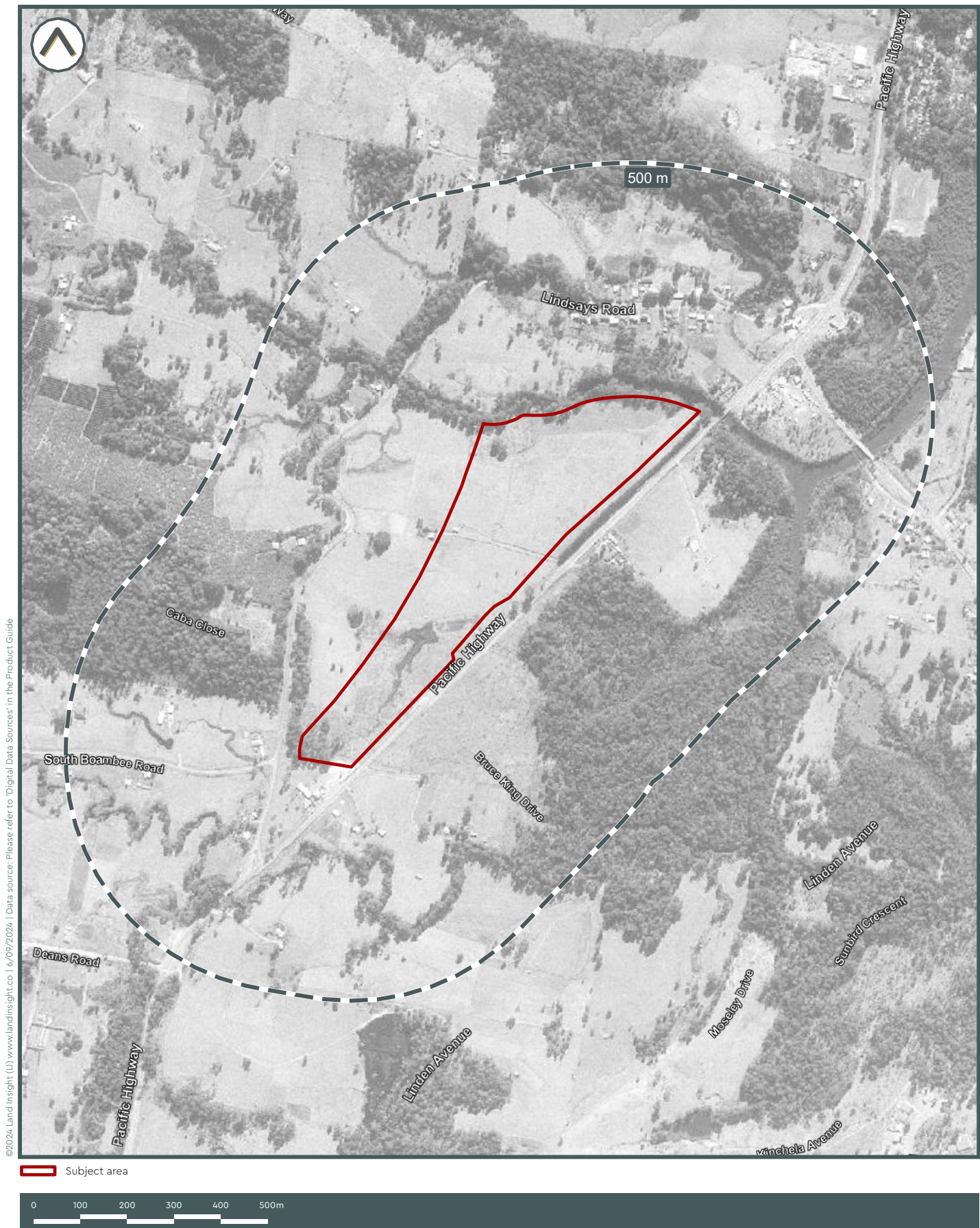
Historic Aerial Photograph - 1973



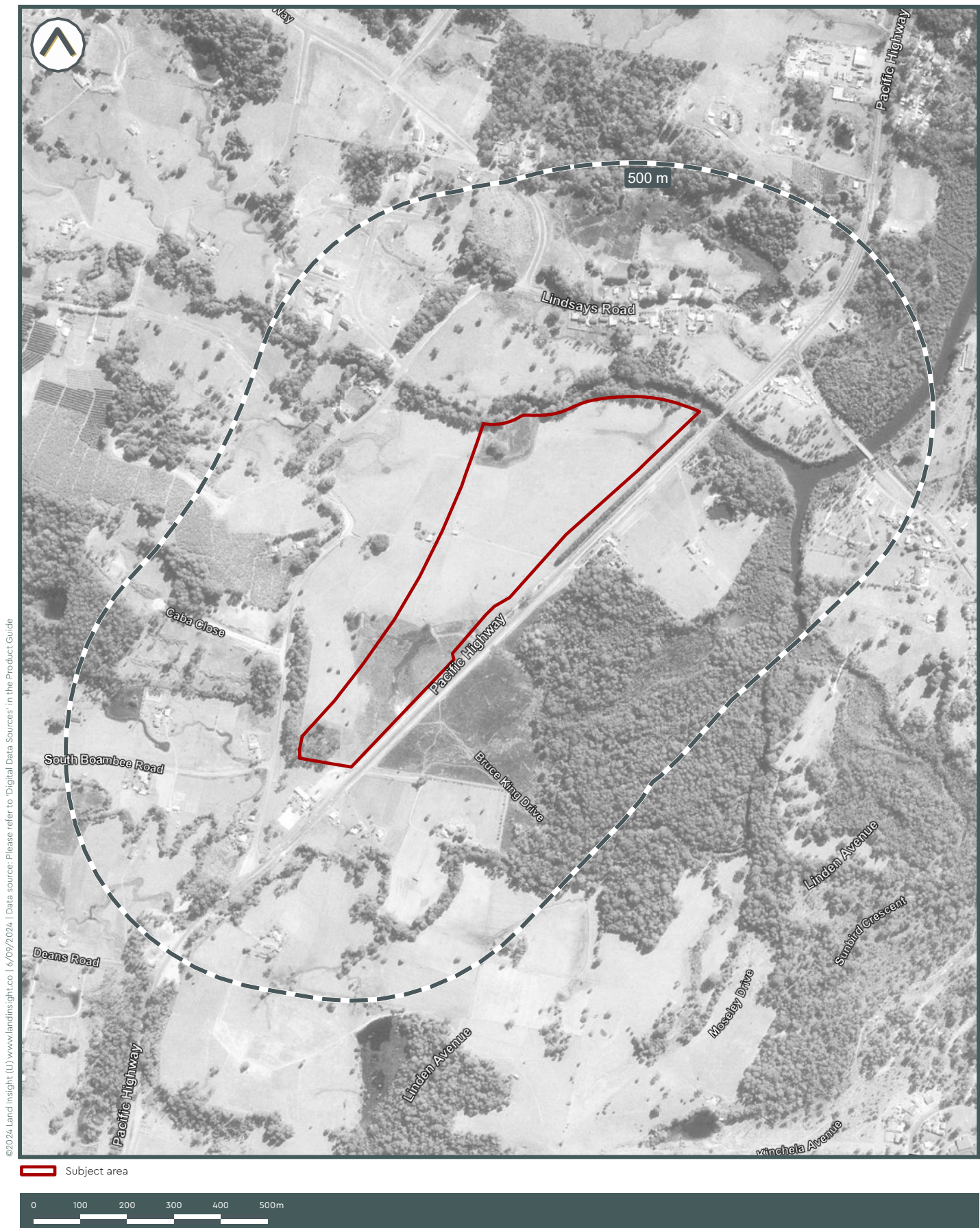
 Subject area



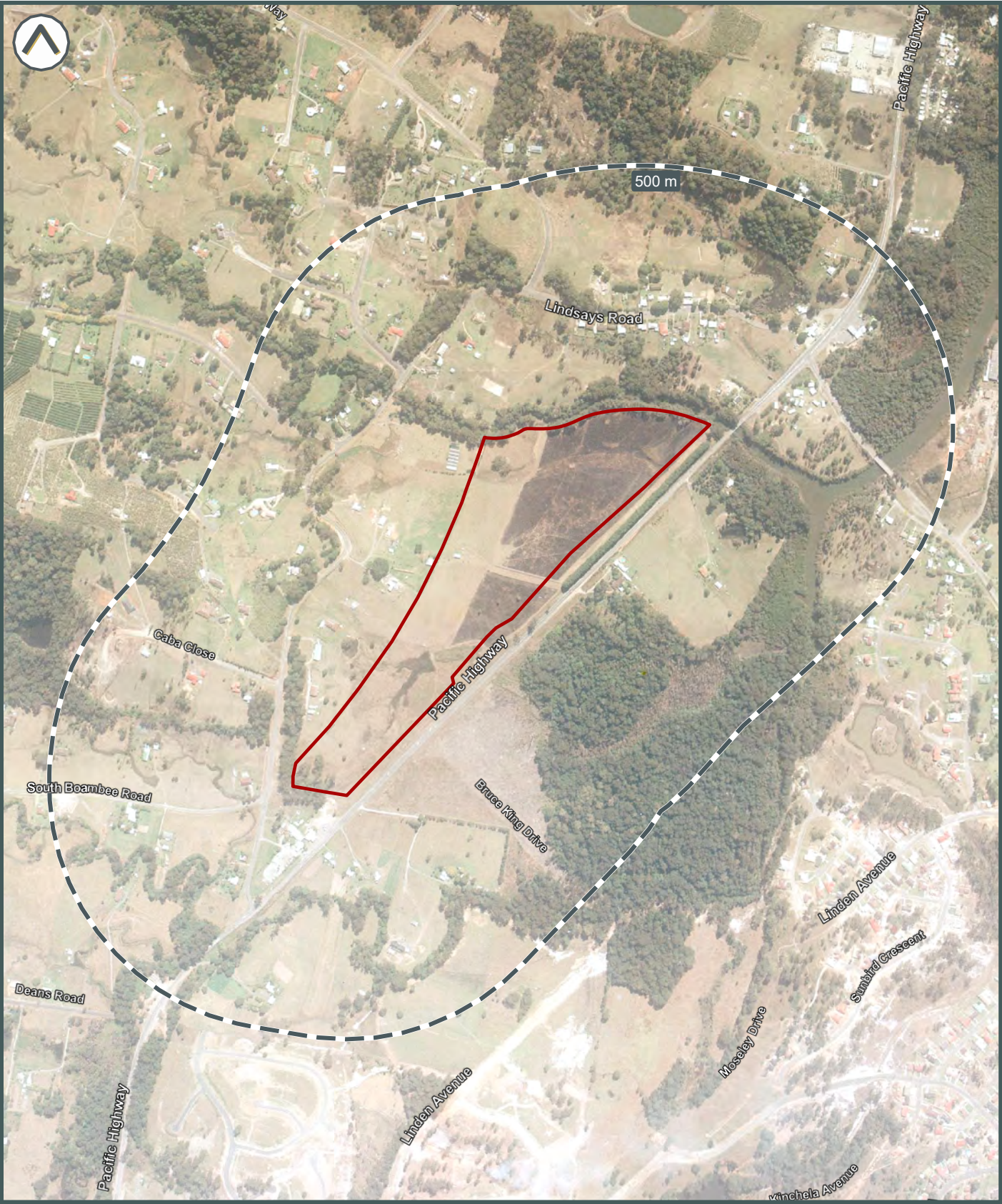
Historic Aerial Photograph - 1980



Historic Aerial Photograph - 1984



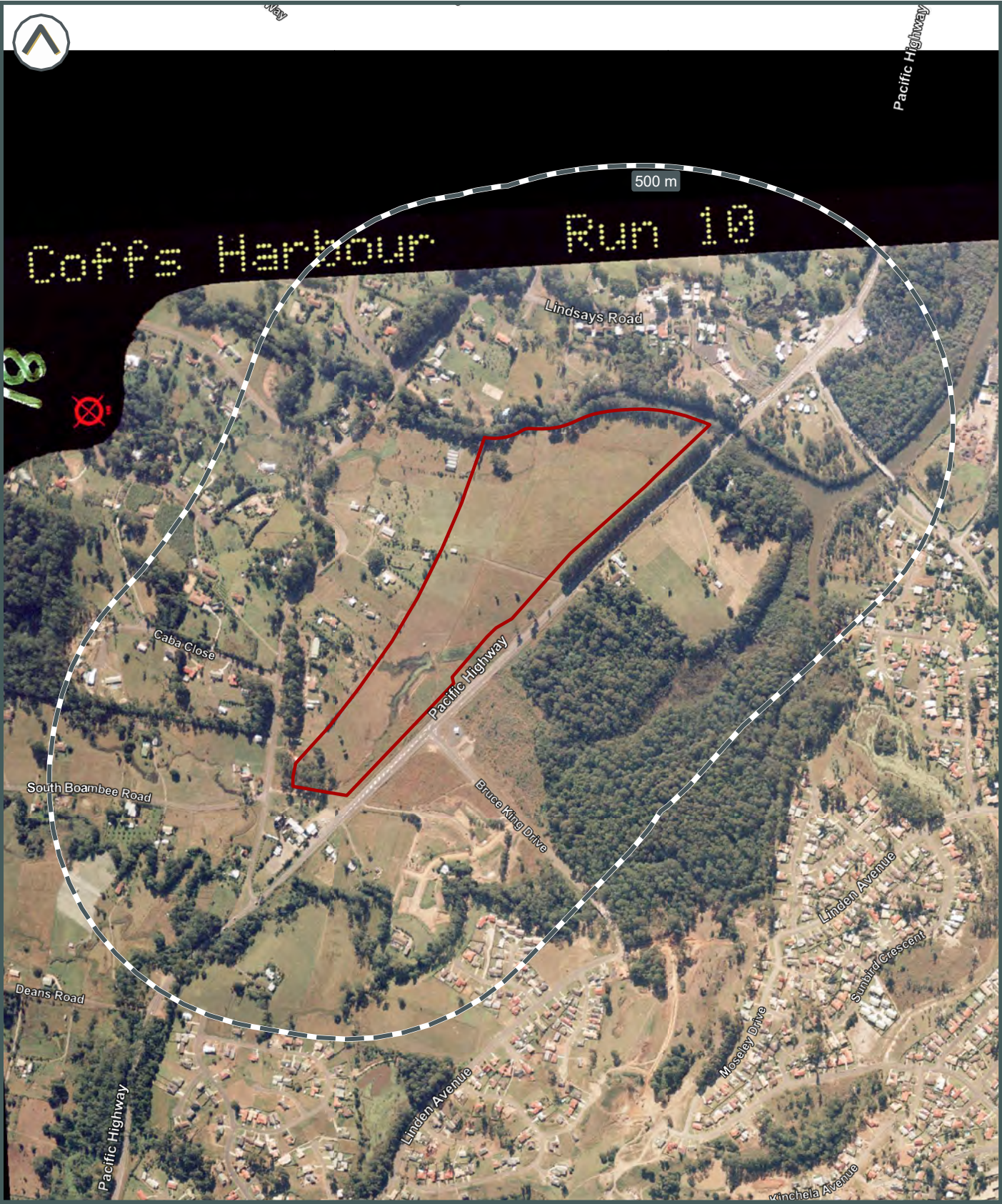
Historic Aerial Photograph - 1989



Subject area



Historic Aerial Photograph - 1994



Subject area



Historic Aerial Photograph – 2009



Subject area



Historic Aerial Photograph - 2013



Historic Aerial Photograph - 2018



Subject area



Historic Aerial Photograph - 2020



Subject area



Historic Aerial Photograph - 2024



Subject area



APPENDIX C

Earth Water Consulting Pty Limited
2-16 Lourdes Avenue
Urunga
NSW 2455



NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: **Strider Duerinckx**

Report **1136557-S**
Project name **LINDSAYS RD**
Project ID **223-049**
Received Date **Sep 06, 2024**

Client Sample ID			S-1	G01 S-2	G01 S-3	S-4
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S24-Se0015900	S24-Se0015901	S24-Se0015902	S24-Se0015903
Date Sampled			Sep 05, 2024	Sep 05, 2024	Sep 05, 2024	Sep 05, 2024
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	< 1	< 1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
a-HCH	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
b-HCH	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
d-HCH	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
g-HCH (Lindane)	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
Toxaphene	0.5	mg/kg	< 0.5	< 10	< 10	< 0.5
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.5	< 0.5	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	< 1	< 1	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	< 1	< 1	< 0.1
Dibutylchlorendate (surr.)	1	%	81	71	85	97
Tetrachloro-m-xylene (surr.)	1	%	88	97	98	84
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Bolstar	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Coumaphos	2	mg/kg	< 2	< 5	< 5	< 2
Demeton-S	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2

Client Sample ID			S-1	G01S-2	G01S-3	S-4
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S24-Se0015900	S24-Se0015901	S24-Se0015902	S24-Se0015903
Date Sampled			Sep 05, 2024	Sep 05, 2024	Sep 05, 2024	Sep 05, 2024
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Demeton-O	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Diazinon	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Dimethoate	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Disulfoton	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
EPN	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Ethion	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Ethoprop	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Fenthion	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Malathion	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Merphos	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Mevinphos	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Monocrotophos	2	mg/kg	< 2	< 5	< 5	< 2
Naled	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Omethoate	2	mg/kg	< 2	< 5	< 5	< 2
Phorate	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Ronnel	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Terbufos	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Tokuthion	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Trichloronate	0.2	mg/kg	< 0.2	< 0.5	< 0.5	< 0.2
Triphenylphosphate (surr.)	1	%	76	72	91	94
Heavy Metals						
Arsenic	2	mg/kg	4.9	40	15	4.6
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	8.6	21	14	7.4
Copper	5	mg/kg	10	19	33	8.7
Lead	5	mg/kg	18	56	31	14
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	5.0	10	< 5
Zinc	5	mg/kg	23	32	65	19
Sample Properties						
% Moisture	1	%	18	12	7.9	31

Client Sample ID			S-5	S-6	SH-1	SH-2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S24-Se0015904	S24-Se0015905	S24-Se0015906	S24-Se0015907
Date Sampled			Sep 05, 2024	Sep 05, 2024	Sep 05, 2024	Sep 05, 2024
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4,4'-DDD	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4,4'-DDE	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4,4'-DDT	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
a-HCH	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
b-HCH	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
d-HCH	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
g-HCH (Lindane)	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Toxaphene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibutylchloroendate (surr.)	1	%	102	118	88	81
Tetrachloro-m-xylene (surr.)	1	%	82	92	65	68
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Bolstar	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Coumaphos	2	mg/kg	< 2	< 2	< 2	< 2
Demeton-S	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Demeton-O	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Diazinon	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Dimethoate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Disulfoton	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
EPN	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethoprop	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fenthion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Malathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Merphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2

Client Sample ID			S-5	S-6	SH-1	SH-2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S24-Se0015904	S24-Se0015905	S24-Se0015906	S24-Se0015907
Date Sampled			Sep 05, 2024	Sep 05, 2024	Sep 05, 2024	Sep 05, 2024
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Methyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Mevinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Monocrotophos	2	mg/kg	< 2	< 2	< 2	< 2
Naled	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Omethoate	2	mg/kg	< 2	< 2	< 2	< 2
Phorate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ronnel	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Terbufos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Tokuthion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Trichloronate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Triphenylphosphate (surr.)	1	%	89	112	78	77
Heavy Metals						
Arsenic	2	mg/kg	3.0	4.1	21	620
Cadmium	0.4	mg/kg	< 0.4	< 0.4	0.8	< 0.4
Chromium	5	mg/kg	6.7	8.9	13	15
Copper	5	mg/kg	19	14	66	110
Lead	5	mg/kg	15	27	140	990
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.3
Nickel	5	mg/kg	< 5	< 5	< 5	5.0
Zinc	5	mg/kg	18	31	320	310
Sample Properties						
% Moisture	1	%	25	26	24	31

Client Sample ID			G01SH-3	G01SH-4
Sample Matrix			Soil	Soil
Eurofins Sample No.			S24-Se0015908	S24-Se0015909
Date Sampled			Sep 05, 2024	Sep 05, 2024
Test/Reference	LOR	Unit		
Organochlorine Pesticides				
Chlordanes - Total	0.1	mg/kg	< 1	< 1
4,4'-DDD	0.05	mg/kg	< 0.5	< 0.5
4,4'-DDE	0.05	mg/kg	< 0.5	< 0.5
4,4'-DDT	0.05	mg/kg	< 0.5	< 0.5
a-HCH	0.05	mg/kg	< 0.5	< 0.5
Aldrin	0.05	mg/kg	< 0.5	< 0.5
b-HCH	0.05	mg/kg	< 0.5	< 0.5
d-HCH	0.05	mg/kg	< 0.5	< 0.5
Dieldrin	0.05	mg/kg	< 0.5	< 0.5
Endosulfan I	0.05	mg/kg	< 0.5	< 0.5
Endosulfan II	0.05	mg/kg	< 0.5	< 0.5
Endosulfan sulphate	0.05	mg/kg	< 0.5	< 0.5
Endrin	0.05	mg/kg	< 0.5	< 0.5
Endrin aldehyde	0.05	mg/kg	< 0.5	< 0.5
Endrin ketone	0.05	mg/kg	< 0.5	< 0.5
g-HCH (Lindane)	0.05	mg/kg	< 0.5	< 0.5

Client Sample ID			G01SH-3	G01SH-4
Sample Matrix			Soil	Soil
Eurofins Sample No.			S24-Se0015908	S24-Se0015909
Date Sampled			Sep 05, 2024	Sep 05, 2024
Test/Reference	LOR	Unit		
Organochlorine Pesticides				
Heptachlor	0.05	mg/kg	< 0.5	< 0.5
Heptachlor epoxide	0.05	mg/kg	< 0.5	< 0.5
Hexachlorobenzene	0.05	mg/kg	< 0.5	< 0.5
Methoxychlor	0.05	mg/kg	< 0.5	< 0.5
Toxaphene	0.5	mg/kg	< 10	< 10
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.5	< 0.5
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.5	< 0.5
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 1	< 1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 1	< 1
Dibutylchlorendate (surr.)	1	%	59	126
Tetrachloro-m-xylene (surr.)	1	%	83	95
Organophosphorus Pesticides				
Azinphos-methyl	0.2	mg/kg	< 0.5	< 0.5
Bolstar	0.2	mg/kg	< 0.5	< 0.5
Chlorfenvinphos	0.2	mg/kg	< 0.5	< 0.5
Chlorpyrifos	0.2	mg/kg	< 0.5	< 0.5
Chlorpyrifos-methyl	0.2	mg/kg	< 0.5	< 0.5
Coumaphos	2	mg/kg	< 5	< 5
Demeton-S	0.2	mg/kg	< 0.5	< 0.5
Demeton-O	0.2	mg/kg	< 0.5	< 0.5
Diazinon	0.2	mg/kg	< 0.5	< 0.5
Dichlorvos	0.2	mg/kg	< 0.5	< 0.5
Dimethoate	0.2	mg/kg	< 0.5	< 0.5
Disulfoton	0.2	mg/kg	< 0.5	< 0.5
EPN	0.2	mg/kg	< 0.5	< 0.5
Ethion	0.2	mg/kg	< 0.5	< 0.5
Ethoprop	0.2	mg/kg	< 0.5	< 0.5
Ethyl parathion	0.2	mg/kg	< 0.5	< 0.5
Fenitrothion	0.2	mg/kg	< 0.5	< 0.5
Fensulfothion	0.2	mg/kg	< 0.5	< 0.5
Fenthion	0.2	mg/kg	< 0.5	< 0.5
Malathion	0.2	mg/kg	< 0.5	< 0.5
Merphos	0.2	mg/kg	< 0.5	< 0.5
Methyl parathion	0.2	mg/kg	< 0.5	< 0.5
Mevinphos	0.2	mg/kg	< 0.5	< 0.5
Monocrotophos	2	mg/kg	< 5	< 5
Naled	0.2	mg/kg	< 0.5	< 0.5
Omethoate	2	mg/kg	< 5	< 5
Phorate	0.2	mg/kg	< 0.5	< 0.5
Pirimiphos-methyl	0.2	mg/kg	< 0.5	< 0.5
Pyrazophos	0.2	mg/kg	< 0.5	< 0.5
Ronnel	0.2	mg/kg	< 0.5	< 0.5
Terbufos	0.2	mg/kg	< 0.5	< 0.5
Tetrachlorvinphos	0.2	mg/kg	< 0.5	< 0.5
Tokuthion	0.2	mg/kg	< 0.5	< 0.5
Trichloronate	0.2	mg/kg	< 0.5	< 0.5
Triphenylphosphate (surr.)	1	%	74	122

Client Sample ID			G01 SH-3	G01 SH-4
Sample Matrix			Soil	Soil
Eurofins Sample No.			S24-Se0015908	S24-Se0015909
Date Sampled			Sep 05, 2024	Sep 05, 2024
Test/Reference	LOR	Unit		
Heavy Metals				
Arsenic	2	mg/kg	4.3	4.5
Cadmium	0.4	mg/kg	0.7	< 0.4
Chromium	5	mg/kg	12	9.7
Copper	5	mg/kg	41	22
Lead	5	mg/kg	130	39
Mercury	0.1	mg/kg	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5
Zinc	5	mg/kg	1800	140
Sample Properties				
% Moisture	1	%	29	26
Total Recoverable Hydrocarbons				
TRH C6-C9	20	mg/kg	< 20	-
TRH C10-C14	20	mg/kg	< 20	-
TRH C15-C28	50	mg/kg	< 50	-
TRH C29-C36	50	mg/kg	< 50	-
TRH C10-C36 (Total)	50	mg/kg	< 50	-
TRH C6-C10	20	mg/kg	< 20	-
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20	-
TRH >C10-C16	50	mg/kg	< 50	-
TRH >C10-C16 less Naphthalene (F2) ^{*N01}	50	mg/kg	< 50	-
TRH >C16-C34	100	mg/kg	< 100	-
TRH >C34-C40	100	mg/kg	< 100	-
TRH >C10-C40 (total)*	100	mg/kg	< 100	-
BTEX				
Benzene	0.1	mg/kg	< 0.1	-
Toluene	0.1	mg/kg	< 0.1	-
Ethylbenzene	0.1	mg/kg	< 0.1	-
m&p-Xylenes	0.2	mg/kg	< 0.2	-
o-Xylene	0.1	mg/kg	< 0.1	-
Xylenes - Total*	0.3	mg/kg	< 0.3	-
4-Bromofluorobenzene (surr.)	1	%	114	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
Naphthalene ^{N02}	0.5	mg/kg	< 0.5	-
Polycyclic Aromatic Hydrocarbons				
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	-
Acenaphthene	0.5	mg/kg	< 0.5	-
Acenaphthylene	0.5	mg/kg	< 0.5	-
Anthracene	0.5	mg/kg	< 0.5	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	-
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	< 0.5	-
Benzo(g,h,i)perylene	0.5	mg/kg	< 0.5	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	-
Chrysene	0.5	mg/kg	< 0.5	-
Dibenz(a,h)anthracene	0.5	mg/kg	< 0.5	-
Fluoranthene	0.5	mg/kg	< 0.5	-
Fluorene	0.5	mg/kg	< 0.5	-

Client Sample ID			G01 SH-3	G01 SH-4
Sample Matrix			Soil	Soil
Eurofins Sample No.			S24-Se0015908	S24-Se0015909
Date Sampled			Sep 05, 2024	Sep 05, 2024
Test/Reference	LOR	Unit		
Polycyclic Aromatic Hydrocarbons				
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	-
Naphthalene	0.5	mg/kg	< 0.5	-
Phenanthrene	0.5	mg/kg	< 0.5	-
Pyrene	0.5	mg/kg	< 0.5	-
Total PAH*	0.5	mg/kg	< 0.5	-
2-Fluorobiphenyl (surr.)	1	%	82	-
p-Terphenyl-d14 (surr.)	1	%	90	-
Polychlorinated Biphenyls				
Aroclor-1016	0.1	mg/kg	< 1	-
Aroclor-1221	0.1	mg/kg	< 1	-
Aroclor-1232	0.1	mg/kg	< 1	-
Aroclor-1242	0.1	mg/kg	< 1	-
Aroclor-1248	0.1	mg/kg	< 1	-
Aroclor-1254	0.1	mg/kg	< 1	-
Aroclor-1260	0.1	mg/kg	< 1	-
Total PCB*	0.1	mg/kg	< 1	-
Dibutylchloredate (surr.)	1	%	59	-
Tetrachloro-m-xylene (surr.)	1	%	83	-

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Organochlorine Pesticides - Method: LTM-ORG-2220 OCP & PCB in Soil and Water	Sydney	Sep 12, 2024	14 Days
Organophosphorus Pesticides - Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS	Sydney	Sep 12, 2024	14 Days
Metals M8 - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Sep 12, 2024	28 Days
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 07, 2024	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 07, 2024	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 07, 2024	14 Days
BTEX - Method: LTM-ORG-2010 BTEX and Volatile TRH	Sydney	Sep 07, 2024	14 Days
Polycyclic Aromatic Hydrocarbons - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Sydney	Sep 07, 2024	14 Days
Polychlorinated Biphenyls - Method: LTM-ORG-2220 OCP & PCB in Soil and Water	Sydney	Sep 07, 2024	28 Days
% Moisture - Method: LTM-GEN-7080 Moisture	Sydney	Sep 06, 2024	14 Days



web: www.eurofins.com.au
email: EnviroSales@eurofins.com

ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079

ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370

ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: Earth Water Consulting Pty Limited
Address: 2-16 Lourdes Avenue
Urunga
NSW 2455

Project Name: LINDSAYS RD
Project ID: 223-049

Order No.:
Report #: 1136557
Phone: 0402 6083 96
Fax:

Received: Sep 6, 2024 9:00 AM
Due: Sep 13, 2024
Priority: 5 Day
Contact Name: Strider Duerinckx

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Metals M8	Suite B14: OCP/OPP	Moisture Set	Suite B10B: TRH/BTEXN/PAH/OCP/OPP/PCB/M8
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X
External Laboratory									
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID				
1	S-1	Sep 05, 2024		Soil	S24-Se0015900	X	X	X	
2	S-2	Sep 05, 2024		Soil	S24-Se0015901	X	X	X	
3	S-3	Sep 05, 2024		Soil	S24-Se0015902	X	X	X	
4	S-4	Sep 05, 2024		Soil	S24-Se0015903	X	X	X	
5	S-5	Sep 05, 2024		Soil	S24-Se0015904	X	X	X	
6	S-6	Sep 05, 2024		Soil	S24-Se0015905	X	X	X	
7	SH-1	Sep 05, 2024		Soil	S24-Se0015906	X	X	X	
8	SH-2	Sep 05, 2024		Soil	S24-Se0015907	X	X	X	
9	SH-3	Sep 05, 2024		Soil	S24-Se0015908			X	X
10	SH-4	Sep 05, 2024		Soil	S24-Se0015909	X	X	X	
Test Counts						9	9	10	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	ppm: parts per million
µg/L: micrograms per litre	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	Colour: Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4.4'-DDD	mg/kg	< 0.05			0.05	Pass	
4.4'-DDE	mg/kg	< 0.05			0.05	Pass	
4.4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-HCH	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-HCH	mg/kg	< 0.05			0.05	Pass	
d-HCH	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-HCH (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.05			0.05	Pass	
Toxaphene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organophosphorus Pesticides							
Azinphos-methyl	mg/kg	< 0.2			0.2	Pass	
Bolstar	mg/kg	< 0.2			0.2	Pass	
Chlorfenvinphos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos-methyl	mg/kg	< 0.2			0.2	Pass	
Coumaphos	mg/kg	< 2			2	Pass	
Demeton-S	mg/kg	< 0.2			0.2	Pass	
Demeton-O	mg/kg	< 0.2			0.2	Pass	
Diazinon	mg/kg	< 0.2			0.2	Pass	
Dichlorvos	mg/kg	< 0.2			0.2	Pass	
Dimethoate	mg/kg	< 0.2			0.2	Pass	
Disulfoton	mg/kg	< 0.2			0.2	Pass	
EPN	mg/kg	< 0.2			0.2	Pass	
Ethion	mg/kg	< 0.2			0.2	Pass	
Ethoprop	mg/kg	< 0.2			0.2	Pass	
Ethyl parathion	mg/kg	< 0.2			0.2	Pass	
Fenitrothion	mg/kg	< 0.2			0.2	Pass	
Fensulfothion	mg/kg	< 0.2			0.2	Pass	
Fenthion	mg/kg	< 0.2			0.2	Pass	
Malathion	mg/kg	< 0.2			0.2	Pass	
Merphos	mg/kg	< 0.2			0.2	Pass	
Methyl parathion	mg/kg	< 0.2			0.2	Pass	
Mevinphos	mg/kg	< 0.2			0.2	Pass	
Monocrotophos	mg/kg	< 2			2	Pass	
Naled	mg/kg	< 0.2			0.2	Pass	
Omethoate	mg/kg	< 2			2	Pass	
Phorate	mg/kg	< 0.2			0.2	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Pirimiphos-methyl	mg/kg	< 0.2			0.2	Pass	
Pyrazophos	mg/kg	< 0.2			0.2	Pass	
Ronnel	mg/kg	< 0.2			0.2	Pass	
Terbufos	mg/kg	< 0.2			0.2	Pass	
Tetrachlorvinphos	mg/kg	< 0.2			0.2	Pass	
Tokuthion	mg/kg	< 0.2			0.2	Pass	
Trichloronate	mg/kg	< 0.2			0.2	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g,h,i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a,h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/kg	< 0.1			0.1	Pass	
Aroclor-1221	mg/kg	< 0.1			0.1	Pass	
Aroclor-1232	mg/kg	< 0.1			0.1	Pass	
Aroclor-1242	mg/kg	< 0.1			0.1	Pass	
Aroclor-1248	mg/kg	< 0.1			0.1	Pass	
Aroclor-1254	mg/kg	< 0.1			0.1	Pass	
Aroclor-1260	mg/kg	< 0.1			0.1	Pass	
Total PCB*	mg/kg	< 0.1			0.1	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Zinc	mg/kg	< 5			5	Pass	
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g,h,i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a,h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/kg	< 0.1			0.1	Pass	
Aroclor-1221	mg/kg	< 0.1			0.1	Pass	
Aroclor-1232	mg/kg	< 0.1			0.1	Pass	
Aroclor-1242	mg/kg	< 0.1			0.1	Pass	
Aroclor-1248	mg/kg	< 0.1			0.1	Pass	
Aroclor-1254	mg/kg	< 0.1			0.1	Pass	
Aroclor-1260	mg/kg	< 0.1			0.1	Pass	
Total PCB*	mg/kg	< 0.1			0.1	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	92			70-130	Pass	
4,4'-DDD	%	97			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
4,4'-DDE	%	100			70-130	Pass	
4,4'-DDT	%	87			70-130	Pass	
a-HCH	%	99			70-130	Pass	
Aldrin	%	86			70-130	Pass	
b-HCH	%	99			70-130	Pass	
d-HCH	%	89			70-130	Pass	
Dieldrin	%	95			70-130	Pass	
Endosulfan I	%	94			70-130	Pass	
Endosulfan II	%	85			70-130	Pass	
Endosulfan sulphate	%	87			70-130	Pass	
Endrin	%	100			70-130	Pass	
Endrin aldehyde	%	89			70-130	Pass	
Endrin ketone	%	91			70-130	Pass	
g-HCH (Lindane)	%	96			70-130	Pass	
Heptachlor	%	95			70-130	Pass	
Heptachlor epoxide	%	91			70-130	Pass	
Hexachlorobenzene	%	99			70-130	Pass	
Methoxychlor	%	98			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides							
Diazinon	%	117			70-130	Pass	
Dimethoate	%	125			70-130	Pass	
Ethion	%	103			70-130	Pass	
Fenitrothion	%	119			70-130	Pass	
Methyl parathion	%	127			70-130	Pass	
Mevinphos	%	97			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	94			70-130	Pass	
Acenaphthylene	%	79			70-130	Pass	
Anthracene	%	89			70-130	Pass	
Benz(a)anthracene	%	82			70-130	Pass	
Benzo(a)pyrene	%	84			70-130	Pass	
Benzo(b&j)fluoranthene	%	81			70-130	Pass	
Benzo(g,h,i)perylene	%	88			70-130	Pass	
Benzo(k)fluoranthene	%	89			70-130	Pass	
Chrysene	%	88			70-130	Pass	
Dibenz(a,h)anthracene	%	89			70-130	Pass	
Fluoranthene	%	88			70-130	Pass	
Fluorene	%	100			70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	89			70-130	Pass	
Naphthalene	%	85			70-130	Pass	
Phenanthrene	%	96			70-130	Pass	
Pyrene	%	86			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1016	%	95			70-130	Pass	
Aroclor-1260	%	112			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	91			80-120	Pass	
Cadmium	%	99			80-120	Pass	
Chromium	%	101			80-120	Pass	
Copper	%	103			80-120	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Lead	%	82			80-120	Pass	
Mercury	%	100			80-120	Pass	
Nickel	%	102			80-120	Pass	
Zinc	%	99			80-120	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	104			80-120	Pass	
Cadmium	%	104			80-120	Pass	
Chromium	%	103			80-120	Pass	
Copper	%	105			80-120	Pass	
Lead	%	106			80-120	Pass	
Mercury	%	107			80-120	Pass	
Nickel	%	106			80-120	Pass	
Zinc	%	102			80-120	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	98			70-130	Pass	
TRH C10-C14	%	82			70-130	Pass	
TRH C6-C10	%	97			70-130	Pass	
TRH >C10-C16	%	82			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	98			70-130	Pass	
Toluene	%	100			70-130	Pass	
Ethylbenzene	%	104			70-130	Pass	
m&p-Xylenes	%	109			70-130	Pass	
o-Xylene	%	102			70-130	Pass	
Xylenes - Total*	%	107			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	107			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	82			70-130	Pass	
Acenaphthylene	%	71			70-130	Pass	
Benz(a)anthracene	%	74			70-130	Pass	
Benzo(a)pyrene	%	76			70-130	Pass	
Benzo(b&j)fluoranthene	%	74			70-130	Pass	
Benzo(g,h,i)perylene	%	88			70-130	Pass	
Benzo(k)fluoranthene	%	77			70-130	Pass	
Chrysene	%	78			70-130	Pass	
Dibenz(a,h)anthracene	%	74			70-130	Pass	
Fluorene	%	78			70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	75			70-130	Pass	
Naphthalene	%	79			70-130	Pass	
Phenanthrene	%	71			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1016	%	71			70-130	Pass	
Aroclor-1260	%	91			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S24-Se0014880	NCP	%	100			75-125	Pass	
Cadmium	S24-Se0014880	NCP	%	101			75-125	Pass	
Chromium	S24-Se0014880	NCP	%	101			75-125	Pass	
Copper	S24-Se0014880	NCP	%	102			75-125	Pass	
Lead	S24-Se0014880	NCP	%	104			75-125	Pass	
Mercury	S24-Se0014880	NCP	%	103			75-125	Pass	
Nickel	S24-Se0014880	NCP	%	104			75-125	Pass	
Zinc	S24-Se0014880	NCP	%	89			75-125	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
Chlordanes - Total	S24-Se0015901	CP	%	126			70-130	Pass	
4,4'-DDD	S24-Se0015901	CP	%	75			70-130	Pass	
4,4'-DDE	S24-Se0015901	CP	%	117			70-130	Pass	
4,4'-DDT	S24-Se0015901	CP	%	80			70-130	Pass	
a-HCH	S24-Se0015901	CP	%	122			70-130	Pass	
Aldrin	S24-Se0015901	CP	%	96			70-130	Pass	
b-HCH	S24-Se0015901	CP	%	116			70-130	Pass	
d-HCH	S24-Se0015901	CP	%	114			70-130	Pass	
Dieldrin	S24-Se0015901	CP	%	129			70-130	Pass	
Endosulfan I	S24-Se0015901	CP	%	122			70-130	Pass	
Endosulfan II	S24-Se0015901	CP	%	83			70-130	Pass	
Endosulfan sulphate	S24-Se0015901	CP	%	99			70-130	Pass	
Endrin aldehyde	S24-Se0015901	CP	%	101			70-130	Pass	
Endrin ketone	S24-Se0015901	CP	%	87			70-130	Pass	
g-HCH (Lindane)	S24-Se0015901	CP	%	118			70-130	Pass	
Heptachlor	S24-Se0015901	CP	%	105			70-130	Pass	
Heptachlor epoxide	S24-Se0015901	CP	%	97			70-130	Pass	
Hexachlorobenzene	S24-Se0015901	CP	%	112			70-130	Pass	
Methoxychlor	S24-Se0015901	CP	%	82			70-130	Pass	
Spike - % Recovery									
Polychlorinated Biphenyls				Result 1					
Aroclor-1016	S24-Se0015901	CP	%	125			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C6-C9	S24-Se0017642	NCP	%	70			70-130	Pass	
TRH C10-C14	S24-Se0010341	NCP	%	72			70-130	Pass	
TRH C6-C10	S24-Se0017642	NCP	%	71			70-130	Pass	
TRH >C10-C16	S24-Se0010341	NCP	%	71			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S24-Se0017642	NCP	%	74			70-130	Pass	
Toluene	S24-Se0017642	NCP	%	74			70-130	Pass	
Ethylbenzene	S24-Se0017642	NCP	%	76			70-130	Pass	
m&p-Xylenes	S24-Se0017642	NCP	%	79			70-130	Pass	
o-Xylene	S24-Se0017642	NCP	%	76			70-130	Pass	
Xylenes - Total*	S24-Se0017642	NCP	%	78			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S24-Se0017642	NCP	%	72			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
Endrin	R24-Se0016025	NCP	%	81			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	S24-Se0015900	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	S24-Se0015900	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	S24-Se0015900	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	S24-Se0015900	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-HCH	S24-Se0015900	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	S24-Se0015900	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-HCH	S24-Se0015900	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-HCH	S24-Se0015900	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	S24-Se0015900	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	S24-Se0015900	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	S24-Se0015900	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	S24-Se0015900	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	S24-Se0015900	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	S24-Se0015900	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	S24-Se0015900	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-HCH (Lindane)	S24-Se0015900	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	S24-Se0015900	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	S24-Se0015900	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	S24-Se0015900	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	S24-Se0015900	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	S24-Se0015900	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	S24-Se0015900	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	S24-Se0015900	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	

Duplicate								
Organophosphorus Pesticides				Result 1	Result 2	RPD		
Terbufos	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Tetrachlorvinphos	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Tokuthion	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Trichloronate	S24-Se0015900	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Duplicate								
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD		
Acenaphthene	S24-Se0015900	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Acenaphthylene	S24-Se0015900	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Anthracene	S24-Se0015900	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benz(a)anthracene	S24-Se0015900	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(a)pyrene	S24-Se0015900	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(b&j)fluoranthene	S24-Se0015900	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(g,h,i)perylene	S24-Se0015900	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(k)fluoranthene	S24-Se0015900	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Chrysene	S24-Se0015900	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Dibenz(a,h)anthracene	S24-Se0015900	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Fluoranthene	S24-Se0015900	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Fluorene	S24-Se0015900	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Indeno(1,2,3-cd)pyrene	S24-Se0015900	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Naphthalene	S24-Se0015900	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Phenanthrene	S24-Se0015900	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Pyrene	S24-Se0015900	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Duplicate								
Polychlorinated Biphenyls				Result 1	Result 2	RPD		
Aroclor-1016	S24-Se0015900	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1221	S24-Se0015900	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1232	S24-Se0015900	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1242	S24-Se0015900	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1248	S24-Se0015900	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1254	S24-Se0015900	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1260	S24-Se0015900	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Total PCB*	S24-Se0015900	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Cadmium	S24-Se0015901	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass
Chromium	S24-Se0015901	CP	mg/kg	21	20	3.0	30%	Pass
Copper	S24-Se0015901	CP	mg/kg	19	16	18	30%	Pass
Lead	S24-Se0015901	CP	mg/kg	56	26	72	30%	Fail
Mercury	S24-Se0015901	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Nickel	S24-Se0015901	CP	mg/kg	5.0	< 5	9.0	30%	Pass
Zinc	S24-Se0015901	CP	mg/kg	32	26	22	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic	S24-Se0015906	CP	mg/kg	21	18	13	30%	Pass
Cadmium	S24-Se0015906	CP	mg/kg	0.8	0.7	23	30%	Pass
Chromium	S24-Se0015906	CP	mg/kg	13	10	20	30%	Pass
Copper	S24-Se0015906	CP	mg/kg	66	56	17	30%	Pass
Lead	S24-Se0015906	CP	mg/kg	140	110	25	30%	Pass
Mercury	S24-Se0015906	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Nickel	S24-Se0015906	CP	mg/kg	< 5	< 5	<1	30%	Pass

Duplicate								
Organochlorine Pesticides				Result 1	Result 2	RPD		
Chlordanes - Total	S24-Se0015908	CP	mg/kg	< 1	< 1	<1	30%	Pass
4,4'-DDD	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
4,4'-DDE	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
4,4'-DDT	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
a-HCH	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Aldrin	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
b-HCH	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
d-HCH	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Dieldrin	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Endosulfan I	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Endosulfan II	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Endosulfan sulphate	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Endrin	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Endrin aldehyde	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Endrin ketone	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
g-HCH (Lindane)	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Heptachlor	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Heptachlor epoxide	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Hexachlorobenzene	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Methoxychlor	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Duplicate								
Organophosphorus Pesticides				Result 1	Result 2	RPD		
Azinphos-methyl	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Bolstar	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Chlorfenvinphos	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Chlorpyrifos	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Chlorpyrifos-methyl	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Coumaphos	S24-Se0015908	CP	mg/kg	< 5	< 5	<1	30%	Pass
Demeton-S	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Demeton-O	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Diazinon	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Dichlorvos	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Dimethoate	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Disulfoton	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
EPN	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Ethion	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Ethoprop	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Ethyl parathion	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Fenitrothion	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Fensulfothion	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Fenthion	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Malathion	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Merphos	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Methyl parathion	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Mevinphos	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Monocrotophos	S24-Se0015908	CP	mg/kg	< 5	< 5	<1	30%	Pass
Naled	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Omethoate	S24-Se0015908	CP	mg/kg	< 5	< 5	<1	30%	Pass
Phorate	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Pirimiphos-methyl	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Pyrazophos	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Ronnel	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Terbufos	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Tetrachlorvinphos	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass

Duplicate								
Organophosphorus Pesticides				Result 1	Result 2	RPD		
Tokuthion	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Trichloronate	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD		
TRH C6-C9	S24-Se0016322	NCP	mg/kg	< 20	< 20	<1	30%	Pass
TRH C10-C14	S24-Se0015908	CP	mg/kg	< 20	< 20	<1	30%	Pass
TRH C15-C28	S24-Se0015908	CP	mg/kg	< 50	< 50	<1	30%	Pass
TRH C29-C36	S24-Se0015908	CP	mg/kg	< 50	< 50	<1	30%	Pass
TRH C6-C10	S24-Se0016322	NCP	mg/kg	< 20	< 20	<1	30%	Pass
TRH >C10-C16	S24-Se0015908	CP	mg/kg	< 50	< 50	<1	30%	Pass
TRH >C16-C34	S24-Se0015908	CP	mg/kg	< 100	< 100	<1	30%	Pass
TRH >C34-C40	S24-Se0015908	CP	mg/kg	< 100	< 100	<1	30%	Pass
Duplicate								
BTEX				Result 1	Result 2	RPD		
Benzene	S24-Se0016322	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Toluene	S24-Se0016322	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Ethylbenzene	S24-Se0016322	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
m&p-Xylenes	S24-Se0016322	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
o-Xylene	S24-Se0016322	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Xylenes - Total*	S24-Se0016322	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD		
Naphthalene	S24-Se0016322	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Duplicate								
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD		
Acenaphthene	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Acenaphthylene	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Anthracene	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benz(a)anthracene	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(a)pyrene	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(b&j)fluoranthene	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(g,h,i)perylene	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(k)fluoranthene	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Chrysene	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Dibenz(a,h)anthracene	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Fluoranthene	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Fluorene	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Indeno(1,2,3-cd)pyrene	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Naphthalene	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Phenanthrene	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Pyrene	S24-Se0015908	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Duplicate								
Polychlorinated Biphenyls				Result 1	Result 2	RPD		
Aroclor-1016	S24-Se0015908	CP	mg/kg	< 1	< 1	<1	30%	Pass
Aroclor-1221	S24-Se0015908	CP	mg/kg	< 1	< 1	<1	30%	Pass
Aroclor-1232	S24-Se0015908	CP	mg/kg	< 1	< 1	<1	30%	Pass
Aroclor-1242	S24-Se0015908	CP	mg/kg	< 1	< 1	<1	30%	Pass
Aroclor-1248	S24-Se0015908	CP	mg/kg	< 1	< 1	<1	30%	Pass
Aroclor-1254	S24-Se0015908	CP	mg/kg	< 1	< 1	<1	30%	Pass
Aroclor-1260	S24-Se0015908	CP	mg/kg	< 1	< 1	<1	30%	Pass
Total PCB*	S24-Se0015908	CP	mg/kg	< 1	< 1	<1	30%	Pass
Duplicate								
Organochlorine Pesticides				Result 1	Result 2	RPD		
Toxaphene	S24-Se0015851	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass

Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	S24-Se0015909	CP	%	26	24	7.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Andrew Black	Analytical Services Manager
Fang Yee Tan	Senior Analyst-Metal
Mickael Ros	Senior Analyst-Metal
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Sample Properties
Roopesh Rangarajan	Senior Analyst-Volatile



Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.



CHAIN OF CUSTODY RECORD

Eurofins | mgt ASN 50 005 085 521



Sydney Laboratory

Unit F3 84a F 13 Mars Road Lane Cove West NSW 2066
02 9920 8400 EnviroSampleNSW@eurofins.com



Brisbane Laboratory

Unit 1 21 Smokedwood Place Murgine Qld 4172
07 3502 9600 EnviroSampleQLD@eurofins.com



Perth Laboratory

Unit 2 911 Leach Highway Kewdale WA 6105
08 9251 5600 EnviroSampleWA@eurofins.com



Melbourne Laboratory

2 Kingston Town Close Oakleigh VIC 3166
03 2584 5600 EnviroSampleVIC@eurofins.com

Company	Earth Water Consulting Pty Limited	Project No	2223- 049	Project Manager	SD	Sampler(s)	all	
Address	Unit 6 / 1A Marina Crescent, Urunga NSW 2455	Project Name	LINDSAYS RD	EDD Format	ES01, c015 etc	Handed over by	all	
Contact Name	Strider Durinckx	Analyses *Once made, are required, please specify "Test" or "Analysis" *Suitable for use in estimating of SUE score	N8 SUITE B14 SUITE B10B SUITE				Email for Invoice	strider@ewcon.com.au
Phone No	0402608396						Email for Results	strider@ewcon.com.au
Special Directions							Containers *Change to match test & volume & vial size	
Purchase Order	2223- 049						Required Turnaround Time Default will be 5 days if not selected	
Quote ID No	Earth Water Consulting				*Surcharge will apply			
No	Client Sample ID	Sampled Date/Time dd/mm/yyyy hh:mm	Matrix S+H+L, S, L, Water etc				☐ Overnight (reporting by 9am) ☐ Same day* ☐ 2 days* ☒ 5 days (Standard) ☐ Other()	
							Sample Comments / Dangerous Goods Hazard Warning	
1	S-1	5.9.24	S	/	/		/	
2	S-2			/	/		/	
3	S-3			/	/		/	
4	S-4			/	/		/	
5	S-5			/	/		/	
6	S-6			/	/		/	
7	SH-1			/	/		/	
8	SH-2			/	/		/	
9	SH-3			/	/		/	
10	SH-4			/	/		/	
Total Counts				7	9	1	10	
Method of Shipment	☒ Courier (#)	☐ Hand Delivered	☐ Postal	Name	ROS	Signature	Date	5.9.24
Eurofins mgt	Received By	Signature	Date	Time	19.1			
Laboratory Use Only	Received By	Signature	Date	Time	09.00am			

Earth Water Consulting Pty Limited
2-16 Lourdes Avenue
Urunga
NSW 2455



NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: **Strider Duerinckx**

Report **1148938-S**
Project name **LINDSAMS RD**
Project ID **2223-049**
Received Date **Oct 15, 2024**

Client Sample ID			H1-S	H1-M	H1-D	H2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S24- Oc0034377	S24- Oc0034378	S24- Oc0034379	S24- Oc0034380
Date Sampled			Oct 10, 2024	Oct 10, 2024	Oct 10, 2024	Oct 10, 2024
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	4.3	2.7	3.4	2.9
Lead	5	mg/kg	28	13	15	39
Sample Properties						
% Moisture	1	%	25	21	20	30

Client Sample ID			H3-S	H3-M	H3-D	H4
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S24- Oc0034381	S24- Oc0034382	S24- Oc0034383	S24- Oc0034384
Date Sampled			Oct 10, 2024	Oct 10, 2024	Oct 10, 2024	Oct 10, 2024
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	4.2	6.1	3.6	4.2
Lead	5	mg/kg	21	8.2	11	17
Sample Properties						
% Moisture	1	%	30	19	24	26

Client Sample ID			H5-S	H5-M	H5-D	H6
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S24- Oc0034385	S24- Oc0034386	S24- Oc0034387	S24- Oc0034388
Date Sampled			Oct 10, 2024	Oct 10, 2024	Oct 10, 2024	Oct 10, 2024
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	4.1	4.5	5.2	3.6
Lead	5	mg/kg	14	13	13	18
Sample Properties						
% Moisture	1	%	25	22	23	34

Client Sample ID			H7-S	H7-M	H7-D	H8
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S24- Oc0034389	S24- Oc0034390	S24- Oc0034391	S24- Oc0034392
Date Sampled			Oct 10, 2024	Oct 10, 2024	Oct 10, 2024	Oct 10, 2024
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	3.0	3.5	3.2	11
Lead	5	mg/kg	17	12	9.7	47
Sample Properties						
% Moisture	1	%	26	20	19	31

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description

Heavy Metals

- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS

% Moisture

- Method: LTM-GEN-7080 Moisture

Testing Site

Sydney

Sydney

Extracted

Oct 15, 2024

Oct 15, 2024

Holding Time

28 Days

14 Days



web: www.eurofins.com.au
email: EnviroSales@eurofins.com

ABN: 50 005 085 521

Melbourne 6 Monterey Road Dandenong South VIC 3175 +61 3 8564 5000 NATA# 1261 Site# 1254	Geelong 19/8 Lewalan Street Grovedale VIC 3216 +61 3 8564 5000 NATA# 1261 Site# 25403	Sydney 179 Magowar Road Girraween NSW 2145 +61 2 9900 8400 NATA# 1261 Site# 18217	Canberra Unit 1,2 Dacre Street Mitchell ACT 2911 +61 2 6113 8091 NATA# 1261 Site# 25466	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 T: +61 7 3902 4600 NATA# 1261 Site# 20794 & 2780	Newcastle 1/2 Frost Drive Mayfield West NSW 2304 +61 2 4968 8448 NATA# 1261 Site# 25079
---	--	--	--	---	--

ABN: 91 05 0159 898

Perth 46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2377 Site# 2370 & 2554
--

NZBN: 9429046024954

Auckland 35 O'Rorke Road Penrose, Auckland 1061 +64 9 526 4551 IANZ# 1327	Auckland (Focus) Unit C1/4 Pacific Rise, Mount Wellington, Auckland 1061 +64 9 525 0568 IANZ# 1308	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 +64 3 343 5201 IANZ# 1290	Tauranga 1277 Cameron Road, Gate Pa, Tauranga 3112 +64 9 525 0568 IANZ# 1402
---	--	--	--

Company Name: Earth Water Consulting Pty Limited
Address: 2-16 Lourdes Avenue
Urunga
NSW 2455

Project Name: LINDSAMS RD
Project ID: 2223-049

Order No.: 2223-049
Report #: 1148938
Phone: 0402 6083 96
Fax:

Received: Oct 15, 2024 10:01 AM
Due: Oct 22, 2024
Priority: 5 Day
Contact Name: Strider Duerinckx

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	Lead	Moisture Set
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X
External Laboratory								
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID			
1	H1-S	Oct 10, 2024		Soil	S24-Oc0034377	X	X	X
2	H1-M	Oct 10, 2024		Soil	S24-Oc0034378	X	X	X
3	H1-D	Oct 10, 2024		Soil	S24-Oc0034379	X	X	X
4	H2	Oct 10, 2024		Soil	S24-Oc0034380	X	X	X
5	H3-S	Oct 10, 2024		Soil	S24-Oc0034381	X	X	X
6	H3-M	Oct 10, 2024		Soil	S24-Oc0034382	X	X	X
7	H3-D	Oct 10, 2024		Soil	S24-Oc0034383	X	X	X
8	H4	Oct 10, 2024		Soil	S24-Oc0034384	X	X	X
9	H5-S	Oct 10, 2024		Soil	S24-Oc0034385	X	X	X
10	H5-M	Oct 10, 2024		Soil	S24-Oc0034386	X	X	X
11	H5-D	Oct 10, 2024		Soil	S24-Oc0034387	X	X	X
12	H6	Oct 10, 2024		Soil	S24-Oc0034388	X	X	X
13	H7-S	Oct 10, 2024		Soil	S24-Oc0034389	X	X	X
14	H7-M	Oct 10, 2024		Soil	S24-Oc0034390	X	X	X



web: www.eurofins.com.au
email: EnviroSales@eurofins.com

ABN: 50 005 085 521

Melbourne 6 Monterey Road Dandenong South VIC 3175 +61 3 8564 5000 NATA# 1261 Site# 1254	Geelong 19/8 Lewalan Street Grovedale VIC 3216 +61 3 8564 5000 NATA# 1261 Site# 25403	Sydney 179 Magowar Road Girraween NSW 2145 +61 2 9900 8400 NATA# 1261 Site# 18217	Canberra Unit 1,2 Dacre Street Mitchell ACT 2911 +61 2 6113 8091 NATA# 1261 Site# 25466	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 T: +61 7 3902 4600 NATA# 1261 Site# 20794 & 2780	Newcastle 1/2 Frost Drive Mayfield West NSW 2304 +61 2 4968 8448 NATA# 1261 Site# 25079
---	--	--	--	---	--

ABN: 91 05 0159 898

Perth 46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2377 Site# 2370 & 2554
--

NZBN: 9429046024954

Auckland 35 O'Rorke Road Penrose, Auckland 1061 +64 9 526 4551 IANZ# 1327	Auckland (Focus) Unit C1/4 Pacific Rise, Mount Wellington, Auckland 1061 +64 9 525 0568 IANZ# 1308	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 +64 3 343 5201 IANZ# 1290	Tauranga 1277 Cameron Road, Gate Pa, Tauranga 3112 +64 9 525 0568 IANZ# 1402
---	--	--	--

Company Name: Earth Water Consulting Pty Limited
Address: 2-16 Lourdes Avenue
Urunga
NSW 2455

Project Name: LINDSAMS RD
Project ID: 2223-049

Order No.: 2223-049
Report #: 1148938
Phone: 0402 6083 96
Fax:

Received: Oct 15, 2024 10:01 AM
Due: Oct 22, 2024
Priority: 5 Day
Contact Name: Strider Duerinckx

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	Lead	Moisture Set
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X
15	H7-D	Oct 10, 2024		Soil	S24-Oc0034391	X	X	X
16	H8	Oct 10, 2024		Soil	S24-Oc0034392	X	X	X
Test Counts						16	16	16

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	ppm: parts per million
µg/L: micrograms per litre	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	Colour: Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank										
Heavy Metals										
Arsenic				mg/kg	< 2			2	Pass	
Lead				mg/kg	< 5			5	Pass	
LCS - % Recovery										
Heavy Metals										
Arsenic				%	101			80-120	Pass	
Lead				%	105			80-120	Pass	
Test	Lab Sample ID	QA Source		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery										
Heavy Metals					Result 1					
Arsenic	S24-Oc0032699	NCP		%	88			75-125	Pass	
Lead	S24-Oc0032699	NCP		%	93			75-125	Pass	
Test	Lab Sample ID	QA Source		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate										
Sample Properties					Result 1	Result 2	RPD			
% Moisture	S24-Oc0034379	CP		%	20	20	3.0	30%	Pass	
Duplicate										
Heavy Metals					Result 1	Result 2	RPD			
Arsenic	S24-Oc0034380	CP		mg/kg	2.9	3.0	2.0	30%	Pass	
Lead	S24-Oc0034380	CP		mg/kg	39	36	8.0	30%	Pass	
Duplicate										
Heavy Metals					Result 1	Result 2	RPD			
Arsenic	S24-Oc0034385	CP		mg/kg	4.1	6.7	48	30%	Fail	Q15
Lead	S24-Oc0034385	CP		mg/kg	14	20	36	30%	Fail	Q15
Duplicate										
Sample Properties					Result 1	Result 2	RPD			
% Moisture	S24-Oc0034389	CP		%	26	25	4.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Andrew Black	Analytical Services Manager
Fang Yee Tan	Senior Analyst-Metal
Mickael Ros	Senior Analyst-Metal
Roopesh Rangarajan	Senior Analyst-Sample Properties



Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.



CHAIN OF CUSTODY RECORD

Eurofins (mg) ABN 53 005 085 521



Sydney Laboratory

Unit F3 Bld F 16 Mara Road Lane Cove NSW 2066
02 9200 8400 EnviroSampleNSW@eurofins.com



Brisbane Laboratory

Unit 1 21 Smalwood Place Marooch QLD 4172
07 3902 4800 EnviroSampleQLD@eurofins.com



Perth Laboratory

Unit 2 91 Leach Highway Kewdale WA 6126
08 9251 9800 EnviroSampleWA@eurofins.com



Melbourne Laboratory

2 Kingston Town Close Oakleigh VIC 3166
03 5364 5000 EnviroSampleVic@eurofins.com

Company		Earth Water Consulting Pty Limited		Project No		2223-049		Project Manager		SD		Sampler(s)		RL	
Address		Unit 6 / 1A Marina Crescent, Urunga NSW 2455		Project Name		LINDSAYS RD		EDD Format		ESHA, ESHA-WP		Handed over by		RL	
Contact Name		Strider Duerinckx		Analyses Where multiple requests, please specify "Test as Requested" SUE: code must be used in front of SUEs pricing								Email for Invoice		strider@ewcon.com.au	
Phone No		0402606396										Email for Results		strider@ewcon.com.au	
Special Directions															
Purchase Order		2223-049													
Quote ID No		Earth Water Consulting													
No	Client Sample ID	Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)	AS AB											
1	H1-S	10.10.24	S	/	/										
2	H1-M	↓	↓	/	/										
3	H1-D			/	/										
4	H2			/	/										
5	H3-S			/	/										
6	H3-M			/	/										
7	H3-D			/	/										
8	H4			/	/										
9	H5-S			/	/										
10	H5-M			/	/										
Total Counts						10 10									
Method of Shipment		☒ Courier (#) ☐ Hand Delivered ☐ Postal		Name		LOB		Signature		[Signature]		Date		10.10.24	
Eurofins (mg) Laboratory Use Only		Received By Elizabeth Brotherton		Signature		EB		Date		15/10		Time		10:01am	
		Received By		Signature				Date				Time		16:3	

Eurofins Environment Testing Australia Pty Ltd trading as Eurofins (mg)

Submission of samples to the laboratory will be deemed as acceptance of Eurofins (mg) Standard Terms and Conditions unless agreed otherwise. A copy of Eurofins (mg) Standard Terms and Conditions is available on request.



CHAIN OF CUSTODY RECORD

Eurofins | reg: ABN 50 005 086 521



Sydney Laboratory

Unit F3 Bld F 16 Mars Road Lane Cove West NSW 2056
02 9905 8400 EnviroSampleNSW@eurofins.com



Brisbane Laboratory

Unit 1 21 Smallwood Place Maranoa Qld 4177
07 3902 4600 EnviroSampleQLD@eurofins.com



Perth Laboratory

Unit 2 91 Leach Highway Kewdale WA 6105
08 9251 9860 EnviroSampleWA@eurofins.com



Melbourne Laboratory

2 Kington Town Close Oakleigh VIC 3166
03 5564 5090 EnviroSampleVIC@eurofins.com

Company	Earth Water Consulting Pty Limited		Project No	2223-- 049		Project Manager	SD		Sampler(s)	RL			
Address	Unit 6 / 1A Marina Crescent, Urunga NSW 2455		Project Name	LINDSAYS RD		EDD Format	ESdat ES15 etc		Handed-over by	RL			
Contact Name	Strider Duerinckx		Analyses When results are requested, please specify Total or Extract SILE (sub-sample for residue analysis) SILE (parent)							Email for Invoice	strider@ewcon.com.au		
Phone No	0402608396									Email for Results	strider@ewcon.com.au		
Special Directions										Containers Change container type & size if necessary		Required Turnaround Time Details with over 5 days is not entered	
Purchase Order	2223- 049									*Surcharge will apply			
Quote ID No	Earth Water Consulting								☐ Overnight (reporting by Sam)* ☐ Same day* ☐ 1 day* ☐ 2 days* ☐ 3 days* ☒ 5 days (Standard) ☐ Other				
No	Client Sample ID	Sampled Date/Time ordinarily to 15m	Matrix Solid (S) Water (W)							Sample Comments / Dangerous Goods Hazard Warning			
1	H5-D	10.10.24	S	/	/								
2	H6	↓	↓	/	/								
3	H7-S			/	/								
4	H7-M			/	/								
5	H7-D			/	/								
6	H8			/	/								
7													
8													
9													
10													
Total Counts				6	6								
Method of Shipment	☒ Courier (#)) ☐ Hand Delivered ☐ Postal		Name	ROS		Signature	[Signature]		Date	10.10.24			
Eurofins reg: Laboratory Use Only	Received By	SYD SHE MEL PER ADL NTL DRW		Signature	Date		Time	Temperature					
	Received By	SYD SHE MEL PER ADL NTL DRW		Signature	Date		Time	Report No					

Eurofins Environment Testing Australia Pty Ltd trading as Eurofins | reg:

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | reg Standard Terms and Conditions unless agreed otherwise. A copy of Eurofins | reg Standard Terms and Conditions is available on request.

Remedial Action Plan - Lots 4, 15, 101 & 102 Lindsays Road, Boambee



21 November 2024

For: Jindra Rai

Authored by: Strider Duerinckx



Ref	Ver	Date	Distribution
2223-049-04	A	21/11/24	Client, PM
	B		

Table of Contents

1	Introduction.....	4
1.1	Objectives.....	4
1.2	Suitability to Undertake Works	4
2	Proposed Development.....	4
3	Scope of Work	4
4	Site Description	4
4.1	Site Identification	4
4.2	Location and Features	4
4.3	Surrounding Land Use	5
5	Site History	5
5.1	Previous Environmental Investigations.....	5
5.1.1	Overburden Stockpile	5
5.1.2	DESA.....	5
6	Remedial Action Plan	6
6.1	Remediation Goal.....	6
6.2	Remediation Hierarchy.....	7
6.3	Preferred Remedial Option	7
6.4	Remediation Category.....	7
6.5	General Remediation Design.....	7
6.6	Remediation Schedule.....	8
6.7	Remediation Supervision	8
6.8	Remediation Site Management	8
6.9	Occupational Health & Safety	8
6.10	Hours of Operation.....	8
6.11	Contingencies	8
6.12	Emergency Contact Details	10
6.13	Long Term Site Management	10
7	References.....	10

Tables (attached)

Table LR1. Summary Soil Analytical Results

Figures

- Figure 1 Site Location
- Figure 2 Proposed Development Layout
- Figure 3 Recommended Shed Remedial Extents
- Figure 4 Recommended Stockpile Removal

1 Introduction

Earth Water Consulting Pty Limited (EWC) was engaged by Jindra Rai (the “Client”) to prepare a Remedial Action Plan (RAP) for remedial works at Lots 4, 15, 101 & 102 Lindsays Road, Boambee (the “Site”) (Figure 1).

1.1 Objectives

The objective of this RAP is to manage remedial works of the contamination identified so as to allow the R5 rezoning and large lot residential subdivision.

1.2 Suitability to Undertake Works

Strider Duerinckx has project managed and signs off on this RAP. Strider is an environmental geologist with >25 years experience in contaminated sites investigations including numerous banana plantation assessments. Strider is a CEnvP (Site Contamination Specialist) accredited.

2 Proposed Development

It is understood that it is proposed to subdivide the property from four (4) lots into fifteen (15) lots of between 0.5-5.1ha R5 Large Lot Residential Parcels (Figure 2). Proposed Lots 1 and 15 will be 5.1ha and 5ha respectively and include new building entitlements and areas of C2 Environmental Conservation. Proposed Lots 2-14 will be 0.5-0.86ha and include new building entitlements.

3 Scope of Work

The RAP scope of works included:

- A desktop review of the previous DESA;
- Presentation of this report including remediation options/strategy, waste management (as required) and validation requirements.

4 Site Description

4.1 Site Identification

The Site is known as Lot 4 of DP 1049350, Lot 15 of DP 861057 and Lots 101/102 of DP 732172, zoned R5 Large Lot Residential and C2 Environmental Conservation and is about 19.75ha in area.

4.2 Location and Features

The Site is located on the western side of the Pacific Motorway and to the east of Lindsays Road (Figure 1). The Site is dominated by a central, low hill crest which falls generally to the north and south.

The northern boundary is bordered by the riparian zone associated with the lower reaches of Boambee Creek, while the southern portion of the property falls gently to a marshland and the meandering course of Cordwell Creek Flood Channel. Approximately 23% of the lower lying northern section following Boambee Creek is mapped as flood prone, according to the CHCC 1 in 100 year flood extent modelling.

The Site is mostly cleared paddock, with sections of remnant native vegetation in the lower northern and southern areas.

The only structures present on the property are a cement brick farm shed, located near the centre of the western boundary and a pump shed, located adjacent to the southern swampland (Figure 3). The shed was observed to have chemical and fuel storage, and some lead roof flashing.

Two small grassy piles of old machinery and timber were observed to the NE and SE of the shed (<2m³) and a concrete stock trough is present to the east of the shed. A small 6m³ stockpile of soil, gravel and small asphalt pieces was also observed (Figure 4), located NE of the shed.

4.3 Surrounding Land Use

The surrounding land use includes:

- To the east – the SP2 Pacific Highway zone; medium density R3 residential and R1 recreation area;
- To the west – R5 residential areas;
- To the north – Boambee Creek and C2 vegetation; and
- To the south – R2 rural landscape areas.

5 Site History

5.1 Previous Environmental Investigations

5.1.1 Overburden Stockpile

A Preliminary Stockpile Contamination Assessment was conducted on the site by Whitehead & Associates (W&A 2016). The investigation aimed to provide an indication of contamination presence in an overburden stockpile generated during the Pacific Highway upgrade.

The stockpile was located at the northwest corner of the property and was estimated by landform shape to be around 4,700m² in area and about 14,000m³ in volume.

Boreholes were drilled and samples collected for laboratory analysis for heavy metals, OCP/PCB pesticides, PAH and TRH/BTEXN hydrocarbons, and asbestos. Based on this the stockpile was assessed to remain onsite and be suitable for residential landuse.

5.1.2 DESA

A Detailed Environmental Site Assessment (DESA) was completed by EWC in 2024. The investigation aimed to establish the site history, develop a Conceptual Site Model and Contaminants of Concern, prepare a sampling plan and data quality objectives, and characterise the contamination status of the Site.

The desktop review indicated that the property has been primarily used for broadscale grazing activities from 1942-2004. The acquisition of the property by the RTA in 2000 led to an area in the northwestern corner of the Site being used for overburden storage during the highway construction in the mid 2000s. By 2009 the property was essentially unused with vegetation regrowth occurring. In the early 2020s the former overburden stockpile had been reduced in size by suspected spreading on the lowerlying northwestern edge of the Site proposed for the roadway access.

The DESA identified potential contamination from several sources, including two stockpiles of wood and wire left over from fence removal (aesthetic), a ~6m³ stockpile of imported roadbase gravel and bitumen, and a farm shed with stored chemical and petroleum drums at the time of assessment.

The sampling and analysis plan proposed a judgemental sampling regime with six check samples collected from across the former grazing portion of the Site, and four targeted locations around the shed, which was assessed to be a potential hotspot. All samples were analysed for OCP, OPP, arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc. Sample SH-3 was further analysed for PAH, TRH and BTEXN.

Slightly elevated zinc concentrations were detected around the margins of the shed, and were assigned to leachate from old building materials, and the investigation concluded that this was not an environmental or human health concern. Elevated arsenic and lead levels in excess of the HIL A Investigation Criteria were detected at one sample (SH-2) adjacent to the shed (attached Table LR1), and a further round of sampling in a 5m grid was undertaken to assess the linear and vertical extents of the identified arsenic and lead. Four samples were collected at depths of 0-100mm, three at 0-150mm, and four at 150-300mm and 300-500mm depth ranges to assess the horizontal and vertical extents of contamination. Concentrations of arsenic and lead in samples were found to be below the EIL and HIL Investigation Criteria.

95% Upper Confidence Limit (95% UCL) analysis of the dataset including the sample SH-2 result outputted arsenic and lead at concentrations >x4 the HIL A Investigation Criteria with 95% confidence, but excluding the results of SH-2 the concentrations were reported below the HIL A Investigation Criteria. As such the sample location at SH-2 was considered a hotspot requiring remediation. Based on the sampling regime a hotspot of ~25m² area was identified to 0.15m depth.

The investigation concluded that, except for the small shed hotspot the Site was considered suitable for the proposed residential landuse, and that a RAP would be required to manage the remedial works.

6 Remedial Action Plan

6.1 Remediation Goal

The goal of remediation is to ensure the condition of the Site is suitable for the proposed rezoning and future residential landuse.

In addition to the arsenic and lead hotspot in soil associated with the shed, the two stockpiles containing farm waste (wood and metal) and the gravel and the ~6m³ bitumen stockpile are considered to pose aesthetic risks and will be remediated as part of works on the property.

6.2 Remediation Hierarchy

The NEPM (2013) provides a preferred hierarchy of options for Site clean-up and/or management which are outlined as follows:

- If practicable, on-site treatment of the contamination so that it is destroyed and the associated risk is reduced to an acceptable level; and
- Off-site treatment of excavated soil, so that the contamination is destroyed or the associated risk is reduced to an acceptable level.

If the above is not practicable:

- Consolidation and isolation of the soil on-site by containment with a properly designed barrier; or
- Removal of contaminated material to an approved facility, followed, where necessary, by replacement with appropriate material; or
- Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

6.3 Preferred Remedial Option

Given the above remediation hierarchy, as well as the nature and extent of the contamination:

- Excavation and offsite disposal to a licensed facility of the hotspot soils and three stockpiles would be the appropriate management strategy.

6.4 Remediation Category

The works are minor in volume, the contamination is within soil only, and simple in nature (arsenic and lead). As such the remediation would be Category 2 (minor) remediation works.

6.5 General Remediation Design

In consideration of the ongoing residential landuse, the remedial works would involve (Figure 3):

- Marking out the 25m² surface extents of the remediation area outside the shed footprint;
- Demolition of the shed and extension of the hotspot extents beneath the former shed footprint;
- Excavation of soil to 150mm depth and stockpiling on a bunded platform for waste classification;
- Validation sampling of the remediated area with to confirm arsenic and lead concentrations are appropriate in the walls and floor of the excavation zone; and
- Following receipt of appropriate arsenic and lead validation results, and therefore final stockpile volume, sampling and waste classification of the hotspot stockpile to SCC1 or SCC2 criteria (NSW EPA 2014). Offsite disposal to a licensed facility of the hotspot stockpile;
- Sampling and waste classification of the gravel and bitumen stockpile either for offsite disposal to a licensed facility or to assess suitability to remain onsite for reuse on road construction;

- Sorting of the two farm stockpiles to separate metal and wood products, offsite disposal of the sorted material to a licensed facility and recycling where appropriate;
- Preparation of a validation report.

6.6 Remediation Schedule

It is expected that civil works will take in the order of 2 days to complete.

6.7 Remediation Supervision

So as to ensure that all impact material is excavated, the remedial works are to be undertaken under the supervision of a suitably qualified environmental consultant.

6.8 Remediation Site Management

The principal contractor will undertake remedial works in accordance with good civil works practice, including:

- Occupational health and safety requirements to protect the health of site workers and the general public;
- Controlling site access;
- Soil and stormwater management;
- Dust control;
- Control of spillages and vehicular tracking of soils off-site; and
- Biosecurity controls to limit the transport of soda apple in the LGA.

6.9 Occupational Health & Safety

Given that arsenic and lead is present within soil inhalation of fines is the primary pathway of exposure. Heavy metals may bioaccumulate following ingestion of contaminated fines.

The risk of inhalation of dust during remediation activities is low if wetting down of the soil is undertaken, and excavator operators and truck drivers remain within their air-conditioned cabins and windows are closed. Additional PPE is not required.

6.10 Hours of Operation

The hours of operation will be consistent with the requirements imposed by Council's policy on civil works, that is Monday to Friday 7am-5pm, and Saturday 8.30-12.30pm.

6.11 Contingencies

The presence of previously unidentified types of contaminants, may be identified during works by observation of any unusual physical or sensory characteristics.

The following outlines some of the unexpected situations that may arise:

- Unexpected discovery of demolition building materials;
- Unexpected fill material;
- Contaminants in addition to the type already identified on-site may be encountered that are invisible to the naked eye;
- Side effects to workers of site works such as unacceptable levels of odour, noise, dust;

- Surface runoff from unusual weather conditions; and
- Initial validation samples exceed the validation criteria.

Should any unexpected situations be encountered, the following procedures must be followed:

- Stop work and make the area secure;
- Notify the environmental consultant; and
- Follow the procedures listed in Table 1 below.

Table 1: Proposed Contingencies

Contingency	Resolution
Unexpected discovery of demolition building materials	The materials are to be stockpiled in a bunded zone and assessed to confirm the type of contaminant and concentrations, and suitability for remaining onsite. If the material is unsuitable for inclusion, a separate Waste Classification will be required prior to offsite disposal to a licensed facility to be determined based on the material. All works are to limit double handling of materials. If excavation and temporary stockpiling is required, potentially contaminated material may be excavated and placed into leak-proof skip bins or separately stockpiled in a secure location on strong impermeable plastic sheeting to prevent the contamination of the underlying soils and covered with plastic sheeting, which should be securely fitted. The stockpile should be surrounded by adequate sedimentation control to collect runoff and prevent overland stormwater flow from affecting the base of the stockpile. The bin or stockpile is to be covered to limit rainfall infiltration and leachate generation. Once the stockpile material has been removed the underlying soil will need to be checked by the environmental consultant to confirm contaminated material has been removed and the underlying soil is suitable for the proposed landuse.
Additional potentially contaminated materials (fill or disturbed soils) are encountered	
Additional contaminants identified	
Side effects to workers are experienced	The affected worker is assessed to confirm health status. WorkSafe is notified as required. A safety assessment is undertaken to assess the cause of the affect and the solution (elimination, substitution, isolation, engineering, administration, PPE). Works recommence and monitoring undertaken as required to confirm safe workplace operations.

Contingency	Resolution
Surface runoff or potential environmental pollution incident occurs	The environmental consultant, Coffs Harbour City Council and NSW EPA are notified as required and depending on the severity of the event/impact, whether a Significant Risk of Harm (SROH) is assessed, and whether runoff went offsite. Remedial works are undertaken to the impacted zone as instructed, which may include excavation of impacted soil, water or groundwater cleanup, and validation of the works.
Initial validation samples fail validation criteria	Strip contaminated surface and dispose off-site with waste classification, then revalidate.

6.12 Emergency Contact Details

A list of site personnel who will be working on the remedial works will be prepared by the contractor prior to commencement of the remediation and displayed at the Site entrance.

Strider Duerinckx of EWC will be the primary environmental contact and can be reached on 0402608396.

6.13 Long Term Site Management

Following remediation and validation no long-term management of the remediated area is required.

7 References

Coffs Harbour City Council. 2017. Contaminated Land Management Policy

Coffs Harbour City Council. 2018. Contaminated Land Management Procedure

Coffs Harbour City Council Local Environmental Plan 2013.

DEC. 2005. Guidelines for Assessing Former Orchards and Market Gardens.

Earth Water Consulting. 2024. Detailed Environmental Site Assessment - Lots 4, 15, 101 & 102 Lindsays Road, Boambee. Ref: 2223-049, dated 28 October 2024.

NEPC. 2013. National Environment Protection (Assessment of Site Contamination) Measure. Schedule B1-Schedule B1 Guideline on Investigation Levels For Soil and Groundwater. National Environment Protection Council.

NSW EPA. 2014. Waste Classification Guidelines Part 1: Classifying waste. November

NSW EPA. 2022. Sampling Design Part 1 – Application (Contaminated Land Guidelines).

Whitehead & Associates. 2016. Preliminary Stockpile Contamination Assessment for Lindsays Road, Boambee. Ref: 1647 240516sd, dated 24 May 2016.

TABLES

Table LR1: Summary of Round 1 Soil Discrete Analytical Results

Sample ID	Units	LOR	Investigation Criteria					S-1	S-2	S-3	S-4	S-5	S-6	SH-1	SH-2	SH-3	SH-4	
Date Collected		Eurofins	NSW EPA	NEPM				5/09/2024										
Depth Collected				BP	HIL (A)	EIL	ESL(A)	HSL (A)	0-100	0-100	0-100	0-100	0-100	0-100	0-100	0-100	0-100	
% Moisture	%	1	-	-	-	-	-	-	18	12	7.9	31	25	26	24	31	29	26
Heavy Metals																		
Arsenic	mg/kg	2	100	100	100	-	-	-	4.9	40	15	4.6	3	4.1	21	620	4.3	4.5
Cadmium	mg/kg	0.4	-	20	-	-	-	-	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	0.8	< 0.4	0.7	< 0.4
Chromium	mg/kg	5	-	100	480	-	-	-	8.6	21	14	7.4	6.7	8.9	13	15	12	9.7
Copper	mg/kg	5	-	6000	140	-	-	-	10	19	33	8.7	19	14	66	110	41	22
Lead	mg/kg	5	300	300	1100	-	-	-	18	56	31	14	15	27	140	990	130	39
Mercury	mg/kg	0.1	-	40		-	-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.3	< 0.1	< 0.1
Nickel	mg/kg	5	-	400	55	-	-	-	< 5	5	10	< 5	< 5	< 5	< 5	5	< 5	< 5
Zinc	mg/kg	5	-	7400	210	-	-	-	23	32	65	19	18	31	320	310	1800	140
Total Recoverable Hydrocarbons																		
Naphthalene	mg/kg	0.5	-	-	-	-	-	5	-	-	-	-	-	-	-	-	< 0.5	-
TRH C6-C10 less BTEX (F1)	mg/kg	20	-	-	-	180	50		-	-	-	-	-	-	-	-	< 20	-
TRH >C10-C16 less Naphthalene (F2)	mg/kg	50	-	-	-	120	280		-	-	-	-	-	-	-	-	<50	-
TRH >C16-C34	mg/kg	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<100	-
TRH >C34-C40	mg/kg	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<100	-
TRH >C10-C40 (total)*	mg/kg	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<100	-
BTEX																		
Benzene	mg/kg	0.1	-	-	-	65	0.7		-	-	-	-	-	-	-	-	< 0.1	-
Ethylbenzene	mg/kg	0.1	-	-	-	125	-		-	-	-	-	-	-	-	-	< 0.1	-
m&p-Xylenes	mg/kg	0.2	-	-	-				-	-	-	-	-	-	-	-	< 0.2	-
o-Xylene	mg/kg	0.1	-	-	-				-	-	-	-	-	-	-	-	< 0.1	-
Toluene	mg/kg	0.1	-	-	-	105	480		-	-	-	-	-	-	-	-	< 0.1	-
Xylenes - Total*	mg/kg	0.3	-	-	-	45	110		-	-	-	-	-	-	-	-	< 0.3	-
Organochlorine Pesticides																		
4,4'-DDD	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
4,4'-DDE	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
4,4'-DDT	mg/kg	0.05	50	-	180	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
a-BHC	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Aldrin	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Aldrin and Dieldrin (Total)*	mg/kg	0.05	10	6	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
b-BHC	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Chlordanes - Total	mg/kg	0.1	-	50	-	-	-	-	< 0.1	< 1	< 1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1	< 1
d-BHC	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
DDT + DDE + DDD (Total)*	mg/kg	0.05	-	240	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Dieldrin	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Endosulfan I	mg/kg	0.05	-	270	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Endosulfan II	mg/kg	0.05	-		-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Endosulfan sulphate	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Endrin	mg/kg	0.05	-	10	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Endrin aldehyde	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Endrin ketone	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
g-BHC (Lindane)	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Heptachlor	mg/kg	0.05	-	6	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Heptachlor epoxide	mg/kg	0.05	-	-	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Hexachlorobenzene (HCB)	mg/kg	0.05	-	10	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Methoxychlor	mg/kg	0.05	-	300	-	-	-	-	< 0.05	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.5
Toxaphene	mg/kg	0.1	-	20	-	-	-	-	< 0.5	< 10	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 10
Organophosphorus Pesticides																		
Azinphos-methyl	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Bolstar	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Chlorfenvinphos	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Chlorpyrifos	mg/kg	0.2	-	160	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Chlorpyrifos-methyl	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Coumaphos	mg/kg	2	-	-	-	-	-	-	< 2	< 5	< 5	< 2	< 2	< 2	< 2	< 2	< 5	< 5
Demeton-O	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Demeton-S	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Diazinon	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Dichlorvos	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Dimethoate	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Disulfoton	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
EPN	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Ethion	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Ethoprop	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Ethyl parathion	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Fenitrothion	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Fensulfothion	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Fenthion	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Malathion	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Merphos	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Methyl parathion	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Mevinphos	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Monocrotophos	mg/kg	2	-	-	-	-	-	-	< 2	< 5	< 5	< 2	< 2	< 2	< 2	< 2	< 5	< 5
Naled	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Omethoate	mg/kg	2	-	-	-	-	-	-	< 2	< 5	< 5	< 2	< 2	< 2	< 2	< 2	< 5	< 5
Phorate	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Pirimiphos-methyl	mg/kg	0.2	-	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0					

Table LR1: Summary of Round 1 Soil Discrete Analytical Results

Sample ID	Units	LOR	Investigation Criteria					S-1	S-2	S-3	S-4	S-5	S-6	SH-1	SH-2	SH-3	SH-4
Date Collected		Eurofins	NSW EPA	NEPM				5/09/2024									
Depth Collected			BP	HIL (A)	EIL	ESL(A)	HSL (A)	0-100	0-100	0-100	0-100	0-100	0-100	0-100	0-100	0-100	0-100
Tokuthion	mg/kg	0.2	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Trichloronate	mg/kg	0.2	-	-	-	-	-	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5
Polycyclic Aromatic Hydrocarbons																	
Acenaphthene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Acenaphthylene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Anthracene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Benz(a)anthracene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Benzo(a)pyrene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Benzo(a)pyrene TEQ (lower bound) *	mg/kg	0.5	-	3	-	1.4	-	-	-	-	-	-	-	-	-	< 0.5	-
Benzo(b&j)fluoranthene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Benzo(g,h,i)perylene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Benzo(k)fluoranthene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Chrysene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Dibenz(a,h)anthracene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Fluoranthene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Fluorene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Indeno(1.2.3-cd)pyrene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Naphthalene	mg/kg	0.5	-	-	-	-	5	-	-	-	-	-	-	-	-	< 0.5	-
Phenanthrene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Pyrene	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-
Total PAH*	mg/kg	0.5	-	300	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-

Notes

Indicates sample concentration exceeds HILA investigation criteria value

Indicates sample concentration exceeds HIL Ainvestigation criteria value by >250%

Indicates sample concentration exceeds EIL

Table LR2: Summary of Round 2 Soil Discrete Analytical Results

Sample ID	Units	LOR	Investigation Criteria					H1-S	H1-M	H1-D	H2	H3-S	H3-M	H3-D	H4	H5-S	H5-M	H5-D
Date Collec		Eurofins	NSW EPA	NEPM				10/10/2024										
Depth Colle			BP	HIL (A)	EIL	ESL(A)	HSL (A)	0-150	150-300	300-500	0-100	0-150	150-300	300-500	0-100	0-150	150-300	300-500
% Moisture	%	1	-	-	-	-	-	25	21	20	30	30	19	24	26	25	22	23
Heavy Metals																		
Arsenic	mg/kg	2	100	100	100	-	-	4.3	2.7	3.4	2.9	4.2	6.1	3.6	4.2	4.1	4.5	5.2
Lead	mg/kg	5	300	300	1100	-	-	28	13	15	39	21	8.2	11	17	14	13	13

Notes

Indicates sample concentration exceeds investigation criteria value

Indicates sample concentration exceeds investigation criteria value by >250%

Table LR2: Summary of Round 2 Soil Discrete Analytical Results

Sample ID	Units	LOR	Investigation Criteria					H6	H7-S	H7-M	H7-D	H8
Date Collec		Eurofins	NSW EPA	NEPM								
Depth Colle			BP	HIL (A)	EIL	ESL(A)	HSL (A)	0-100	0-150	150-300	300-500	0-100
% Moisture	%	1	-	-	-	-	-	34	26	20	19	31
Heavy Metals												
Arsenic	mg/kg	2	100	100	100	-	-	3.6	3	3.5	3.2	11
Lead	mg/kg	5	300	300	1100	-	-	18	17	12	9.7	47

Notes

 Indicates sample concentration exceeds investigation criteria value

 Indicates sample concentration exceeds investigation criteria value by >250%

Table LR3: 95% Upper Confidence Limits

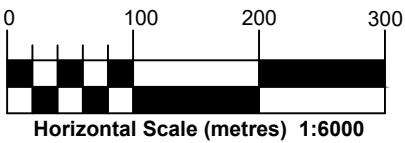
Sample ID		LOR	Investigation Criteria					SH-1	SH-2	SH-3	SH-4	H1-S	H2	H3-S	H4	H5-S	H6	H7-S
Date Collec			NSW EPA	NEPM				5/09/2024				10/10/2024						
Depth Colle	Units	Eurofins	BP	HIL (A)	EIL	ESL(A)	HSL (A)	0-100	0-100	0-100	0-100	0-150	0-100	0-150	0-100	0-150	0-100	0-150
% Moisture	%	1	-	-	-	-	-	24	31	29	26	25	30	30	26	25	34	26
Heavy Metals																		
Arsenic	mg/kg	2	100	100	100	-	-	21	620	4.3	4.5	4.3	2.9	4.2	4.2	4.1	3.6	3
	mg/kg						Ln	3.0	6.4	1.5	1.5	1.5	1.1	1.4	1.4	1.4	1.3	1.1
Lead	mg/kg	5	300	300	1100	-	-	140	990	130	39	28	39	21	17	14	18	17
	mg/kg						Ln	4.9	6.9	4.9	3.7	3.3	3.7	3.0	2.8	2.6	2.9	2.8

Sample ID		LOR	Investigation Criteria					SH-1	SH-2 (Excl)	SH-3	SH-4	H1-S	H2	H3-S	H4	H5-S	H6	H7-S
Date Collec			NSW EPA	NEPM				5/09/2024				10/10/2024						
Depth Colle	Units	Eurofins	BP	HIL (A)	EIL	ESL(A)	HSL (A)	0-100	0-100	0-100	0-100	0-150	0-100	0-150	0-100	0-150	0-100	0-150
% Moisture	%	1	-	-	-	-	-	24		29	26	25	30	30	26	25	34	26
Heavy Metals																		
Arsenic	mg/kg	2	100	100	100	-	-	21		4.3	4.5	4.3	2.9	4.2	4.2	4.1	3.6	3
	mg/kg						Ln	3.0		1.5	1.5	1.5	1.1	1.4	1.4	1.4	1.3	1.1
Lead	mg/kg	5	300	300	1100	-	-	140		130	39	28	39	21	17	14	18	17
	mg/kg						Ln	4.9		4.9	3.7	3.3	3.7	3.0	2.8	2.6	2.9	2.8

Table LR3: 95% Upper Confidence Limits

[illegible][illegible]

FIGURES



LEGEND

- Property Boundary
- Contour (10m)

- Drainage Alignment
- - - Study Boundary
- Existing Building



TITLE Site Location

FIGURE Figure 1

SHEET 1 OF 1 ISSUE A

PROJECT RAP for Lots 4, 15,
101 & 102 Lindsay's
Road, Boambee

CLIENT Jinderpal Rai

AUTHOR

SD

DATE

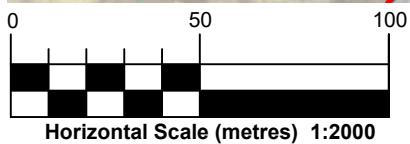
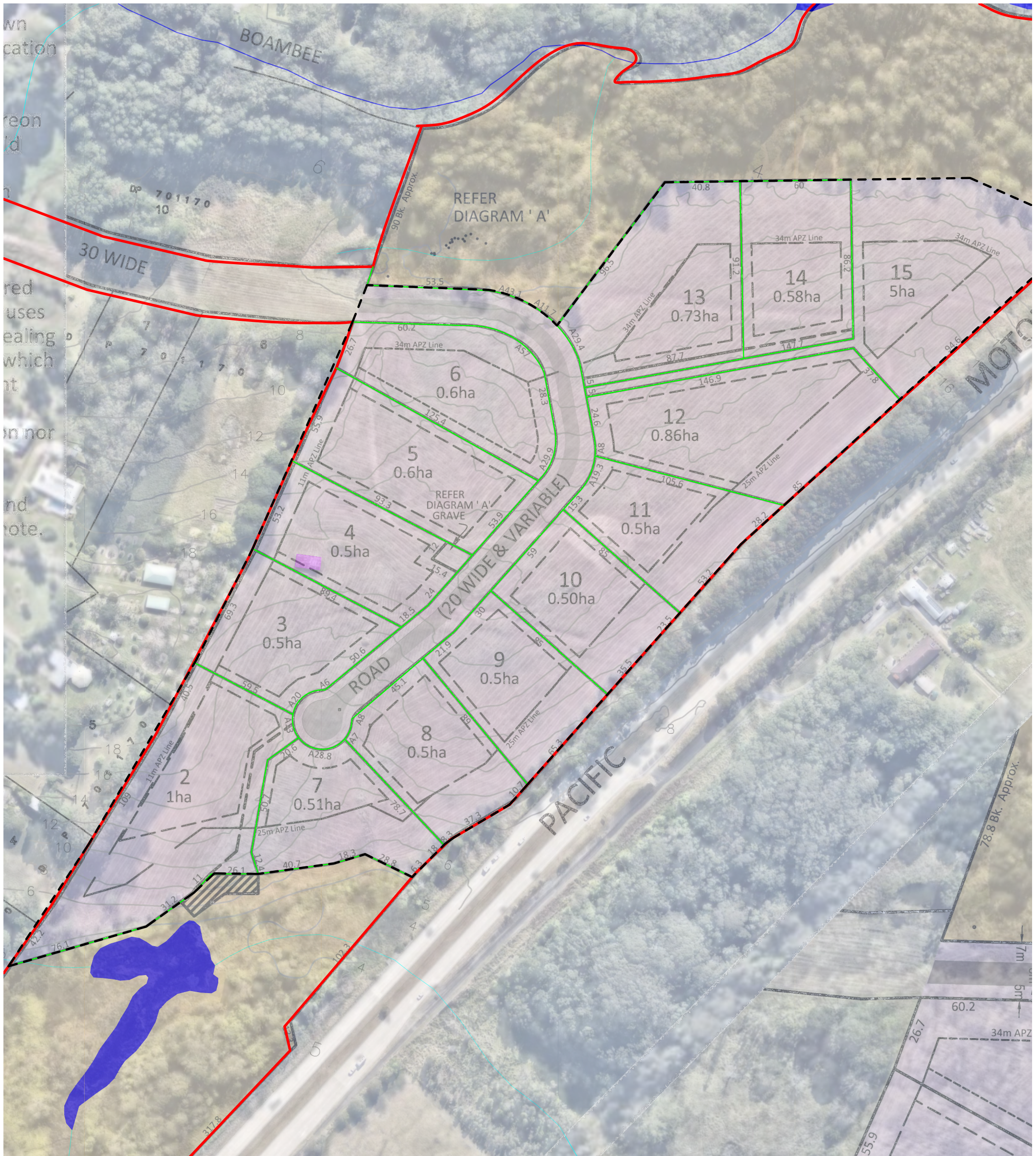
12/11/24

SCALE

1:6000

PROJECT

2223-049

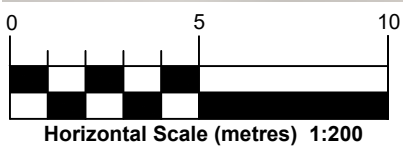
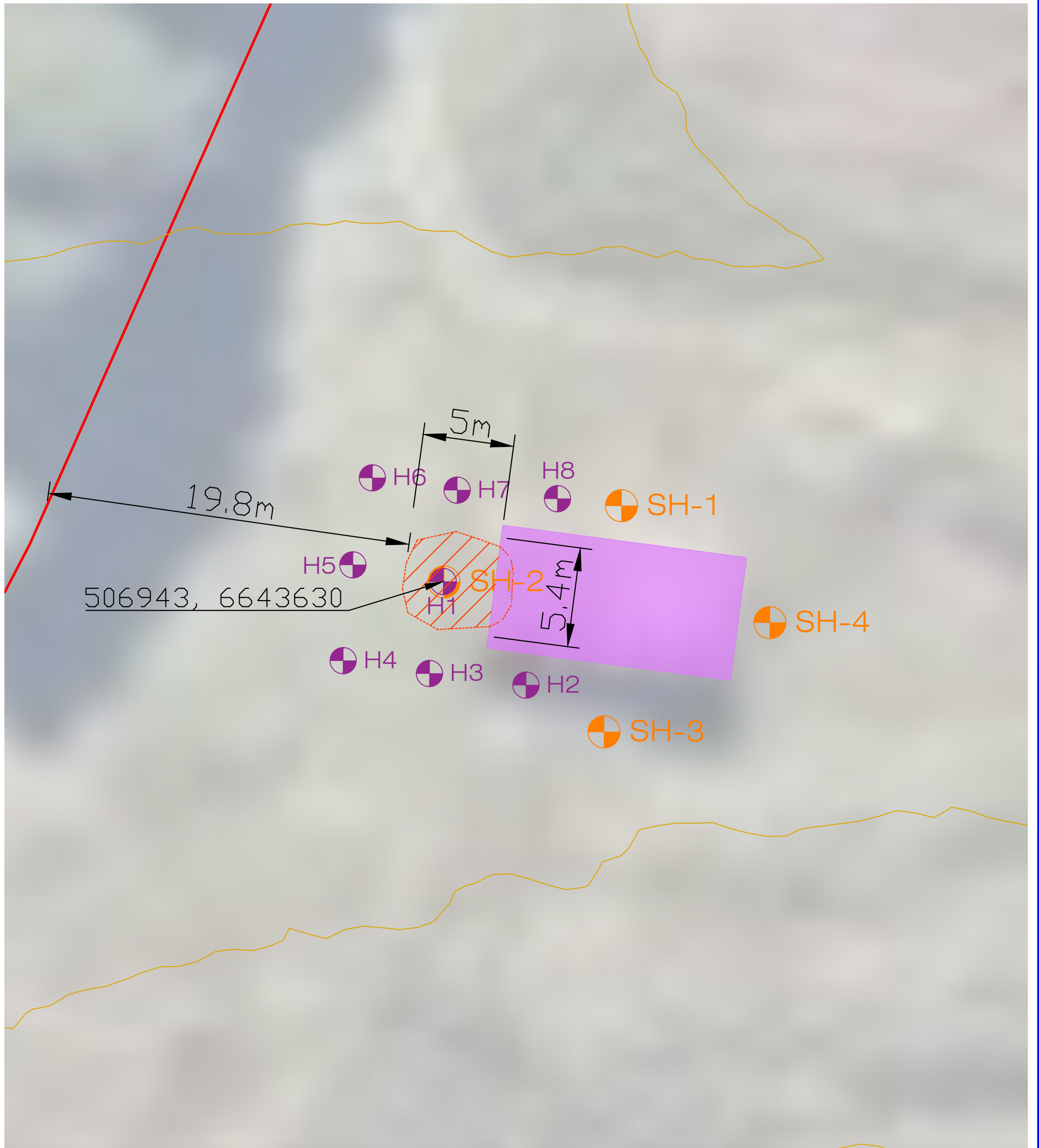


- LEGEND
- Property Boundary
 - Subdivision Boundary
 - Contour Line (2m)

- Drainage Alignment
- Study Boundary



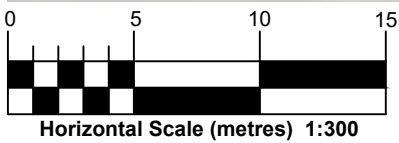
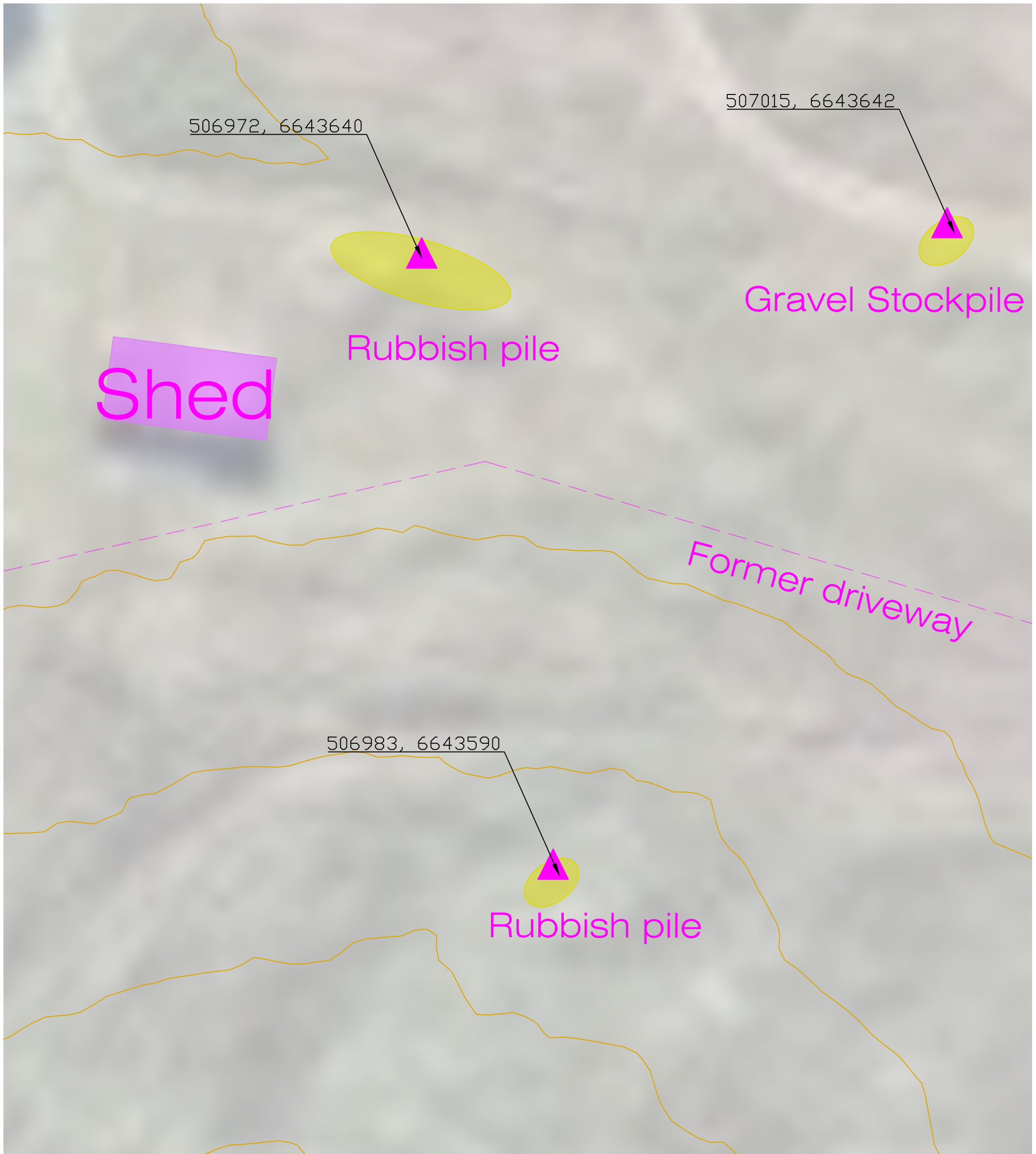
TITLE Proposed Development Layout		FIGURE Figure 2	
		SHEET 1 OF 1	ISSUE A
PROJECT RAP for Lots 4, 15, 101 & 102 Lindsays Road, Boambee		CLIENT Jinderpal Rai	
AUTHOR SD	DATE 12/11/24	SCALE 1:2000	PROJECT 2223-049



LEGEND	
	Property Boundary
	Contour Line (2m)
	Drainage Alignment
	Existing Shed
	EWC Sample Round 1
	EWC Sample Round 2
	Recommended Remedial Extents



TITLE Recommended Shed Remedial Extents		FIGURE Figure 3	
		SHEET 1 OF 1	ISSUE A
PROJECT RAP for Lots 4, 15, 101 & 102 Lindsays Road, Boambee		CLIENT Jinderpal Rai	
AUTHOR SD	DATE 22/10/24	SCALE 1:200	PROJECT 2223-049



LEGEND

- Property Boundary
- Contour Line (2m)
- Drainage Alignment

- Existing Shed
- Stockpile



TITLE Recommended Stockpile Removal			FIGURE Figure 4	
PROJECT RAP for Lots 4, 15, 101 & 102 Lindsays Road, Boambee			SHEET 1 OF 1	ISSUE A
			CLIENT Jinderpal Rai	
AUTHOR SD	DATE 21/11/24	SCALE 1:300	PROJECT 2223-049	

Review of extent of works carried out under the 2015 VMP for Lindsays Road Boambee

Prepared for

Keiley Hunter Urban Planner

G N Elks BSc MLitt MECA

Idyll Spaces Environmental Consultants

21 Titans Close, Bonville 2450

gregelks@bigpond.com

02 6653 4190

8 July 2020

Contents

Introduction	3
Method	3
Results.....	7
Initial weed control.....	7
Initial Planting	7
Maintenance	8
Other evidence.....	8
Outstanding Works	8

Figures & Tables

Figure 1 Northern precinct management zones, 2015 image	5
Figure 2 Northern precinct, 2020 image.....	5
Figure 3 Southern precinct management zones, 2015 image	6
Figure 4 Southern precinct 2020 image.....	6
Table 1 Initial weed control, plantings and maintenance actions by Management Zone.....	3
Table 2 2015 Weed status and changes in cover 2015 to 2020	4

Introduction

A VMP was prepared in March 2015 (Elks 2015) to offset the impacts of clearing of scattered native vegetation for the purpose of blueberry production in part of a property comprising Lots 101 and 102 DP 732172, Lot 15 DP 861057 and/or Lot 4 DP 1049350, Boambee.

The VMP surveyed the vegetation on the lot and proposed offset actions to address the poor condition of vegetation that had regrown since cessation of farming some 20 years earlier, the weed invasion of remnant vegetation by invasive exotic grasses, pine trees and other exotic and Noxious plant species and the associated impacts on adjoining vegetation and fauna habitat.

This report was commissioned by Keiley Hunter Urban Planner to

- review the changes to the vegetation in response to the weed control and planting proposed in the 2015 VMP, and
- provide a brief report describing the findings and identifying any outstanding work.

Method

The parts of the property subject to the 2015 VMP were surveyed by means of meander transects over 4 hours on 30 June 2020 to examine the vegetation for evidence of weed control and planting activities carried out to meet the requirements of the VMP. Those requirements were drawn from Table 2 of the VMP (**Table 1**).

Table 1 Initial weed control, plantings and maintenance actions by Management Zone

#	Management Zone	Initial weed control*	Planting	Maintenance
1a	Mature Blackbutt-Tallowood Open Forest	Control all weeds and garden escapes under mature tree canopy	None required	Continue control under mature tree canopy, reduce extent of weeds & garden escapes on margins
1b	Mature Swamp Oak Swamp Forest	Control all weeds under mature tree canopy	None required	Continue control under mature tree canopy, reduce extent of weeds & garden escapes on margins
2a	Acacia-Eucalypt Regrowth Woodland N	Control N4, WON, E, G	<i>Eucalyptus</i> & <i>Allocasuarina</i> infill x 60	Control N4, WON, E, G; maintain plantings
2a	Acacia-Eucalypt Regrowth Woodland S	Control N4, WON, E, G	<i>Eucalyptus</i> & <i>Allocasuarina</i> infill x 60	Control N4, WON, E, G; maintain plantings
2b	Swamp Oak-Acacia Regrowth Woodland	Control N4, WON, E, G	<i>Casuarina</i> , <i>Melaleuca</i> & <i>Callistemon</i> infill x 45	Control N4, WON, E, G; maintain plantings
2c	Acacia-Eucalypt Highway Buffer	Control N4, WON	None required	Control N4, WON
3a	Freshwater Wetland & <i>E. tetraquetra</i> Habitat	Identify extent of Occurrence of <i>E. tetraquetra</i> in Summer. Control E, KTP in Winter	None required	Control E, KTP
3b	Freshwater Wetland	Control E, KTP within 10m of <i>E. tetraquetra</i>	<i>Callistemon</i> buffer to access road x 56	Control E, KTP within 10m of <i>E. tetraquetra</i> ; maintain buffer plantings
3c	Freshwater Wetland with Woody Emergents	Control WON	<i>Eucalyptus robusta</i> edge plantings x 11	Control WON, maintain edge plantings
4	Highway buffer to development	na	<i>E. robusta</i> , <i>E. pilularis</i> C. <i>intermedia</i> ; <i>B. integrifolia</i> , <i>A. torulosa</i> , <i>S. glomulifera</i> x 79	Maintain plantings

Cover/abundance scores for weed occurrences were compared with those in 2015 as listed in Table 3 of the VMP and compared with current weed occurrences (**Table 2**).

Table 2 2015 Weed status and changes in cover 2015 to 2020

Species / Management Zone	1a	1b	2a	2b	3a	3b	3c	Weed Status
GRASSES								
<i>Andropogon virginicus</i> *						2	2	KTP
<i>Chloris gayana</i> *		2						KTP
<i>Paspalum mandiocanum</i> *	1	1	3		2	2	2	E
<i>Paspalum urvillei</i> *					2	2	2	KTP
<i>Setaria sphacelata</i> *					1	3	1	KTP
NON-WOODY								
<i>Ageratina adenophora</i> *		2		3	1	1	1	E
<i>Ageratina riparia</i> *		1						E
<i>Ageratum houstonianum</i> *		2		2	2	2	2	E
<i>Colocasia esculenta</i> *		2		2				E
<i>Phoenix canariensis</i> *		2						G
<i>Solanum jasminoides</i> *		2						E
<i>Syagrus romanzoffiana</i> *	2							G
WOODY								
<i>Cinnamomum camphora</i> *	1	1		1				E
<i>Eriobotrya japonica</i> *	1							G
<i>Lantana camara</i> *	1	1						N4, WON
<i>Pinus radiata</i> *	2	2	2(N)	2			3(N)	WON
<i>Senna pendula</i> *		2		2				E
<i>Viburnum odoratissimum</i> *		1						G
SINCE 2015								
<i>Hedychium gardnerianum</i>								
<i>Cortaderia</i> spp								
<i>Tradescantia</i> spp								

Key:

	increase
	decrease
	no change

Aerial imagery from 2015 (**Figures 1,3**) and 2020 (**Figures 2,4**) were examined for evidence of changes to woody vegetation cover.

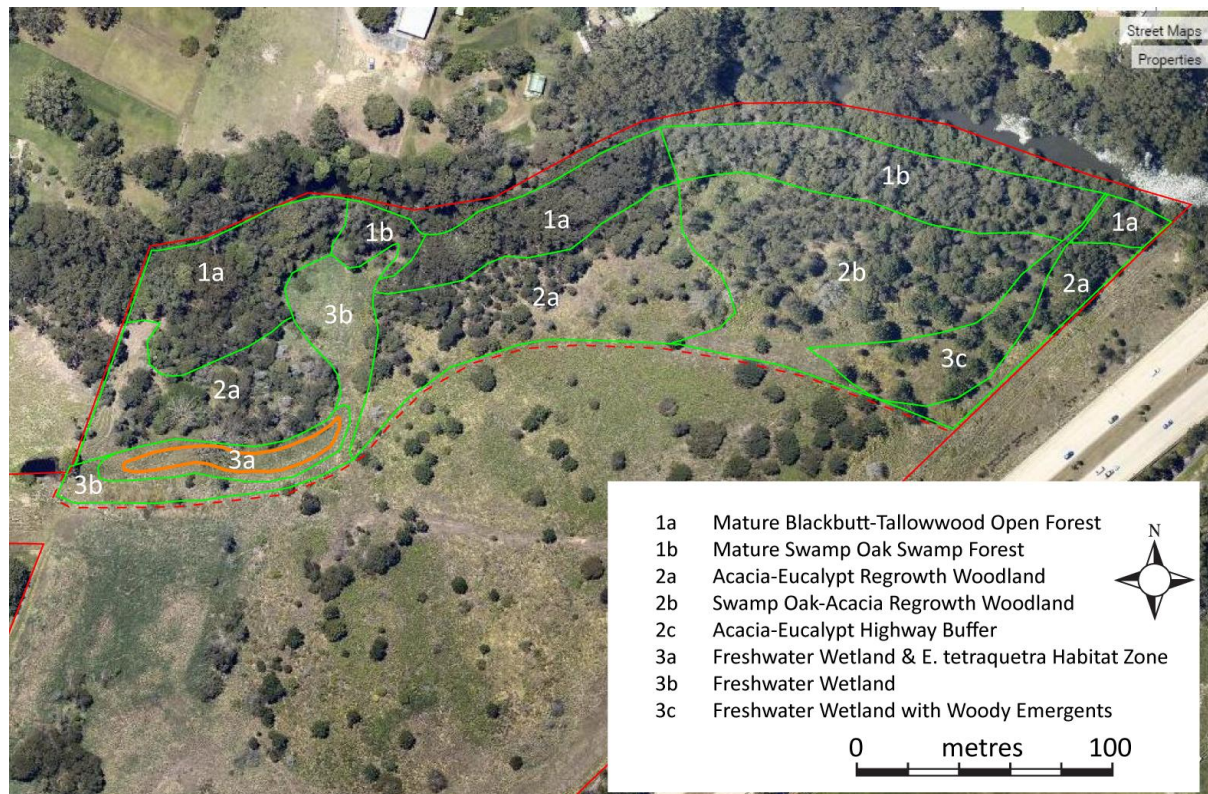


Figure 1 Northern precinct management zones, 2015 image



Figure 2 Northern precinct, 2020 image



Figure 3 Southern precinct management zones, 2015 image



Figure 4 Southern precinct 2020 image

Results

Initial weed control

Of the woody weeds, Pine *Pinus radiata*, a weed of national significance (WON), has been treated in all areas where it occurred but the treatment was not entirely successful. The number of live mature pines has been reduced from about 70 to about 33 and there are many standing dead and fallen dead pines. Some live pines show evidence of treatment that has damaged, but not killed them.

Lantana, another WON, has been eliminated from Community 1a but is now present in 2a and 2b.

Mature Camphor laurel *Cinnamomum camphora* has been successfully treated except in 3b and 3c, where two small trees were apparently present but not recorded in 2015.

Winter senna *Senna pendula* in 1b & 2b has not apparently been treated and now also occurs in 2a.

The non-woody weed Black taro *Colocasia esculenta* has apparently been treated but not fully controlled. Mistflower *Ageratina riparia* and Billygoat weed have apparently declined in 1b but this may be a response to increased tree cover rather than treatment as the species has not declined in other communities. Date palm *Phoenix spp* and Potato vine *Solanum jasminoides* have not declined but they are located on the creek bank and may be outside of the property. Mature Cocos palm *Syagrus romanzoffianum* has been successfully treated in 1a.

Of the exotic grasses, Setaria grass *S. sphacelata* has increased in Freshwater Wetland habitat of the threatened spike-rush *Eleocharis tetraquetra* but there has been a decline of most exotic grasses in most other communities. Whether or not this is a response to treatment or to other factors such as increased competition from native plants is unknown.

There are localised occurrences of several other weed species that were not detected in 2015.

Initial Planting

The plantings in Communities 3c & 4 appears to have been competently undertaken.

Planting has been undertaken in 2a & 2b, however the total number could not be confirmed due to the difficulty of locating them within dense regeneration of woody vegetation and/or very dense cover of ferns and rushes greater than 1.5 metres tall.

The planting of a buffer planting of 56 trees in 3b between the proposed access road and the main *Eleocharis tetraquetra* population was proposed on completion of the road construction, which has not yet occurred.

Maintenance

The duration of maintenance of the plantings could not be determined, although survival rates in accessible plantings exceed 90% and suggest that some follow-up maintenance has been undertaken.

Similarly, the duration of quarterly weed control could not be accurately determined, although the growth and development stage of various weed species is indicative. The occurrence of numerous Pine seedlings around 1m tall, mostly in 2a, indicate that control of this species has not been maintained for at least the past 2 or 3 years. The common presence of Cocos palm seedlings, as well as occasional mature Lantana, Kahili ginger *Hedychium gardnerianum* and Pampas grass *Cortaderia spp* also indicate a lack of maintenance for at least 2 or 3 years.

Other evidence

It is apparent from the aerial photographs (**Figures 1-4**) that there has been a substantial increase in woody vegetation cover in during the past 5 years, especially 2a & 2b. What is not so apparent from the aerial photos is the considerable increase in the height and cover of native ferns and rushes in 3b. These three communities were the most impacted by previous disturbance in 2015 and together with 1a & 1b now appear to be on the way to recovery.

The main threats to recovery include

- the continued presence of mature and seedling Pines, although extensive plantings of this species occur along the western boundary on several adjoining properties and this species will be an ongoing problem for the foreseeable future;
- the gradual expansion of Setaria grass into the main area of habitat for *Eleocharis tetraquetra*;
- the continued presence and expansion of Crofton weed *Ageratina adenophora* into new parts of in the northern precinct of the property;
- the continued presence of Camphor laurel as seedlings and mature trees, and
- the continued presence and expansion of Lantana and seedling Cocos palm into new areas.

Outstanding Works

The outstanding works include

- completion of the initial control of Pine, Setaria (in Community 3b), Camphor laurel, Lantana and Crofton weed, and
- completion of the maintenance actions listed in Table 1.

The planting of the buffer between the proposed access road and the main area of habitat for *Eleocharis tetraquetra* is also outstanding but cannot be completed until the access road earthworks are completed.

Level 32
52 Martin Place
SYDNEY NSW 2000

DX: 130 SYDNEY
T: 02 8227 9600
F: 02 8227 9699
E: nick.eastman@mpchambers.net.au

MEMORANDUM OF ADVICE

Lindsays Road, Boambee Planning Proposal

Request for Advice

1. I am instructed by MBT Lawyers to provide advice in relation to a Planning Proposal made to Coffs Harbour City Council (**Council**) for land at Lindsays Road in Boambee.
2. As part of a request for additional information dated 28 March 2023 (**RFI**), the Council have said:

- **Burial/Grave**

The City of Coffs Harbour does not support the indicative subdivision lot layout with regard the reduction in minimum lot size and the burial/grave site. The private burial would need to be managed in accordance with the NSW *Public Health Regulation 2022*. The indicative subdivision lot layout appears to create a cemetery incorporated into the road reserve. The current layout of the burial/grave would form part of the City's road reserve to which the City would be responsible for.

It is recommended that independent legal advice be obtained on how best to proceed. As the burial has taken place in the last 100 years, this would involve discussions with the NSW Coroner, which would also establish if the deceased was legally buried. In addition to reviewing the applications consistency with the public health regulations (regarding the private burial and indicative subdivision lot layout), it is also recommended exhuming the body be investigated as the preferred way forward. This pathway would require a voluntary planning agreement to be established before the City can agree to reduce the minimum lot size.

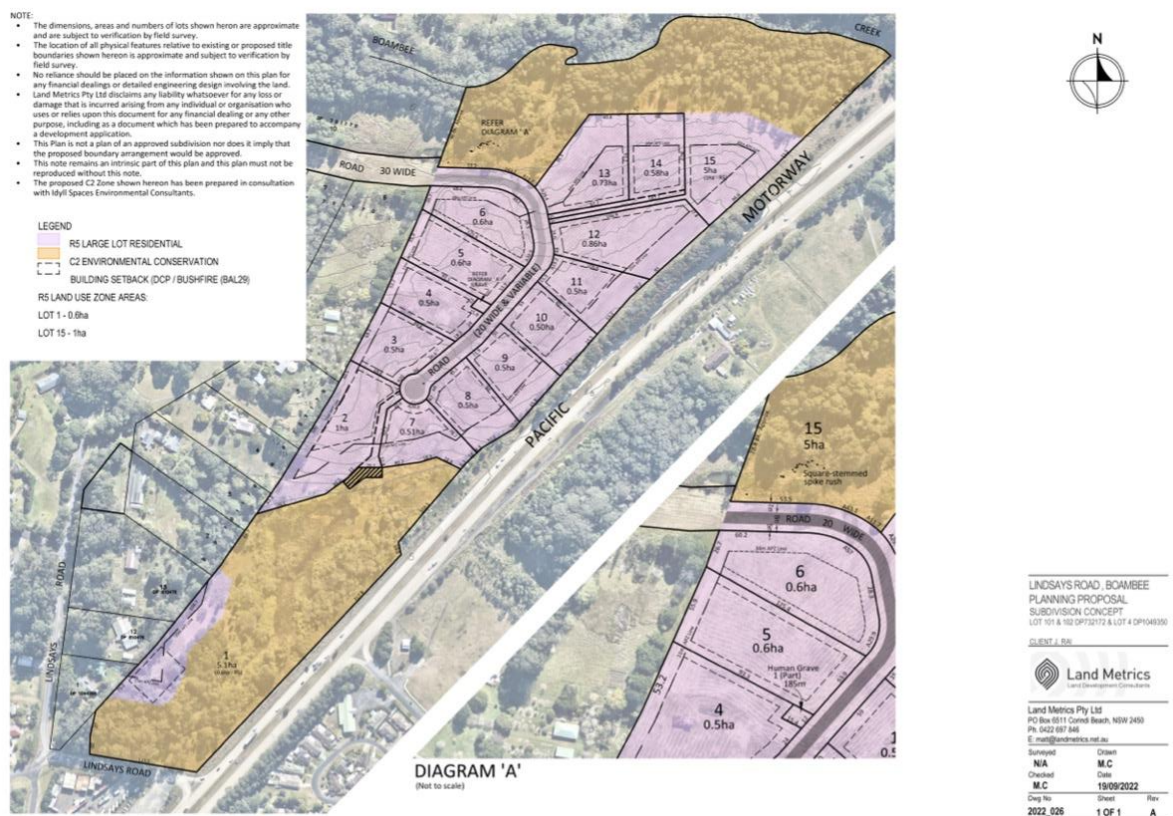
Details on this legal advice and the intended pathway forward should be submitted to the City for review and consideration

3. I am instructed to provide advice in relation those matters set out in the Council's RFI and about any related issues.

Background

4. By way of background, the subject land is located on the Pacific Highway and Lindsays Road at Boambee and legally comprises:
 - a. Lot 101 and Lot 102 DP 732172;
 - b. Lot 15 DP 861057; and
 - c. Lot 4 DP 1048350.
5. The subject land is zoned R5 Large Lot Residential and C2 Environmental Conservation under the *Coffs Harbour Local Environmental Plan 2013 (LEP)*.
6. The total area of the property is 19.75 hectares. Approximately 47% (9.45 ha) of the property is zoned R5 with the remaining 53% (10.3 ha) zoned C2. Boambee Creek forms part of the northern boundary. The land has frontage to the Pacific Highway along the eastern boundary, however, vehicular access to the property is from Lindsays Road.
7. In December 2016, a Development Application (DA 288/16) was approved by Council, for a subdivision creating five (5) additional lots ranging in size from 1 to 2.1 hectares. The approved subdivision involves a 500 m long public road with three culvert crossings and cul-de-sac. I am instructed that the approved subdivision layout is not feasible due to road construction costs and is one of the reasons which motivates the present Planning Proposal.
8. A Development Application (DA0797/18) for horticulture (blueberries) was submitted to Council in 2018 and subsequently withdrawn due to community objections.
9. A Planning Proposal is made to amend the LEP to:
 - a. Reduce the Minimum Subdivision Lot Size of the R5 Large Lot Residential zoned part of the subject land from 1 ha to 5,000 m²; and
 - b. Adjust the C2 Environmental Conservation zone boundary to reflect the actual extent of high conservation value land.
10. The LEP amendments described in this Planning Proposal will enable a residential subdivision of the land resulting in up to 15 rural residential lots.

11. I am instructed that the subject site is said to contain an unmarked grave in contention was previously marked within Lot 1 of DP 258697 as of April 1979. This notation, however, was not carried forward into the registration of DP 732172.
12. The marking of the grave is depicted on DP 258697 however, on further subdivision of the plan, Deposited Plan 732172 now shows the land, in the same location without noting the location of a grave.
13. A concept proposed subdivision plan was submitted with the Planning Proposal to demonstrate the likely outcome of an application for subdivision to be made under it. It depicts as follows:



14. That indicates an achievable layout, with the gravesite part of Lot 1 (which is larger than 5ha, a matter of some relevance addressed further below).

Issues

15. Arising from the Council's RFI correspondence dated 28 March 2023 are a range of issues. However, these are in the context of a planning proposal (set out provisions in the EP&A Act which relate to it). There is presently no application for a burial or

exhumation. There is no present application pursuant to s 139 of the *Heritage Act* 1977 for a permit to disturb a ‘*relic*’ (which human remains can be for the purposes of s 4). There is no subdivision application and there is no application for use and development of the land. How the grave site or the human remains might be dealt with in the future, or whether or not anything is in fact necessary, cannot yet be known.

16. There is an implicit assumption in the Council’s 28 March 2023 RFI that there is some requirement or necessity to deal with the grave site as part of the Planning Proposal. The foundation of that assumption is necessary to explore.
17. Having regard to the Council’s 28 March 2023 RFI and the issues as they have been presented generally, the key issues for consideration are:
 - a. What is the relevance of the existence of the grave to the planning proposal and proposed alteration to reduce the minimum allotment size?
 - b. What is the relevance of the existence of the grave to any future application for subdivision of the land and / or development for a permissible R5 purpose?
18. The answers in summary are:
 - a. The size of potential future allotments where one such future putative site may contain a grave, will be a relevant consideration for either or both a future subdivision application and for the use any development of a lot containing a grave site when a development application is made for the use and development of that land, but there is no specific reason that ought be the subject of consideration at a planning proposal level;
 - b. If there is to be a disturbance of the grave site or human remains, then further approvals may be required under the *Public Health Regulation* 2022 and the *Heritage Act* 1977, although what may or may not be required cannot be presently known;
 - c. What is necessary at this stage, is to ensure that the existence of the grave is able to be noted so that it will be known and therefore relevant to any future application/s;
 - d. That can be achieved by the creation of a s 88B instrument to ensure the location of the grave is to be recalled.

19. It is my advice that the step in [18(d)] directly above should occur now, prior to the Planning Proposal being approved, and then there is no reasonable impediment to approving the Planning Proposal.

20. Those matters, and the relevant applicable legal provisions, are now addressed in further detail.

Legal provisions and their application to these facts

21. Approval for a burial is required by a local authority pursuant to the *Public Health Regulation 2022* but not under the *Environmental Planning and Assessment Act 1979* unless the land is used for the purposes of a cemetery, which an individual grave is not.

22. The applicable provision in the *Public Health Regulation 2022* which relates to burial on private land is in cl 92, which relevantly provides:

92 Burials in certain areas prohibited

(1) A person must not place a body in a grave or vault unless the grave or vault is located—

...

(c) on private land, if the area of landholding is 5 hectares or more and the location has been approved by a local government authority,

...

(2) A person must not bury a body in or on land if to do so would make likely the contamination of a drinking water supply or a domestic water supply.
Maximum penalty—10 penalty units.

23. Accordingly, if an application was considered today, approval for burial on private land requires both:

- a. An area of not less than 5ha; and
- b. consideration of the impact on domestic water supply and drinking water.

24. Those considerations self evidently do not arise where a grave already exists.

25. In the consideration of the appropriateness of a Planning Proposal and the rezoning of land in relation, there is no express consideration in Part 3 of the *Environmental Planning and Assessment Act 1979* in the making of an amendment to an environmental planning instrument, that requires express consideration of this matter.

26. The location of the grave would be likely be a relevant consideration in either a future subdivision of the land or an application for use and development in the vicinity of the grave site, pursuant to s 4.15(1) of the *Environmental Planning and Assessment Act* 1979 (particularly s 4.15(1)(c) which deals with the suitability of any site for development).
27. Further, any potential exhumation (albeit none is presently proposed) would involve the *Public Health Regulation* 2022, Part 8, Division 3. Clauses 94-97 relate to exhumations:

Division 3 Exhumations

94 Exhumation without approval prohibited

(1) A person must not exhume the remains of a body unless the exhumation of the remains has been—

- (a) ordered by a coroner, or
- (b) approved by the Secretary.

Maximum penalty—20 penalty units.

(2) However, a funeral director may, without a coroner's order or Secretary's approval, transfer a coffin from a vault in a cemetery to a mortuary for the purposes of the coffin being immediately repaired and returned to the vault.

(3) A funeral director must return the coffin to the cemetery within 24 hours of the transfer.

Maximum penalty—10 penalty units.

95 Application to exhume remains

(1) An application for the approval of the Secretary to exhume the remains of the body of a dead person may be made by—

- (a) an executor of the estate of the dead person, or
- (b) the nearest surviving relative of the dead person, or
- (c) if there is no executor or relative available to make the application—a person who, in the opinion of the Secretary, is a proper person in all the circumstances to make the application.

(2) An application must be made in the approved form and be accompanied by—

- (a) a certified copy of the death certificate issued under the Births, Deaths and Marriages Registration Act 1995, and
- (b) a statutory declaration as to the relationship of the applicant to the dead person and the dead person's wishes, if any, regarding the disposal of the dead person's body, so far as the wishes are known to the applicant, and
- (c) the application fee specified in Schedule 5.

(3) Despite subsection (2), the Secretary may dispense with the requirement for an application to be accompanied by a certified copy of the death certificate issued under the Births, Deaths and Marriages Registration Act 1995 if the Secretary—

- (a) is satisfied that it is not reasonably practicable to obtain the death certificate in the circumstances, and
- (b) consults the State Coroner about the application.

96 Approval to exhume remains

(1) The Secretary may—

- (a) grant an approval to exhume the remains of a body, subject to any conditions specified in the approval, or
- (b) refuse the application.

(2) In granting an approval to exhume the remains of a body under this section, the Secretary must impose conditions the Secretary considers necessary to ensure the remains of the body are treated with dignity and respect during the exhumation.

(3) An approval granted under this section remains valid for 3 months from the date of the approval or for a period agreed to by the Secretary.

97 Exhumation not to take place without authorised officer

(1) A person must not proceed with an exhumation unless an authorised officer or a member of staff of the Ministry of Health is present at the exhumation.

Maximum penalty—15 penalty units.

(2) A person must not proceed with an exhumation if the authorised officer or the Ministry of Health staff member who is present at the exhumation orders the exhumation to stop.

Maximum penalty—15 penalty units.

28. Clause 94 makes it clear that any exhumation as part of the DA works will require an order by the Coroner (s94(a)) or an approval by the Secretary (s94(b)) putting in issue the prospects of success of an application under s 95(1)(c), turning on whether the client would be considered the ‘proper person in all circumstances to make the application’).

29. Additionally again, there is potential application of the provisions the *Heritage Act* 1977 may be relevant, specifically if the grave and remains fit the definition of ‘relic’ in s 4(1) of the *Heritage Act* 1977, which is:

relic means any deposit, artefact, object or material evidence that—

(a) relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and

(b) is of State or local heritage significance.

30. ‘State or local heritage significance’ is further defined in s 4A(1):

State heritage significance, in relation to a place, building, work, relic, moveable object or precinct, means significance to the State in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.

local heritage significance, in relation to a place, building, work, relic, moveable object or precinct, means significance to an area in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.

31. If the burial site or remains do fall within the scope of the *Heritage Act*’s definition of ‘relic’, then ss139(1), (2) will apply:

139 Excavation permit required in certain circumstances

(1) A person must not disturb or excavate any land knowing or having reasonable cause to suspect that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed unless the disturbance or excavation is carried out in accordance with an excavation permit.

(2) A person must not disturb or excavate any land on which the person has discovered or exposed a relic except in accordance with an excavation permit.

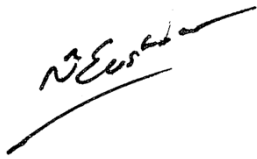
32. The burial will be within the definition of ‘relic’ in s 4 if the gravesite relates to a non-Aboriginal settlement of the area and is of local heritage significance. If these circumstances are reasonably suspected, then excavation or disturbance of the burial

site may be a breach of the *Heritage Act* without a specific permit. In *Ryan v Northern Regional Planning Panel* (No 4) [2020] NSWLEC 55 Pain J considered at [239]-[240] whether reasonable cause to suspect a relic was made out by two reports referring to a possible historic graveyard on the relevant land, of possible significance to one or more local cultural groups. One report concluded that the heritage significance was unknown at the stage. Pain J held that this was sufficient to establish ‘reasonable cause’ under s 139(1) and that the subsequent completion of excavation works to confirm the presence of a graveyard, without a permit, was a breach of the *Heritage Act*. This was despite the fact that excavation works were requested by Lismore Police.

33. Here, knowledge of the presence of a burial state is indicated by the inclusion of the burial state on a (now former) Deposited Plan 258697, may have an impact on that consideration.
34. All of these matters would require specific and detailed considerations at a **later** stage than the planning proposal stage and the decision to alter the minimum allotment size in the LEP. Not only are these not expressly relevant for consideration at this stage, the way the grave and the human remains may be dealt with (if it is necessary to do anything at all), cannot be known until such an application was made. It is foreseeable that a subdivision plan similar to that set out at [13] above could be submitted, which preserves the grave sit on one of the larger lots.
35. Considerations about the ‘suitability of the site for development’ under s 4.15(1)(c) of the *Environmental Planning and Assessment Act* 1977, the need for a permit under the *Heritage Act* 1977 if the body is a ‘relic’ or an application for exhumation under the *Public Health Regulation* 2022, would all be matters that ought be properly considered when it is known:
 - a. What is the lot and lot size upon which the grave will ultimately be;
 - b. Will it need to be removed;
 - c. Is there a potential for an affect on water supply;
 - d. Is exhumation required;
 - e. Is the a requirement to obtain further approval under the *Heritage Act* 1977 or the *Public Health Regulation* 2022 if the body is to be exhumed.

36. Those matters cannot be properly known or determined at this stage. It is appropriate for consideration at a subdivision or development stage, when the specific lot layout or ultimate form of development is proposed and can be assessed (including any necessity for any application for exhumation to be done by way of condition or voluntary planning agreement).
37. The only matter that appears to be relevant to the planning proposal stage, is to ensure that this process **will** be undertaken when it comes to assess any subdivision application or use and development application on an individual lot.
38. Presently, the grave site is known because (now former) Deposited Plan 258697, which has been superseded by a later plan where the grave site is not marked.
39. I would recommend that the landowner voluntarily place a restrictive covenant, pursuant to s 88B of the *Conveyancing Act* 1977 on the subject land. This is a common form of restrictive covenant, and a form of 88B instrument is enclosed with this advice. There is a Registrar General's Guideline published on the Land Registry Services (LRS) website entitled "*Easement and Restrictions for Burial Grounds*". Of note, this refers to the now repealed provision in cl 22(1)(c) of the *Public Health (Disposal of Bodies) Regulation* 2002, which contained a requirement that no 88B instrument is to be created unless the land upon which the grave exists is over 5ha. In relation to that, I note three relevant matters:
- a. That provision is repealed and there is no equivalent size restriction in the *Public Health Regulation* 2022 which replaced the *Public Health (Disposal of Bodies) Regulation* 2002;
 - b. In any event, the subject land presently exceeds 5ha as it is;
 - c. In the event of a further subdivision, the concept plan indicates that even in the absence of a legal requirement to have a 5ha site for the grave (and to be clear, there is presently no such requirement), the lot layout of a future subdivision, such as that set out below paragraph [13] above, can be readily accommodated on the land;
 - d. There has already been a 6 lot subdivision approved historically on the subject land by Coffs Harbour Council in development application numbered 0288/16DA.

40. Accordingly, it is my view that if an 88B instrument is placed on the site, an application for subdivision or other use and development of the land can then appropriately deal with the more fine grained approach to the manner in which the grave site and potentially the human remains can be dealt with, and at a planning proposal stage, it is sufficient to know that that will occur once the 88B instrument is properly registered.

A handwritten signature in black ink, appearing to read 'N M Eastman', with a long, sweeping horizontal line extending from the end of the signature.

N M Eastman
Ph. 8227 9600
nick.eastman@mpchambers.com.au

23 August 2023

Appendix 12

NSW Coastal Design Guidelines 2023 Appendix 1: Assessment checklist for planning proposals;

NSW Coastal Design Guidelines 2023



Appendix 1: Assessment checklist for planning proposals

Hierarchy of coastal management areas:

1. CWLRA = coastal wetlands and littoral rainforests area
2. CVA = coastal vulnerability area
3. CEA = coastal environment area
4. CUA = coastal use area

Note: Requirements relating to coastal hazards must be considered for all coastal hazard and risk areas, regardless of which relevant coastal management area(s) these fall within. 'Coastal hazard and risk areas' mean any mapped coastal vulnerability areas and/or areas affected by (or projected to be affected by) coastal hazards that have been identified in a state environmental planning policy, local environmental plan, development control plan, coastal management program, coastal hazard policy or study adopted by council.

Outcome A. Protect and enhance coastal environmental values			
Requirement	Relevant coastal management area(s)	Applicable to planning proposal (Y/N)	Planning proposal is consistent with guidelines (Y/N) If 'No', justify this
Outcome A.1 Protect coastal ecosystems			
A.1a Avoid development on undeveloped headlands and significant coastal landforms.	CVA, CEA	Yes	N/A. The proposal site is not located on a headland or significant coastal
A.1b Do not increase development or intensify land uses where there is existing development on headlands and significant coastal landforms.	CVA, CEA	Yes	N/A. The proposal site is not located on a headland or significant coastal landform.
A.1c Identify, protect and enhance sensitive coastal ecosystems including coastal wetlands, littoral rainforests and other coastal threatened ecological communities that may be affected by development.	CWLRA, CEA	Yes	Yes. The site is located within, and in proximity to coastal wetlands. The proposal is supported by ecological studies, including a review of square-stemmed spike rush (SSSR)
A.1d Maintain and protect the presence of beaches, rock platforms, coastal dunes, riparian vegetation and the natural features of foreshores, including along estuaries and coastal lakes.	CWLRA, CVA, CEA	Yes	Yes. The proposal maintains and protects the presence of riparian vegetation and natural features along the estuary. The C2 Environmental Conservation zoning is retained for
A.1e Use environmental buffers and limit the number of access points and pathways to protect coastal ecosystems. In some cases, it may not be appropriate to allow public access to areas with highly sensitive ecosystems or animal populations.	CWLRA, CEA, CUA	Yes	Yes. The proposal maintains and protects the presence of riparian vegetation and natural features along the estuary. The C2 Environmental Conservation zoning is retained for these areas, ensuring their ongoing

Outcome A. Protect and enhance coastal environmental values

Requirement	Relevant coastal management area(s)	Applicable to planning proposal (Y/N)	Planning proposal is consistent with guidelines (Y/N) If 'No', justify this
A.1f Consider if the planning proposal is needed or if development zones could be better located to minimise effects on biodiversity.	CWLRA, CEA, CUA	Yes	Yes. The proposal has been informed by ecological studies to identify areas of high ecological
A.1g Avoid development that may disturb, expose or drain areas of Class 1 and Class 2 acid sulfate soils.	CWLRA, CEA, CUA	Yes	N/A. The land is mapped as Class 3, 4 and Class 5 on the Acid Sulfate Soils Planning Maps.
A.1h Consider direct and indirect effects of development, including any necessary infrastructure, on water quality, water quantity and hydrological flows of waterways and groundwater.	CEA, CUA	Yes	Yes. The proposal avoids development in areas that could directly impact water quality, water quantity, and hydrological flows. The C2 Environmental Conservation

Outcome A.2 Protect coastal wetlands and littoral rainforests

A.2a Identify coastal wetlands and littoral rainforests, including areas that could be rehabilitated or restored in the future, and do not increase development or intensify land uses in these areas.	CWLRA	Yes	No. The proposal seeks to reduce the buffer distance to coastal wetlands by rezoning a portion of the C2 Environmental Conservation zone to R5 Large Lot Residential.
A.2b Allow for the adaptive management of stormwater run-off so that the quality of water leaving the site is better than pre-development quality to lessen effects on coastal wetlands or other sensitive receiving environments.	CWLRA, CEA, CUA	Yes	Yes. No development is proposed as a result of this planning proposal. The proposal will not impact on the ability of the site to accommodate appropriate
A.2c Provide environmental buffers and riparian corridors that enable the long-term management and protection of areas of biodiversity and ecosystem integrity.	CWLRA, CVA, CEA, CUA	Yes	Yes. The proposal maintains C2 Environmental Conservation zoning for riparian corridors and areas of high biodiversity value, ensuring their
A.2d Identify and protect areas that allow for landward migration pathways for coastal wetlands to respond to climate change.	CWLRA, CEA	Yes	Yes. The proposal maintains C2 Environmental Conservation zoning for riparian corridors and areas of
A.2e Exclude land uses that affect the natural state of coastal wetlands and littoral rainforests or that will make it harder to rehabilitate these ecosystems in the future.	CWLRA	Yes	Yes. No land uses are proposed to be excluded as part of this planning proposal. The site is currently split zoned R5 Large Lot Residential and

Outcome A.3 Protect marine parks and aquatic reserves

A.3a Avoid development and land uses that affect the environmental, economic, social and cultural values of marine parks and aquatic reserves.	CEA, CUA	Yes	N/A. The site is not located within a marine park or aquatic reserve.
A.3b Protect the ecological health of marine parks and aquatic reserves, including providing for riparian vegetation and buffers in their catchments.	CEA, CUA	Yes	N/A. The site is not located within a marine park or aquatic reserve.

Outcome B. Ensure the built environment is appropriate for the coast and local context

Requirement	Relevant coastal management area(s)	Applicable to planning proposal (Y/N)	Planning proposal is consistent with guidelines (Y/N) If 'No', justify this
Outcome B.1 Respond to and protect elements that make the place special			
B.1a Integrate development within the natural topography of the site and ensure land use, building scale and height respond sympathetically to coastal landforms.	CWLRA, CVA, CEA, CUA	Yes	N/A. No development is proposed as a result of this planning proposal. The site is currently split zoned R5 Large Lot Residential and Zone C2
B.1b Ensure the intended form and footprint of development does not dominate coastal elements, including foreshores, public spaces and other areas of natural beauty.	CWLRA, CVA, CEA, CUA	Yes	N/A. No development is proposed as a result of this planning proposal. The site is currently split zoned R5 Large Lot Residential and Zone C2
B.1c Incorporate adaptive, water-sensitive urban design into the development footprint to reduce run-off and manage water quality within receiving environments.	CWLRA, CEA, CUA	Yes	N/A. No development is proposed as a result of this planning proposal. The site is currently split zoned R5 Large Lot Residential and Zone C2
B.1d Ensure that lot sizes, building heights and density are appropriate for the coastal settlement, and complement the existing or desired local character, supported by place-based strategies.	CEA, CUA	Yes	Yes. The planning proposal seeks to reduce the minimum lot size of the land zoned R5 Large Lot Residential from 1 hectare to 5000m2. The site is located within an existing rural
B.1e Avoid development that would harm geological features and geoheritage.	CEA, CUA	Yes	N/A. The proposal does not involve any development that would harm
Outcome B.2 Ensure urban development complements coastal scenic values			
B.2a Limit ribbon development and urban sprawl wherever possible. In certain locations, place-based strategies may support increased development density and building heights as a better response to urban growth.	CEA, CUA	Yes	Yes. The proposal is consistent with the existing R5 Large Lot Residential zoning and does not contribute to ribbon development or urban sprawl. Any future Development Application
B.2b Use greenbelts to create, maintain and mark out separation between settlements.	CEA, CUA	Yes	Yes. The proposal seeks to rezone a portion of the C2 Environmental
B.2c Consider effects on scenic values and maintain publicly accessible views to significant landmarks.	CEA, CUA	Yes	Yes. The proposal is not expected to have a significant impact on scenic values or public views. The site is
B.2d Ensure that building heights consider the effect on views from different vantage points.	CEA, CUA	Yes	N/A. No development is proposed as a result of this proposal. Any future
B.2e Retain or create views from public spaces. Prioritise this over creating views from private property.	CEA, CUA	Yes	N/A. No development is proposed as a result of this planning proposal. Any future development will be
B.2f Provide for active transport links along foreshores, including along estuaries and coastal lakes, and between settlements to increase public access and amenity.	CWLRA, CVA, CEA, CUA	Yes	N/A. No development is proposed as a result of this planning proposal.

Outcome C. Protect and enhance the social and cultural values of the coastal zone

Requirement	Relevant coastal management area(s)	Applicable to planning proposal (Y/N)	Planning proposal is consistent with guidelines (Y/N) If 'No', justify this
Outcome C.1 Protect and promote heritage values			
C.1a Ensure development does not harm heritage values or sites.	CWLRA, CVA, CEA, CUA	Yes	Yes. An Aboriginal cultural heritage (Due Diligence) assessment to
C.1b Work collaboratively with local Aboriginal people before and throughout the planning proposal process.	CWLRA, CVA, CEA, CUA	Yes	Yes. The Local Aboriginal Land Council have been engaged. and have visited the
C.1c With permission and guidance from local Traditional Custodians, identify and emphasise significant features of coastal land and sea Country.	CWLRA, CVA, CEA, CUA	Yes	N/A. Assessment of the site by the Local Aboriginal Land Council did not reveal any significant features of coastal
C.1d With permission and guidance from local Traditional Custodians, identify and protect sacred and significant areas through the appropriate siting of development.	CWLRA, CVA, CEA, CUA	Yes	Yes. As part of the Aboriginal Cultural Heritage Due Diligence Assessment, a site inspection was undertaken in conjunction with Coffs
C.1e Ensure land use, building type, scale and height respond to heritage items and areas.	CEA, CUA	Yes	Yes. The current assessment has demonstrated that Aboriginal
Outcome C.2 Provide public access to significant coastal assets			
C.2a Protect and, where practical, improve, public amenity, access to and use of beaches, foreshores, rock platforms, geoheritage sites and headlands, unless you must restrict access for public safety or for environmental or cultural protection. In doing so, consider both current and projected future coastal hazards.	CVA, CEA	Yes.	N/A. No development is proposed as a result of this planning proposal. The site is approximately 3.3km away from the coast and is not located in proximity to any beaches, foreshores, rock platforms, geoheritage sites and headlands.
C.2b Identify opportunities to maintain and improve existing public access to beaches, foreshores, coastal waters and coastal lakes that support active and passive recreation activities, where this does not interfere with existing coastal industries.	CWLRA, CVA, CEA, CUA	Yes	N/A. No development is proposed as a result of this planning proposal.
C.2c Consolidate access points and consider alternative access to protect sacred and significant Aboriginal cultural areas.	CWLRA, CVA, CEA, CUA	Yes	N/A. No development is proposed as a result of this planning proposal.
C.2d Maintain and improve foreshore access and connections to existing or proposed networks of public open spaces. This includes waterways, riparian areas, bushland and parks for active and passive recreation.	CWLRA, CVA, CEA, CUA	Yes	N/A. No development is proposed as a result of this planning proposal.
C.2e Consider opportunities to protect and improve habitat connectivity through settlements, such as those described in the <i>Greener Places Design Guide</i> .	CWLRA, CEA, CUA	Yes	Yes. The proposal will maintain existing vegetation riparian corridors to protect habitat connectivity.

Outcome C. Protect and enhance the social and cultural values of the coastal zone

Requirement	Relevant coastal management area(s)	Applicable to planning proposal (Y/N)	Planning proposal is consistent with guidelines (Y/N) If 'No', justify this
C.2f Avoid development on coastal dunes and foreshore reserves unless it is for essential public purposes, such as surf life-saving club buildings. Any building or structure located on dunes must be of lightweight construction and relocatable.	CVA, CEA	Yes	N/A. There are no coastal dunes or foreshore reserves on the site
C.2g Define the boundaries of development sites with a public edge – for example, a pedestrian pathway or public laneway.	CEA, CUA	Yes	N/A. No development is proposed as a result of this planning proposal.
C.2h Prevent the privatisation of coastal open space by ensuring development next to foreshores is set back, maintains public access and accessibility, and provides links and connections to other public accessways.	CEA, CUA	Yes	N/A. The site is not directly adjacent to coastal open space or the foreshore.
Outcome C.3 Protect public amenity			
C.3a Avoid development that will overshadow the beach, foreshore or public domain. Apply the standard that there must be no overshadowing before 4 pm (midwinter) and 7 pm (Eastern Daylight Saving Time).	CEA, CUA	Yes	N/A. No development is proposed as a result of this planning proposal.
C.3b Protect the amenity of public spaces from buildings, structures or land uses that may be visually and/or acoustically intrusive or create wind funnels.	CEA, CUA	Yes	N/A. No development is proposed as a result of this planning proposal.

Outcome D. Support sustainable coastal economies

Requirement	Relevant coastal management area(s)	Applicable to planning proposal (Y/N)	Planning proposal is consistent with guidelines (Y/N) If 'No', justify this
Outcome D.1 Support sustainable industries and recreational activities that depend on the coast			
D.1a Ensure that development will not harm sustainable coastal industries needing waterfront access, or recreational use of the coastal environment.	CEA, CUA	Yes	N/A. The proposed development will not impact coastal industries or recreational uses.
D.1b Protect and improve essential facilities such as access ramps and jetties for sustainable coastal industries needing waterfront access.	CEA, CUA	Yes	N/A. The proposal will not impact upon any waterfront facilities such as access ramps and jetties.
D.1c Ensure access ramps, jetties, pontoons, groynes and other structures do not impede navigation on the water or harm coastal landforms or impair processes such as surf breaks.	CWLRA, CVA, CEA, CUA	Yes	N/A. The proposal does not include any development in waterways.
D.1d Ensure that the proposal considers how development in a waterway may affect the land.	CEA, CUA	Yes	N/A. The proposal does not include any development in
Outcome D.2 Promote green infrastructure			
D.2a Do not allow development that is likely to significantly reduce connectivity of existing green infrastructure.	CEA, CUA	Yes	N/A. The proposal will not impact on or reduce connectivity to nearby green infrastructure.
D.2b Provide for diverse green infrastructure that can support the changing needs of current and future communities, and provide tourism and recreational opportunities.	CEA, CUA	Yes	Yes. The proposal will not limit the opportunities for green infrastructure to be provided (in the detailed design and

Outcome E. Respond to coastal hazards			
Requirement	Relevant coastal management area(s)	Applicable to planning proposal (Y/N)	Planning proposal is consistent with guidelines (Y/N) If 'No', justify this
Outcome E.1 Respond to coastal processes			
E.1a Planning proposals that affect land within a coastal hazard and risk area must not alter coastal processes in a way that harms the natural environment or other land.	CWLRA, CVA, CEA, CUA	Yes	Yes. While a portion of the site proposed to be retained as C2 Environmental Conservation is partially mapped as a coastal
E.1b Exclude development in areas affected by a current or projected future coastal hazard that is likely to increase the risk of coastal hazards on that land or other land.	CWLRA, CVA, CEA, CUA	Yes	N/A. No development is proposed as a result of this planning proposal.
E.1c Locate or consolidate development in areas with little or no exposure to current and projected future coastal hazards, to ensure public safety and prevent risks to life.	CWLRA, CVA, CEA, CUA	Yes	Yes. While a portion of the site proposed to be retained as C2 Environmental Conservation is partially mapped as a coastal
E.1d Do not increase development potential or intensify land uses in a coastal hazard or risk area.	CWLRA, CVA, CEA, CUA	Yes	Yes. The proposal does not increase development potential or intensify land uses in a coastal
Outcome E.2 Account for natural hazard risks			
E.2a Identify areas on and near the proposal that are affected by current or projected future coastal hazards. Ensure that the proposal is compatible with any identified threat or risk.	CWLRA, CVA, CEA, CUA	Yes	Yes. The proposal is compatible with any identified threat or risk associated with a portion of the site (proposed to be retained as C2
E.2b Account for potential interaction between coastal hazards and other current and future natural hazards. This includes flooding, bushfires, landslip, heatwaves, severe storms, east coast lows and cyclones. Refer to the <i>Strategic Guide to Planning for Natural Hazards</i> .	CWLRA, CVA, CEA, CUA	Yes	Yes. The proposal accounts for potential interaction between coastal hazards and other current and future natural hazards.
E.2c Manage natural hazard risk within the development site. Avoid using public space or adjoining land to lessen risk.	CWLRA, CVA, CEA, CUA	Yes	Yes. The proposal manages any natural hazard risk within the site. No development or public space is
Outcome E.3 Account for climate change			
E.3a Demonstrate that the proposal applies a 100-year planning horizon for the full range of climate change projections for coastal hazards. This approach recognises that sea level is projected to continue to rise for centuries because of climate change.	CWLRA, CVA, CEA, CUA	Yes	Yes. The proposal aligns with a 100-year planning horizon for the full range of climate change projections for coastal hazards. The proposal does not increase development potential or intensify land uses in a
E.3b Consider how climate change could affect the risk profile of existing natural hazards and create new vulnerabilities and exposure for the proposal in the future.	CWLRA, CVA, CEA, CUA	Yes	Yes. The proposal does not increase development potential or intensify land uses in a coastal hazard or risk area. While a portion of the site

Outcome E. Respond to coastal hazards

Requirement	Relevant coastal management area(s)	Applicable to planning proposal (Y/N)	Planning proposal is consistent with guidelines (Y/N) If 'No', justify this
Outcome E.4 Provide sustainable defences to coastal hazards			
E.4a Reduce exposure to coastal hazards by protecting, restoring or improving natural defences. This includes coastal dunes, vegetation, coastal floodplains and coastal wetlands, where suitable.	CWLRA, CVA, CEA, CUA	Yes	Yes. The proposal does not increase exposure to coastal hazards by not rezoning land within an area mapped as wetland or floodplain. These areas are proposed to be maintained
E.4b If natural defences are not possible, reduce exposure to coastal hazards without significantly degrading: • biological diversity and ecosystem integrity • ecological, biophysical, geological and geomorphological coastal processes • beach and foreshore amenity, or the social and cultural value of these areas • public safety and access to, or use of, beaches or headlands.	CWLRA, CVA, CEA, CUA	Yes	Yes. The proposal does not increase exposure to coastal hazards by not rezoning land within an area mapped as wetland or floodplain. These areas are proposed to be maintained as C2 Environmental Conservation thereby enabling continued sustainable defenses to potential coastal hazards.
Outcome E.5 Protect essential infrastructure			
E.5a Locate and design essential infrastructure to reduce vulnerability to current and projected future coastal hazards. Consider the effects of climate change over at least a 100-year planning horizon.	CWLRA, CVA, CEA, CUA	Yes	N/A. While a portion of the site zoned C2 Environmental Conservation is located within a coastal vulnerability area, no development is proposed as a result
E.5b Where exposure to coastal hazards cannot be avoided, prepare adaptation plans for essential service infrastructure. These plans should be consistent with any applicable coastal management program.	CWLRA, CVA, CEA, CUA	Yes	N/A. While a portion of the site zoned C2 Environmental Conservation is located within a coastal vulnerability area, no development is proposed as a result
E.5c Consult local Aboriginal land management experts and emergency management agencies on how to strategically locate access routes and other essential infrastructure.	CWLRA, CVA, CEA, CUA	Yes	N/A. While a portion of the site zoned C2 Environmental Conservation is located within a coastal vulnerability area, no
Outcome E.6 Change land uses to manage legacy issues and avoid creating new ones			
E.6a Ensure the proposal will not require coastal management interventions to remain viable over its expected lifespan.	CWLRA, CVA, CEA, CUA	Yes	Yes. The proposal is not expected to require future coastal management interventions. The site is not located
E.6b Consider the potential legacy effects of the proposal and if the proposed land uses or development will create a social, environmental, economic or cultural burden for future generations.	CWLRA, CVA, CEA, CUA	Yes	Yes. No development is proposed as a result of this planning proposal. The proposal seeks to reduce the minimum lot size and amend the land zone boundary to better reflect
E.6c Consider if the proposed change of land use could remove redundant legacy infrastructure or reduce existing legacy effects.	CWLRA, CVA, CEA, CUA	Yes	N/A. No development is proposed as a result of this planning proposal. The proposal does not involve the

Gateway Determination

Planning proposal (Department Ref: PP-2023-2086): *Reduce the minimum lot size and make changes to the zoning and terrestrial biodiversity mapping at Lot 4 DP 1049350, Lot 15 DP 861057 and Lots 101 and 102 DP 732172, Lindsays Road, Boambee to facilitate a large lot residential subdivision*

I, the Director, Hunter and Northern Region at the Department of Planning, Housing and Infrastructure, as delegate of the Minister for Planning and Public Spaces, have determined under section 3.34(2) of the *Environmental Planning and Assessment Act 1979* (the Act) that an amendment to the Coffs Harbour Local Environmental Plan 2013 to reduce the minimum lot size and make changes to the zoning and terrestrial biodiversity mapping at Lot 4 DP 1049350, Lot 15 DP 861057 and Lots 101 and 102 DP 732172, Lindsays Road, Boambee to facilitate a large lot residential subdivision should proceed subject to the following Gateway conditions.

The Council as planning proposal authority is authorised to exercise the functions of the local plan-making authority under section 3.36(2) of the Act subject to the following:

- (a) the planning proposal authority has satisfied all the conditions of the gateway determination;
- (b) the planning proposal is consistent with applicable directions of the Minister under section 9.1 of the Act or the Secretary has agreed that any inconsistencies are justified; and
- (c) there are no outstanding written objections from public authorities.

The LEP should be completed on or before nine months from the date of the Gateway determination.

Gateway Conditions

1. Prior to agency and community consultation the planning proposal is to be updated to:
 - (a) remove any land proposed to be rezoned to R5 Large Lot Residential that is located within the flood planning area;
 - (b) provide an assessment against NSW Coastal Design Guidelines 2023 Appendix 1: Assessment checklist for planning proposals;
 - (c) include updated and current potential land contamination, Aboriginal Cultural Heritage Assessment and noise impact assessment reports; and
 - (d) remove reference to the land zoning map sheet.
2. Public exhibition is required under section 3.34(2)(c) and clause 4 of Schedule 1 to the Act as follows:
 - (a) the planning proposal is categorised as standard as described in the *Local Environmental Plan Making Guideline* (Department of Planning and Environment, August 2023) and must be made publicly available for a minimum of 20 working days; and

- (b) the planning proposal authority must comply with the notice requirements for public exhibition of planning proposals and the specifications for material that must be made publicly available along with planning proposals as identified in *Local Environmental Plan Making Guideline* (Department of Planning and Environment, August 2023).
3. Consultation is required with the following public authorities and government agencies under section 3.34(2)(d) of the Act and/or to comply with the requirements of applicable directions of the Minister under section 9 of the Act:
- NSW Rural Fire Service
 - NSW Biodiversity Conservation and Science
 - NSW Department of Primary Industries and Regional Development - Fisheries
- Each public authority is to be provided with a copy of the planning proposal and any relevant supporting material via the NSW Planning Portal and given at least 30 working days to comment on the proposal.
4. A public hearing is not required to be held into the matter by any person or body under section 3.34(2)(e) of the Act. This does not discharge Council from any obligation it may otherwise have to conduct a public hearing (for example, in response to a submission or if reclassifying land).

Dated 23 August 2024



Jeremy Gray
Director, Hunter and Northern Region
Local Planning and Council Support
Department of Planning, Housing and
Infrastructure

Delegate of the Minister for Planning and
Public Spaces