PLANNING PROPOSAL

CITY OF COFFS HARBOUR

Planning Proposal PP-2021-5514
R5 Large Lot Residential Rezoning
Lot 11 DP 1141269, 9-9A Gaudrons Road, Sapphire Beach
Lot 7 DP 555490, 148-158 Gaudrons Road, Sapphire Beach

July 2023

VERSION 2 Exhibition

PLANNING PROPOSAL STATUS

Stage	**Version / Date** *(blank until achieved)*
Reported to Council – Initiate s3.33 **Version 1 - Pre_Exhibition**	**Version 1 – Pre-Exhibition** **27 April 2023**
Referred to DPIE s3.34(1) **Version 1 - Pre_Exhibition**	**Version 1 – Pre-Exhibition**
Gateway Determination s3.34(2) **Version 1 - Pre_Exhibition**	**Version 1 – Pre-Exhibition**
Amendments Required:	***Yes***
Public Exhibition – Schedule 1 Clause 4 **Version 2 - Exhibition**	***Public Exhibition - 31/07/23 – 28/08/23***
Reported to Council – Initiate Revised PP s3.33 **Version x - Re_Exhibition**	***(insert date on revised PP)***
Revised PP Sent to the Minister - s3.35(1) **Version x - Re_Exhibition**	***(insert new date if the PP is amended after Council meeting or put N/A if no changes)***
Altered Gateway Determination s3.34(2) **Version x - Re_Exhibition**	***(insert Date of Altered Determination or N/A)***
Public Exhibition – Schedule 1 Clause 4 **Version x - Re_Exhibition**	***(insert Exhibition Dates xx/xx/xx – xx/xx/xx or N/A)***
Reported to Council – Endorsement (or Making of LEP if delegated) s3.36 **Version x - Post Exhibition**	***(insert date on PP)***
Endorsed by Council for Submission to Minister for Notification (or Making where not delegated) s3.36(2) **Version x – Post Exhibition**	***(insert date on PP)***

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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. The City, 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 and Environment's *Local Environmental Plan Making Guideline 2022*.

What is the Intent of this planning proposal?

The intent of this planning proposal is to amend Coffs Harbour LEP 2013 to rezone two lots located at 9-9A and 148-158 Gaudrons Road, Sapphire Beach from Zone RU2 Rural Landscape to Zone R5 Large Lot Residential. The planning proposal also looks to reduce the minimum lot size from 40 hectares to 6000 m^2 and 1 hectare respectively.

Public Exhibition

This planning proposal is being placed on public exhibition in accordance with the Gateway Determination issued by NSW Department of Planning and Environment. 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:
Marten Bouma on (02) 6648 4657
or email marten.bouma@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	R5 Large Lot Residential Rezoning
Property Details	Lot 11 DP 114126, 9-9A Gaudrons Road, Sapphire Beach Lot 7 DP 555490, 148-158 Gaudrons Road, Sapphire Beach
Current Land Use Zone(s)	RU2 Rural Landscape
Proponent	Keiley Hunter
Landowner	C. E. Bowen and C. G. Bowen (Lot 11 DP 114126) and K. F. Hunter (Lot 7 DP 555490)
Location	A location map is included in Figure 1

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 Local Environmental Plan 2013 ('LEP 2013') to enable large lot residential development on two properties on Gaudrons Road, Sapphire Beach.

The Sites

This planning proposal applies to two sites as detailed in Table 1. The two sites have a combined area of 73,435m^2 and are shown in Figure 1.

The subject sites are located approximately 6.3 kilometres north of the Coffs Harbour Central Business District, located on the Mid-North Coast of New South Wales. The sites are located west of the Pacific Highway and are accessed via Gaudrons Road. Each site is currently zoned RU2 Rural Landscape under LEP 2013.

Table 1 Subject sites

Lot/DP	Address	Land area (m^2)	Land use
Lot 11 DP 1141269	9-9A Gaudrons Road, Sapphire Beach	52,939	Rural dwellings (2) and horticulture
Lot 7 DP 555490	148-158 Gaudrons Road, Sapphire Beach	20,496	Rural dwellings (2)

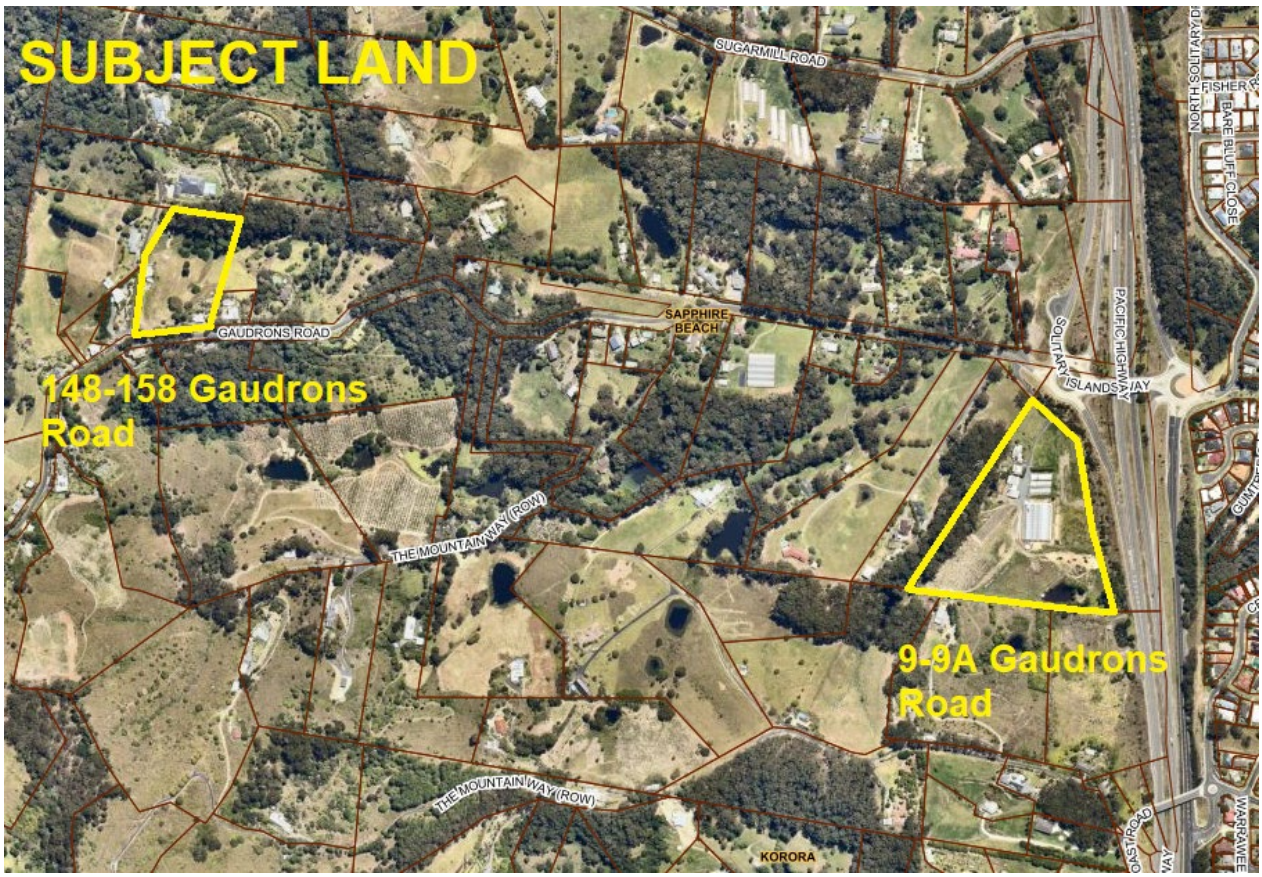


Figure 1 – Location of Subject Sites

A concept subdivision plan (see Figure 2 below) shows 8 lots for 9-9A Gaudrons Road when applying a minimum lot size of 6000m^2. 148-158 Gaudrons Road contains 2 existing dwellings and the application seeks to enable the land to be subdivided into 2 lots, each with a minimum lot size of 1 hectare.

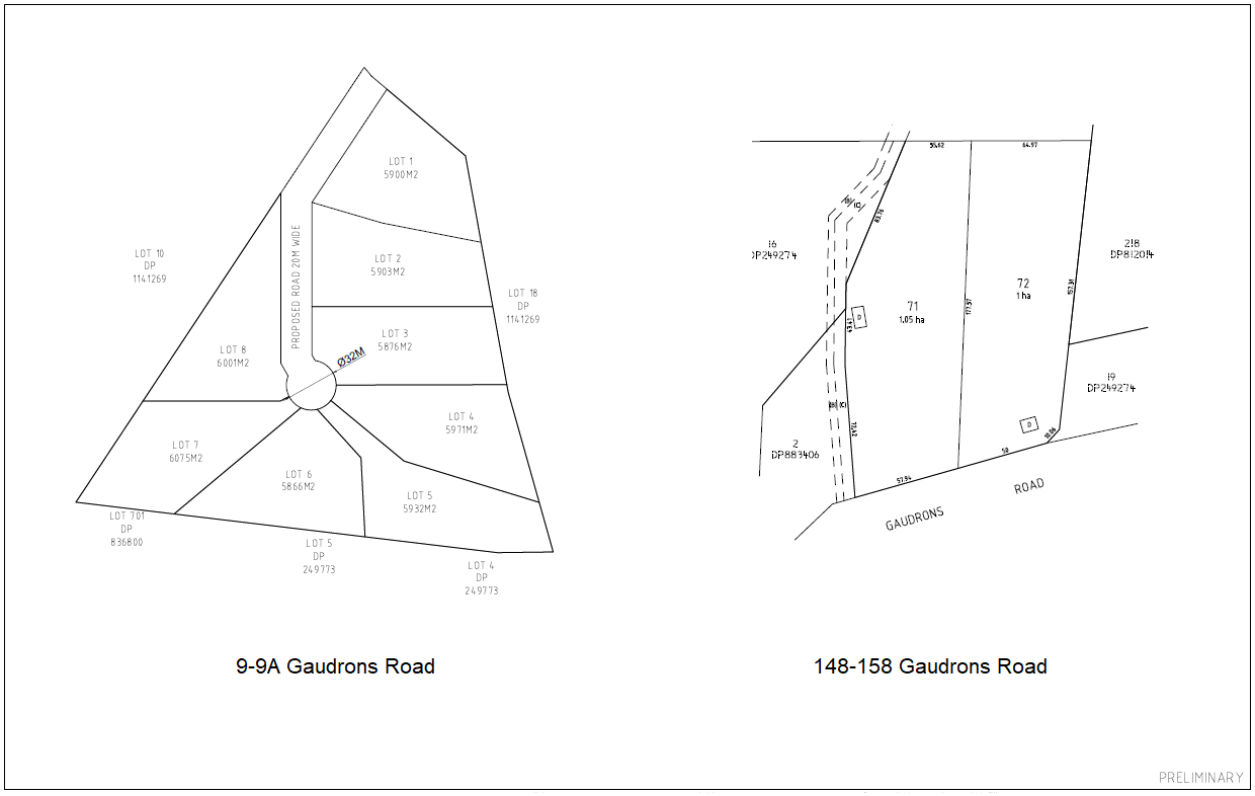


Figure 2 – Concept Lot Layout

PART 1 – OBJECTIVES OR INTENDED OUTCOMES

The objectives and intended outcomes of this planning proposal are to:

- Amend LEP 2013 to permit large lot residential development on the subject sites;
- Ensure that the Gaudrons Road locality is developed on the basis of sound planning and design principles; and
- Ensure that the rezoning and reduction in minimum lot size is consistent with the broad strategic direction for the locality as described by North Coast Regional Plan 2041 and Chapter 6 (Large Lot Residential Lands) of the City's Local Growth Management Strategy (LGMS) 2020.

PART 2 – EXPLANATION OF PROVISIONS

The intended outcomes of the planning proposal will be achieved by making the following amendments to LEP 2013 maps:

- Amend the Coffs Harbour Land Zoning Map (Sheet LZN_005C) to change land currently within Zone RU2 Rural Landscape to Zone R5 Large Lot Residential. The following lots would be rezoned:
    - Lot 11 DP 1141269, 9-9A Gaudrons Road, Sapphire Beach
    - Lot 7 DP 555490, 148-158 Gaudrons Road, Sapphire Beach
- Amend the Coffs Harbour Lot Size Map (Sheet LSZ_005C) to change land currently subject to a minimum lot size provision AB – 40 ha to 6,000 m^2 and 1 hectare respectively. The following lots would be affected:
    - Lot 11 DP 1141269, 9-9A Gaudrons Road, Sapphire Beach (6000 sqm)
    - Lot 7 DP 555490, 148-158 Gaudrons Road, Sapphire Beach (1 ha)

All of the above amendments to LEP 2013 maps are shown in Part 4 (mapping) of this planning proposal.

PART 3 – JUSTIFICATION

This part provides a response to the following matters in accordance with *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. This planning proposal has been prepared in response to a Request to Amend Coffs Harbour Local Environmental Plan (LEP) 2013 lodged on behalf of the landowners. This planning proposal is accompanied by a number of detailed environmental studies which are included as appendices. The planning proposal has been prepared in line with the findings of the Coffs Harbour Local Growth Management Strategy (LGMS) 2020.

2. 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 means of achieving the objectives and intended outcomes to amend the zoning and minimum lot size of the subject sites.

3. 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 will enable the sites to be subdivided and developed for large lot residential purposes under Coffs Harbour LEP 2013. The criteria in the Net Community Benefit test cannot be properly applied to this planning proposal.

Section B – Relationship to strategic planning framework

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

The *North Coast Regional Plan 2041* applies to the Coffs Harbour LGA. The land is not identified as an Urban Growth Area or Investigation Area in the plan. The proposed LEP amendment is 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, given that it seeks to provide additional housing stock in the LGA.

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 given that it offers additional housing choice in a suitable location.

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 as the site can be feasibly serviced to facilitate development.

Strategy 1.4 *Councils in developing their future housing strategies must prioritise new infill development to assist in meeting the region's overall 40% multi-dwelling / small lot housing target and are encouraged to work collaboratively at a subregional level to achieve the target.*

The proposed LEP amendment is not inconsistent with this strategy given it offers additional housing choice in a suitable location, as demonstrated in this planning proposal.

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 consistent with this strategy given that the land has been identified in the Coffs Harbour Local Growth Management Strategy (2020).

Action 2 *Provide guidance to help councils plan for and manage accommodation options for seasonal and itinerant workers.*

The proposed LEP amendment is not inconsistent with this action.

- ***Objective 2 – Provide for more affordable and low cost housing***

Action 3 *Establish Housing Affordability Roundtables for the Mid North Coast and Northern Rivers subregions with councils, community housing providers, State agencies and the housing development industry to collaborate, build knowledge and identify measures to improve affordability and increase housing diversity.*

The proposed LEP amendment is not inconsistent with this action as it would increase the density and opportunity for additional housing.

- ***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 given that the sites contain limited biodiversity.

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.

Objective 4 – Understand, celebrate and integrate Aboriginal culture

Strategy 4.1 *Councils prepare cultural heritage mapping with an accompanying Aboriginal cultural management plan in collaboration with Aboriginal communities to protect culturally important sites.*

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 4.2 *Prioritise applying dual names in local Aboriginal language to important places, features or infrastructure in collaboration with the local Aboriginal community.*

The proposed LEP amendment is not inconsistent with this strategy.

- ***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.

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.

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.

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 and it will facilitate resilient and adaptive building and land management.

Strategy 5.5 *Partner with local Aboriginal communities to develop land management agreements and policies to support cultural management practices.*

The proposed LEP amendment is not inconsistent with this strategy.

- ***Objective 6 – Create a circular economy***

Strategy 6.1 *Support the development of circular economy, hubs, infrastructure and activities and consider employment opportunities that may arise from circular economies and industries that harness or develop renewable energy technologies and will aspire towards an employment profile that displays a level of economic self-reliance, and resilience to external forces.*

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 6.2 *Use strategic planning and waste management strategies to support a circular economy, including dealing with waste from natural disasters and opportunities for new industry specialisations.*

The proposed LEP amendment is not inconsistent with this strategy.

- ***Objective 7 – Promote renewable energy opportunities***

Strategy 7.1 *When reviewing LEPs and local strategic planning statements:*

- *ensure current land use zones encourage and promote new renewable energy infrastructure;*
- *identify and mitigate impacts on views, local character and heritage where appropriate; and*
- *undertake detailed hazard studies.*

The proposed LEP amendment is not inconsistent with this strategy.

- ***Objective 8 – Support the productivity of agricultural land***

Strategy 8.1 *Local planning should protect and maintain agricultural productive capacity in the region by directing urban, rural residential and other incompatible development away from important farmland.*

The proposed LEP amendment is not inconsistent with this strategy as the sites are no longer considered to be particularly agriculturally productive.

- ***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 higherwater 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.

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.

Strategy 9.3 *Encourage a whole of catchment approach to land use and water management across* the region that considers climate change, water security, sustainable demand and growth, the natural environment and investigate options for water management through innovation.

The proposed LEP amendment is not inconsistent with this strategy.

- ***Objective 10 – Sustainably manage the productivity of our natural resources***

Strategy 10.1 *Enable the development of the region's natural, mineral and forestry resources by avoiding interfaces with land uses that are sensitive to impacts from noise, dust and light interference.*

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 10.2 *Plan for the ongoing productive use of lands with regionally significant construction material resources in locations with established infrastructure and resource accessibility.*

The proposed LEP amendment is not inconsistent with this strategy.

GOAL 2 – PRODUCTIVE AND CONNECTED

- ***Objective 11 – Support cities and centres and coordinate the supply of well-located employment land***

Strategy 11.1 *Local council plans will support and reinforce cities and centres as a focal point for economic growth and activity.*

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 11.2 *Utilise strategic planning and land use plans to maintain and enhance the function of established commercial centres by:*

- *simplifying planning controls*
- *developing active city streets that retain local character*

- *facilitating a broad range of uses within centres in response to the changing retail environment*
- *maximising the transport and community facilities commensurate with the scale of development proposals.*

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 11.3 *Support existing and new economic activities by ensuring council strategic planning and local plans:*

- *retain, manage and safeguard significant employment lands*
- *respond to characteristics of the resident workforce and those working in the LGA and neighbouring LGAs*
- *identify local and subregional specialisations*
- *address freight, service and delivery considerations*
- *identify future employment lands and align infrastructure to support these lands*
- *provide flexibility in local planning controls*
- *are responsive to future changes in industry to allow a transition to new opportunities*
- *provide flexibility and facilitate a broad range of commercial, business and retail uses within centres*
- *focus future commercial and retail activity in existing commercial centres, unless there is no other suitable site within existing centres, there is a demonstrated need, or there is positive social and economic benefit to locate activity elsewhere*
- *are supported by infrastructure servicing plans for new employment lands to demonstrate feasibility prior to rezoning.*

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 11.4 *New employment areas are in accordance with an employment land strategy endorsed by the Department of Planning and Environment.*

The proposed LEP amendment is not inconsistent with this strategy.

- ***Objective 12 – Create a diverse visitor economy***

Strategy 12.1 *Council strategic planning and local plans should consider opportunities to:*

- *enhance the amenity, vibrancy and safety of centres and township precincts;*
- *create green and open spaces that are accessible and well connected and enhance existing green infrastructure in tourist and recreation facilities;*
- *support the development of places for artistic and cultural activities;*
- *identify appropriate areas for tourist accommodation and tourism development;*
- *protect heritage, biodiversity and agriculture to enhance cultural tourism, agri-tourism and eco-tourism;*
- *partner with local Aboriginal communities to support cultural tourism and connect ventures across the region;*
- *support appropriate growth of the night time economy;*
- *provide flexibility in planning controls to allow sustainable agritourism and ecotourism;*
- *improve public access and connection to heritage through innovative interpretation; and*
- *incorporate transport planning with a focus on active transport modes to connect visitors to key destinations.*

The proposed LEP amendment is not inconsistent with this strategy.

- ***Objective 13 – Champion Aboriginal self-determination***

Strategy 13.1 *Provide opportunities for the region's LALCs, Native Title holders and community recognised Aboriginal organisations to utilise the NSW planning system to achieve development aspirations, maximising the flow of benefits generated by land rights to Aboriginal communities through strategic led planning.*

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 13.2 *Prioritise the resolution of unresolved Aboriginal land claims on Crown land.*

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 13.3 *Partner with community recognised Aboriginal organisations to align strategic planning and community aspirations including enhanced Aboriginal economic participation, enterprise and land, sea and water management.*

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 13.4 *Councils consider engaging Aboriginal identified staff within their planning teams to facilitate strong relationship building between councils, Aboriginal communities and key stakeholders such as Local Aboriginal Land Councils and local Native Title holders.*

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 13.5 *Councils should establish a formal and transparent relationship with local recognised Aboriginal organisations and community, such as an advisory committee.*

The proposed LEP amendment is not inconsistent with this strategy.

Action 5 *The Department of Planning and Environment will work with LALCs, Native Title holders and councils by:*

- *meaningfully engaging with LALCs and Native Title holders in the development and review of strategic plans to ensure aspirations are reflected in plans;*
- *building capacity for Aboriginal communities, LALCs and Native Title holders to utilise the planning system; and*
- *incorporating Aboriginal knowledge of the region into plan.*

The proposed LEP amendment is not inconsistent with this action.

- ***Objective 14 – Deliver new industries of the future***

Strategy 14.1 *Facilitate agribusiness employment and income-generating opportunities through the regular review of council planning and development controls, including suitable locations for intensive agriculture and agribusiness.*

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 14.2 *Protect established agriculture clusters and identify expansion opportunities in local plans that avoid land use conflicts, particularly with residential and rural residential land uses.*

The proposed LEP amendment is not inconsistent with this strategy as the proposed rezoning is not expected to result in land use conflicts.

- ***Objective 15 – Improve state and regional connectivity***

Strategy 15.1 *Protect proposed and existing transport infrastructure and corridors to ensure network opportunities are not sterilised by incompatible land uses or land fragmentation.*

The proposed LEP amendment is not inconsistent with this strategy.

- ***Objective 16 – Increase active and public transport usage***

Strategy 16.1 *Encourage active and public transport use by: • prioritising pedestrian amenity within centres for short everyday trips*

- *providing a legible, connected and accessible network of pedestrian and cycling facilities*
- *delivering accessible transit stops and increasing convenience at interchanges to serve an ageing customer*
- *incorporating emerging anchors and commuting catchments in bus contract renewals*
- *ensuring new buildings and development include end of trip facilities*
- *integrating the active transport network with public transport facilities*
- *prioritising increased infill housing in appropriate locations to support local walkability and the feasibility of public transport stops*

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 16.2 *Local plans should encourage the integration of land use and transport and provide for environments that are highly accessible and conducive to walking, cycling and the use of public transport and encourage active travel infrastructure around key trip generators.*

The proposed LEP amendment is not inconsistent with this strategy.

- ***Objective 17 – Utilise new transport technology***

Strategy 17.1 *Councils should consider how new transport technology can be supported in local strategic plans, where appropriate.*

The proposed LEP amendment is not inconsistent with this strategy.

GOAL 3 – GROWTH CHANGE AND OPPORTUNITY

- ***Objective 18 – Plan for sustainable communities***

Action 6 *Undertake housing and employment land reviews for the Northern Rivers and Mid North Coast subregions to assess future supply needs and locations.*

The proposed LEP amendment is not inconsistent with this action.

- ***Objective 19 – Public spaces and green infrastructure support connected and healthy communities***

Strategy 19.1 *Councils should aim to undertake public space needs analysis and develop public space infrastructure strategies for improving access and quality of all public space to meet community need for public spaces. This could include:*

- *drawing on community feedback to identify the quantity, quality and the type of public space required*
- *prioritising the delivery of new and improved quality public space to areas of most need*
- *considering the needs of future and changing populations*
- *identifying walkable and cycleable connectivity improvements and quality and access requirements that would improve use and enjoyment of existing infrastructure*
- *consolidating, linking and enhancing high quality open spaces and recreational areas*
- *working in partnership with local Aboriginal communities to develop bespoke cultural infrastructure which responds to the needs of Aboriginal communities and*

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 19.2 *Public space improvements and new development should consider the local conditions, including embracing opportunities for greening and applying water sensitive urban design principles.*

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 19.3 *Encourage the use of council owned land for temporary community events and creative practices where appropriate by reviewing development controls.*

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 19.4 *Local environmental plan amendments that propose to reclassify public open space must consider the following:*

- *the role or potential role of the land within the open space network;*
- *how the reclassification is strategically supported by local strategies such as open space or asset rationalisation strategies;*
- *where land sales are proposed, details of how sale of land proceeds will be managed; and*
- *the net benefit or net gain to open space.*

The proposed LEP amendment is not inconsistent with this strategy.

- ***Objective 20 – Celebrate local character***

Strategy 20.1 *Ensure strategic planning and local plans recognise and enhance local character through use of local character statements in local plans and in accordance with the NSW Government's Local Character and Place Guideline.*

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 20.2 *Celebrate buildings of local heritage significance by:*

- *retaining the existing use where possible*
- *establishing a common understanding of appropriate reuses*
- *exploring history and significance*
- *considering temporary uses*
- *designing for future change of use options.*

The proposed LEP amendment is not inconsistent with this strategy.

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

Coffs Harbour Local Strategic Planning Statement 2020

The City adopted its Local Strategic Planning Statement (LSPS) on 25 June 2020. The proposed LEP amendment accords with the vision and planning priorities within the LSPS, in particular:

- *Planning Priority 5: Deliver greater housing supply, choice and diversity.*
- *Action A5.5: Implement remaining actions from the Local Growth Management Strategy as funding allows.*
- *Planning Priority 7: Protect and conserve the natural, rural, built and cultural heritage of Coffs Harbour.*
- *Action A7.3: Implement actions from the Local Growth Management Strategy as funding allows.*

MyCoffs Community Strategic Plan 2032

The MyCoffs 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 several 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 objectives of the Plan by attracting people to work, live and visit; and by undertaking development that is environmentally, socially and economically responsible as shown below:

Theme	Objective	Outcome
An active, safe, and healthy community	A2.4: We cultivate a safe community	The proposed LEP amendment is not inconsistent with this theme and objective.
A thriving and sustainable local economy	B1.2 We attract people to work, live and visit in the Coffs Harbour local government area	The proposed LEP amendment is not inconsistent with this theme and objective.
Liveable neighbourhoods with a defined identity	C1.1 - We create livable spaces that are beautiful andappealing. C1.2 We undertake development that is environmentally, socially, and economically responsible	The proposed LEP amendment is not inconsistent with this theme and objectives.
A natural environment sustained for the future	C2.1: We protect the diversity of our naturalenvironment. C2.2: We use resources responsibly to support a safeand stable climate.	The proposed LEP amendment is not inconsistent with this theme and objectives.
Our leaders give us confidence in thefuture	D1.2 We undertake effective engagement and are informed	The proposed LEP amendment is not inconsistent with this theme and objective.
We have effective use of public resources	D2.1 - We effectively manage the planning and provision of regional public services and infrastructure. D2.2 We collaborate to achieve the best possible future for all the Coffs Harbour area	The proposed LEP amendment is not inconsistent with this theme and objectives.

Coffs Harbour Local Growth Management Strategy

The City's Local Growth Management Strategy (LGMS) 2020 was endorsed by the Department of Planning and Environment in 2020. The purpose of the LGMS is to inform and direct growth in the City to 2040 and to inform the City's Local Strategic Planning Statement 2020.

Chapter 6 Large Lot Residential Lands, of the LGMS identifies the subject sites as being in Precinct 5 (Gaudrons Road/ The Mountain Way) of the Korora, Sapphire, and Moonee Candidate Area. Land in this area is identified for short-term release of large lot residential development (refer Figure 3).

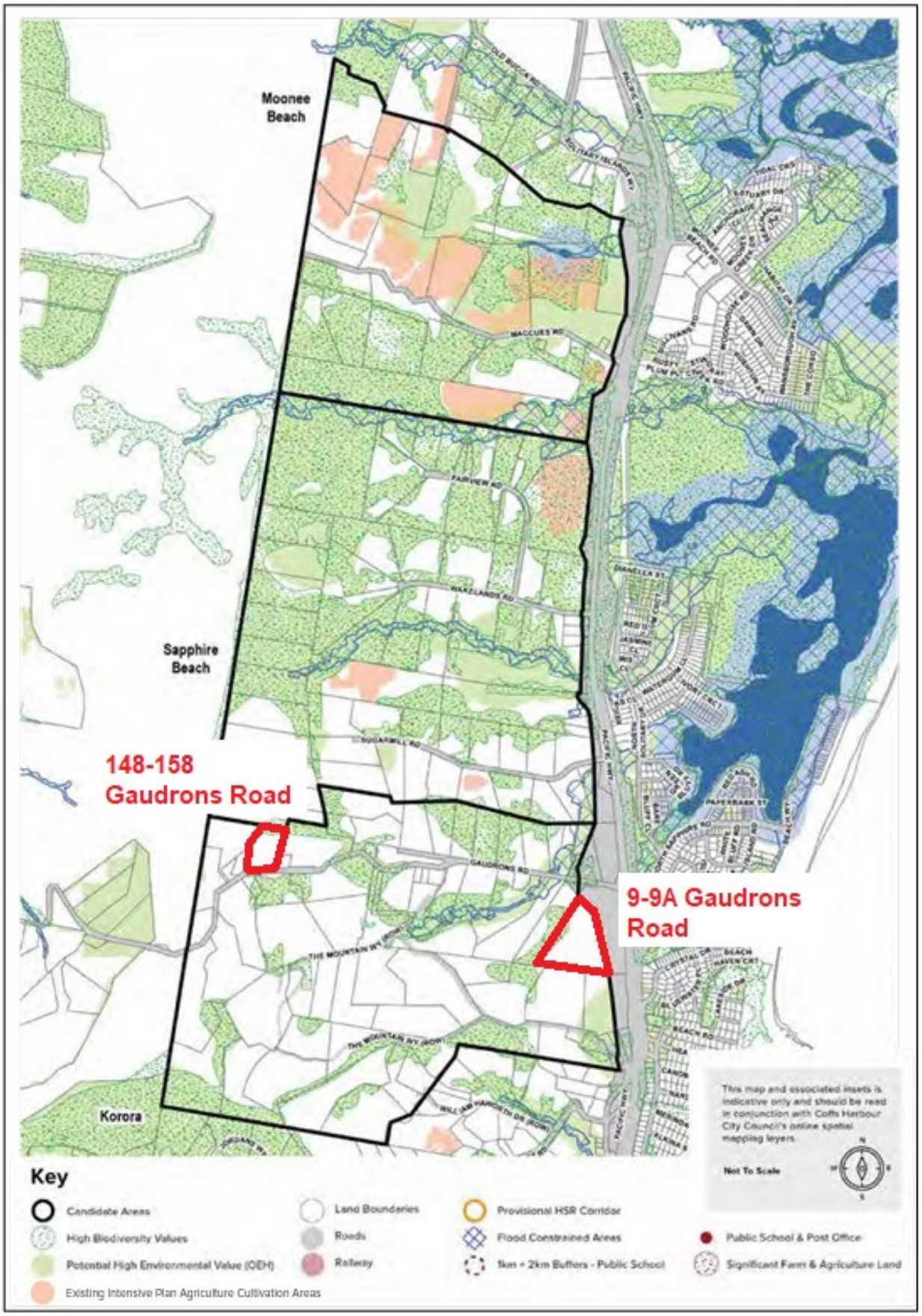


Figure 3 - Korora, Sapphire and Moonee Candidate Area

The Candidate Area was assessed by way of environmental investigations by Eco Logical Australia in 2017. The investigations concluded that precinct 5 is environmentally constrained and economically expensive

to service due to projected infrastructure costs associated with road upgrades and potential new road requirements. However, despite the constraints on the land, the LGMS identifies land in Precinct 5 for short-term release as large lot residential development.

A "joint report" was endorsed by Council at its Ordinary Meeting on 10 August 2017, in which it was agreed that proponent-initiated planning proposals can be lodged seeking rezoning of land for large lot residential purposes within the Korora, Sapphire and Moonee Candidate Area (on an individual or precinct or clustered basis) at a time of their choosing. This action was reflected in LGMS 2020.

Chapter 6 – Large Lot Residential addresses the potential reduction of minimum lot size in the R5 zone, where sufficiently justified. Section 6.7 within Chapter 6 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.' (LGMS 2020 Ch. 6 p. 11)

Coffs Harbour has a range of existing large lot residential lot sizes that reflect past planning subdivision practice. In many cases, lot sizes reflected various constraints including slope, flooding, soil types and water table issues. Minimum lot size requirements were addressed in previous Development Control Plans (e.g., under LEP 2000) prior to being included as a development standard under the Standard Instrument Local Environmental Plan (LEP 2013).

A typical factor affecting lot size in Large Lot Residential zoned areas is onsite sewage management and the potential for the lot/s to be efficiently serviced by an effective onsite sewage management system. The Land Capability Assessment included with this planning proposal (see Appendix 11) demonstrated that a minimum lot size of 6,000m^2 at 9-9A Gaudrons Road would be considered acceptable (also see section 10 of this planning proposal for further information).

Regarding infrastructure upgrades, the LGMS states that:

"*Privately funded planning proposals and subsequent funding of any required infrastructure upgrades will be the responsibility of the landowner/applicant. Subsequently, there will be less financial risk to Council should applicants wish to proceed with planning proposals. Planning proposals would still aim to achieve environmentally sustainable planning outcomes.* (LGMS 2020 Ch. 6 p. 13)

6. 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.

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

The table provided in Appendix 1 provides an assessment of consistency against each State Environmental Planning Policy relevant to the planning proposal.

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

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

9. 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. A Biodiversity Assessment was prepared for the subject sites (Appendix 3). The subject sites have previously been cleared and used for agricultural pursuits. Currently the sites consist of predominantly cleared lands comprising mostly exotic grasses, landscape, and horticultural plantings with some peripheral and isolated stands of dry and wet sclerophyll forest. One threatened flora species, Scrub Turpentine (*Rhodammnia rubescens*) was detected at 9-9A Gaudrons Road with two small saplings identified along the western boundary within forested vegetation. This species is listed as Critically Endangered under the *Biodiversity Conservation Act 2016* and *Environment Protection and Biodiversity Conservation Act 1999*. Plants recorded were observed to have signs of past myrtle rust infection and as such the long-term prognosis for these trees is poor. Despite evidence of the myrtle rust the future subdivision will need to be designed to consider connectivity, threatened species, habitat trees, retain intact vegetation, and generally take on the recommendations in the Biodiversity Report.

No threatened flora species were detected at 148-158 Gaudrons Road.

No threatened fauna species were detected at either site and no significant habitat for threatened fauna occurs at the sites, although the sites provide potential habitat for several locally occurring threatened fauna species.

No threatened ecological communities (TECs) occur at either site.

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

Yes. Other likely environmental effects resulting from the proposed rezoning are discussed in the following sections.

Aboriginal heritage

An Aboriginal Cultural Heritage Assessment (ACHA) was prepared for the subject sites (Appendix 4). The assessment concluded that:

a) One (1) Aboriginal object was identified on the western boundary of Lot 11 DP1141269 (9-9A Gaudrons Road). This object is a unifacial greywacke chopper and has been recorded as Gaudrons Road IF01 (#22-1-0602).

b) No Aboriginal objects or sites of cultural significance, including archaeological sites, are known to occur within 148-158 Gaudrons Road.

c) The extant topsoils with potential to contain Aboriginal objects have been substantially disturbed by historic clearing, banana plantations, cut and fill works and structures.

d) Due to the slope of 148-158 Gaudrons Road and the existing buildings being retained on site, it is unlikely that subdivision of these lots will impact on Aboriginal objects.

e) Having consideration for the predictive model and the results of the site inspection it is considered that the broad ridge crest within 9-9A Gaudrons Road has the potential to contain Aboriginal objects, being a stone artefact scatter located throughout the topsoils along the ridge crest. As such, further investigations are recommended, and these should be undertaken at the subdivision stage.

The ACHA contains recommendations to be implemented at the subdivision and development stage.

Acid sulfate soils

De Groot & Benson (2017) prepared a Preliminary ASS Assessment for the Korora, Sapphire, and Moonee Candidate Area. The assessment found that the presence of class 5 land should not be considered as a constraint on residential type development.

A Preliminary Acid Sulfate Soil Assessment for the proposed rezoning of both properties is included with this planning proposal (Appendix 5). Individual issues relative to both properties are as follows:

- **9-9A Gaudrons Road**

  The City's acid sulfate soil mapping indicates that 9-9A Gaudrons Road is affected by Class 5 Acid Sulfate Soils. However, the Preliminary Acid Sulfate Soil Assessment found that no Acid Sulfate Soils exist at the site.

- **148-158 Gaudrons Road**

  This property is not mapped as being affected by Acid Sulfate Soils.

Bushfire risk

A Bushfire Assessment for the proposed rezoning of both properties is included with this planning proposal (Appendix 6). Individual issues relative to both properties are as follows:

- **9-9A Gaudrons Road**

  The assessment considered an 8-lot (concept) subdivision of 9-9A Gaudrons Road (see Figure 2), which was found to be capable of generally complying with Planning for Bushfire Protection (NSW RFS, 2019).

- **148-158 Gaudrons Road**

  The assessment considered a concept plan for a 2-lot subdivision of 148-158 Gaudrons Road (see Figure 2), which was also found to be capable of generally complying with Planning for Bushfire Protection (NSW RFS, 2019).

The provision of access, asset protection zones, appropriate landscaping and property maintenance would require further assessment at subdivision stage.

Flood risk

A review of the potential flooding issues that affect both properties has been undertaken. Individual issues relative to both properties are as follows:

- **9-9A Gaudrons Road**

The review confirms that there is an overland flow path at the back of proposed lots 7 and 8, however this is only a minor issue as adequate land exists outside of the flow path on these lots which would be developable.

- **148-158 Gaudrons Road**

  A review of the potential flooding issues that affect 148-158 Gaudrons Road shows that there is an overland flow path through the property from the southwestern corner to the north east. However, the existing dwellings are not adversely affected by this issue.

No significant flood issues exist that would prevent the proposed rezoning of either property and this will be further assessed at the subdivision stage.

Stormwater

A Stormwater Assessment for the proposed rezoning of both properties is included with this planning proposal (Appendix 7). Individual issues relative to both properties are as follows:

- **9-9A Gaudrons Road**

  The Stormwater Assessment found no significant issues with the proposed rezoning and subsequent subdivision. The assessment includes recommendations to reduce the risk of stormwater impacts from an eventual subdivision.

- **148-158 Gaudrons Road**

  The Stormwater Assessment found no significant issues with the proposed rezoning and subsequent subdivision. The assessment includes recommendations to reduce the risk of stormwater impacts from an eventual subdivision.

Further assessment in relation to stormwater management for all lots affected by this draft LEP Amendment, will be required at the subdivision stage.

Traffic

A Traffic Impact Assessment for the proposed rezoning of both properties is included with this planning proposal (Appendix 8). The comments provided within the Traffic Impact Assessment are based on the concept subdivision plan shown in Figure 2. Individual issues relative to both properties are as follows:

- **9-9A Gaudrons Road**

  In relation to road access to 9-9A Gaudrons Road, the assessment confirms that satisfactory access can be provided to the property and that traffic issues would not prevent the rezoning of 9-9A Gaudrons Road.

  Further assessment in relation to traffic and access issues will be required at the subdivision stage.

- **148-158 Gaudrons Road**

  In relation to road access to 148-158 Gaudrons Road, the assessment confirms that satisfactory access can be provided to the property at the current access location and that traffic issues would not prevent the rezoning of 148-158 Gaudrons Road. It should be noted that the existing lot contains two dwellings and there will be no increase in daily vehicle trips created by the subdivision of the land into 2 lots. Therefore, there is no nexus on which to require upgrading of Gaudrons Road.

Further assessment in relation to traffic and access issues will be required at the subdivision stage.

Land Use Conflict Risk Assessment

A Land Use Conflict Risk Assessment (LUCRA) for the proposed rezoning of both properties is included with this planning proposal (Appendix 8). Individual issues relative to both properties are as follows:

- **9-9A Gaudrons Road**

  The assessment considered an 8-lot subdivision layout. The assessment found that land use conflict may occur with the RU2 Rural Landscape zoned land to the west, northwest and south of the site. The assessment considers the risk acceptable and suggests mitigation measures to reduce the risk of conflict, which include the use of vegetated separation buffers.

- **148-158 Gaudrons Road**

  The assessment considered a 2-lot subdivision of the site. The assessment considers the risk of land use conflict acceptable and suggests mitigation measures to reduce the risk of conflict, which include the use of vegetated separation buffers.

Further assessment in relation to Land Use Conflict Risk Assessment issues will be required at the subdivision stage.

Noise

Korora, Sapphire, and Moonee Candidate Area

A Noise Impact Assessment for the Korora, Sapphire, and Moonee Candidate Area, which is attached as an appendix to the Environmental Studies (Eco Logical Australia, 2017). The assessment shows that all future lots on the subject sites can achieve the required internal noise levels specified by *State Environmental Planning Policy (Transport and Infrastructure) 2021* subject to Category 1-5 construction materials and dwelling orientation being factored into the design. The details for the individual lots can be considered at subdivision stage.

An updated Noise Impact Assessment for the proposed rezoning of both properties is included with this planning proposal (Appendix 10). Individual issues relative to both properties are as follows:

- **9-9A Gaudrons Road**

  The assessment found that the entire lot is affected by road noise, and that care must be taken in the design and construction of residences to ensure residential amenity is maintained. Siting residences on the western side of the proposed lots may assist in reducing noise impacts. In addition, dwellings can be designed to reduce noise impacts. Further assessment would be required at the subdivision stage.

- **148-158 Gaudrons Road**

  No noise assessment was prepared for this site as it is not included in mapped the area affected by noise.

Further assessment in relation to noise issues will be required at the subdivision stage.

Wastewater

A Minimum Lot Size (MLS) and Land Capability Assessment (LCA) for the proposed rezoning of both properties is included with this planning proposal (Appendix 11). The purpose of the MLS and LCA is to show that wastewater from an On-site Sewage Management System (OSMS) can be sustainably dealt

with on the lots that would be created by an eventual subdivision. Individual issues relative to both properties are as follows:

- **9-9A Gaudrons Road**

  The existing OSMS are satisfactorily located, and no upgrade works are required.

  The assessment found that an OSMS using a combination of secondary treatment and subsurface bed or subsurface irrigation with a land application area of 630 m^2 would be required. While minimal laboratory analysis was undertaken, the assessment is considered sufficient to justify a 6000 m^2 minimum lot size. More detailed assessment would be required at the subdivision stage.

- **148- 158 Gaudrons Road**

  There are two existing OSMS's also at 148 Gaudrons Road. The existing approved dwelling has a septic tank and an absorption trench field both located downslope to the north of the dwelling. The OSMS is located well away from the subdivision boundary and no further works are required.

  The OSMS attached to the second dwelling (on the western boundary) is located downslope to the east and consists of a hand built besser block tank and an unknown land application method. Although the OSMS is located well away from the proposed subdivision boundary, it is failing and will need to be rectified.

  The assessment found that an OSMS using a combination of secondary treatment and subsurface bed or subsurface irrigation with a land application area of 630 m^2 would be required. While minimal laboratory analysis was undertaken, the assessment is considered sufficient for the rezoning stage. More detailed assessment would be required at the subdivision stage.

Further assessment in relation to wastewater issues will be required at the subdivision stage.

Potentially contaminated land

A Detailed Environmental Site Assessment for the proposed rezoning of both properties is included with this planning proposal (Appendix 12). The Detailed Environmental Site Assessment has identified that the subject properties were developed between 1943-1956 as banana plantations, and have progressively ceased these activities since about 1994, with ongoing agricultural landuse activities occurring on No.9-9A Gaudrons Road up to this day. In addition, No.9-9A Gaudrons Road contains existing packing and maintenance sheds, which will be demolished to allow residential redevelopment.

Detailed systematic sampling has been undertaken across both No. 9-9A and 148-158 Gaudrons Road with no elevated arsenic, lead, OCP and OPP pesticides and TRH, BTEX and PAH hydrocarbons reported.

As such, in their current states, the two properties are considered suitable for the proposed rezoning as well as the eventual subdivision and the associated creation of residential building platforms without further investigations.

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

Social and economic effects arising from the planning proposal will be positive in terms of the provision of new housing close to urban facilities in the coastal village of Moonee Beach thereby offering housing choice and diversity for existing and future residents. Consistent with the City's LSPS, Moonee Beach has been identified as a priority area for place making with local character statements and place manuals.

The proposed rezoning would permit large lot residential development in an area predominantly used for hobby farming or lifestyle housing. Consideration has been given to the potential for land use conflicts resulting from the proposed rezoning and the risk of conflict has been deemed acceptable subject to

appropriate mitigation measures to reduce the risk of conflict such as the use of separation buffers and landscaping.

Section D – State and Commonwealth interests

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

Yes. Whilst the sites are not connected to reticulated sewer, mains water or stormwater infrastructure, they have access to a public road, underground reticulated telecommunications, and electricity. Section C1.8 of The Coffs Harbour Development Control Plan 2015 specifies that the following infrastructure is to be provided as part of subdivision proposals for land zoned R5 Large Lot Residential, in accordance with the City's Planning and Design Development Specifications:

- Roads
- Drainage
- Sealed driveways where servicing two or more resulting lots
- Underground reticulated telecommunications
- Underground reticulated electricity
- National Broadband Network (where available)

Any augmentation to the existing infrastructure required to service future lots would be addressed at the subdivision stage in accordance with the City's Planning and Design Development Specification.

13. What are the views of State and Commonwealth public authorities consulted in accordance with the Gateway determination?

There are no matters of interest to Commonwealth authorities in relation to the planning proposal.

A Gateway determination was issued by the NSW Department of Planning and Environment on 23 May 2023. The Gateway determination requires consultation with the following public authorities, as required by section 3.34(2)(d) of the EP&A Act:

- NSW Rural Fire Service.
- Department of Planning and Environment (Biodiversity and Conservation Division).
- Coffs Harbour and District Local Aboriginal Land Council.
- NSW Department of Primary Industries (Agriculture).
- Transport for NSW.
- NSW Mining, Exploration and Geoscience.

This planning proposal will be further updated following the conclusion of the public authority consultation period.

PART 4 – MAPPING

Proposed mapping amendments to Coffs Harbour LEP 2013, as described in Part 2 of this planning proposal, are shown below.

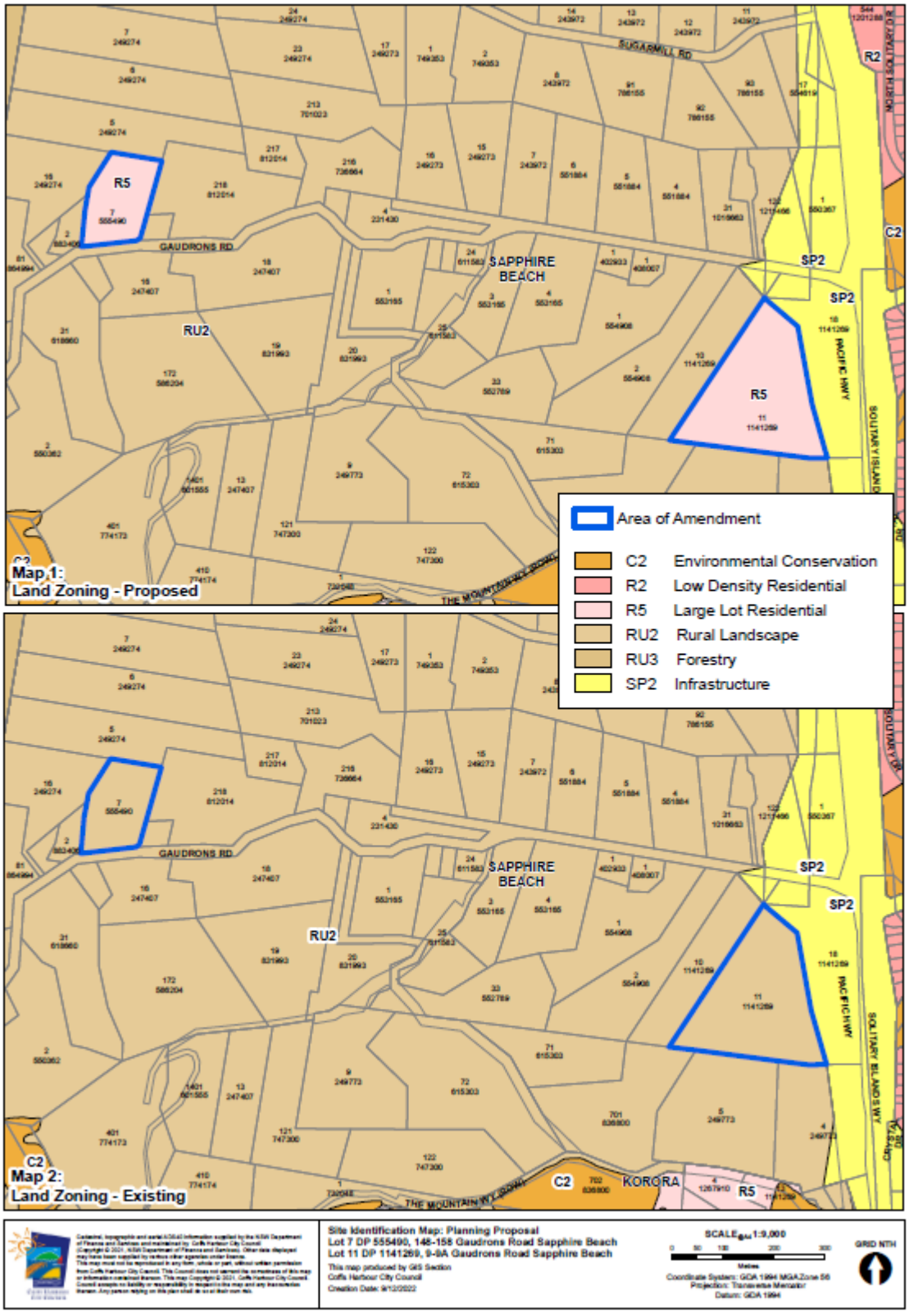


Figure 4 Combined map of existing and proposed amendments to Land Zoning Map – Sheet LZN_005C

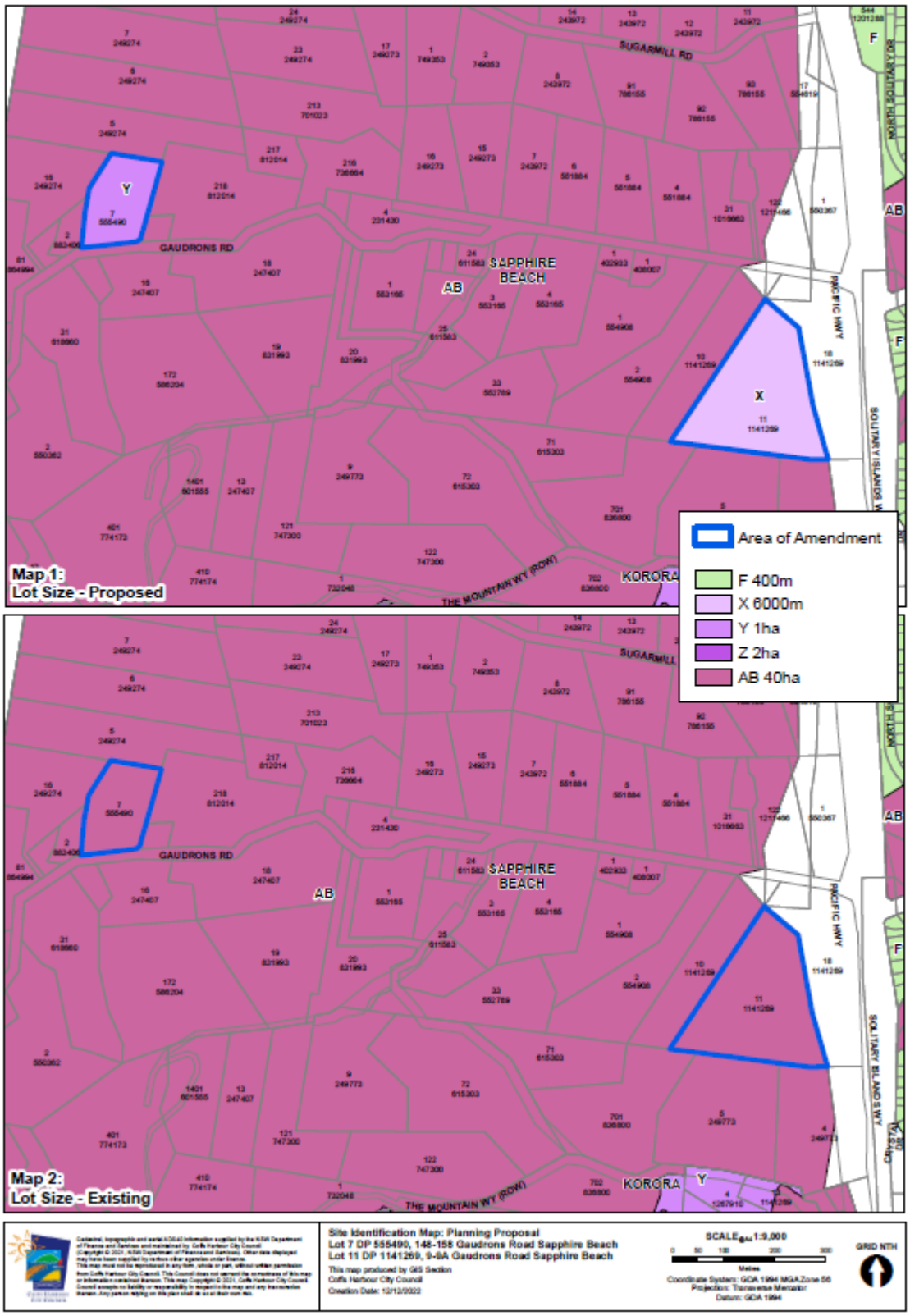


Figure 5 Combined map of existing and proposed amendments to Lot Size Map – Sheet LSZ_005C

PART 5 – COMMUNITY CONSULTATION

A Gateway determination was issued by the NSW Department of Planning and Environment on 23 May 2023. The Gateway determination has specified that public exhibition is required as per section 3.34(2)(c) and clause 4 of Schedule 1 to the Act.

Public Exhibition of the planning proposal has included the following:

Advertisement

Placement of an online advertisement in the Coffs Newsroom and within the Public Notices section of the City's website.

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 has been 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 DPIE will specify the date that the planning proposal is to be completed.

Table 2 Anticipated timeline

Milestone	Anticipated Timeframe
Decision by Council to initiate the planning proposal	April 2023
Commencement (date of Gateway determination)	23 May 2023
Public exhibition & agency consultation	July – August 2023
Consideration of submissions	September 2023
Reporting to Council for consideration	October 2023
Submission to Minister for notification of the plan	November 2023

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	N/A	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 SEPP applies to land zoned R5 Large Lot Residential. Presently, none of the sites are included on the DCP Preservation of Vegetation map. The Biodiversity Assessment (GeoLink, 2021) identified Plant Community Types 695 and 1268 on the subject sites and recommended that this vegetation be added to the City's Preservation of Vegetation map to trigger the requirements of the Vegetation SEPP and Part E1.2 (1) of DCP 2015. The City undertook a Peer Review of the Biodiversity Assessment and stated that the vegetation does not meet the requirements to be included on the Preservation of Vegetation map, and suggested that the vegetation be preserved via a Section 88b instrument under the Conveyancing Act 1919. This would be implemented at the subdivision Development Application stage through the implementation of a Vegetation Management Plan. Noting the above, 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	Yes	Yes	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

APPENDIX 1 – CONSIDERATION OF STATE ENVIRONMENTAL PLANNING POLICIES

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				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. Where an approved Comprehensive Koala Plan of Management (CKPoM) is in place the SEPP defers to this plan. The Coffs Harbour City Koala Plan of Management (CHCKPoM) was prepared in accordance with the requirements of the SEPP and introduced in January 1995. Koala habitat is shown on the City's online mapping system. No mapped primary or secondary Koala habitat occurs on the subject sties however areas of tertiary habitat occur on the periphery of both sites. Under the Coffs Harbour DCP, compensatory offset plantings are not required for impacts to tertiary Koala habitat. 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	N/A	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.

APPENDIX 1 – CONSIDERATION OF STATE ENVIRONMENTAL PLANNING POLICIES

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
SEPP (Exempt and Complying Development Codes) 2008	N/A – this is a standalone State Environmental Planning Policy	N/A	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 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	Yes	Yes	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,

APPENDIX 1 – CONSIDERATION OF STATE ENVIRONMENTAL PLANNING POLICIES

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				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	N/A	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 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	N/A	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.

APPENDIX 1 – CONSIDERATION OF STATE ENVIRONMENTAL PLANNING POLICIES

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
	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	N/A	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	N/A	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 (Precincts—Eastern Harbour City) 2021	Chapter 2 -State Significant Precincts	N/A	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	N/A	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,

APPENDIX 1 – CONSIDERATION OF STATE ENVIRONMENTAL PLANNING POLICIES

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				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 using a well-defined and concise development assessment regime based on environment risks associated with site and operational factors. The land does not comprise state significant agricultural land, or important farmland. The proposed change to an R5 Large Lot Residential zone 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	N/A	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

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State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				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. The proposed LEP amendment is not located within the Coastal Zone footprint and therefore does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 3 – Hazardous and Offensive Development	N/A	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 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	Yes	Yes	The aims of this chapter of the Policy are to promote the remediation of contaminated land for the purpose of

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State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				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. The subject sites were developed sometime between 1943-1956 as banana plantations, therefore an Environmental Site Assessment was prepared by Earth Water Consulting (Earth Water Consulting, 2021). The report states that in their current state, the sites are considered suitable for the proposed rezoning and creation of additional large lot residential development.
State Environmental Planning Policy (Resources and Energy) 2021	Chapter 2 - Mining, Petroleum Production and Extractive Industries	N/A	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 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

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State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				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.

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State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
State Environmental Planning Policy (Transport and Infrastructure) 2021	Chapter 2 - Infrastructure	Yes	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	N/A	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

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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	N/A	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—

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State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				(i) to allow the ongoing use and development of the land until it is 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	The planning proposal is consistent with the North Coast Regional Plan 2041 – see Section B (4) of this planning proposal.
1.2 Development of Aboriginal Land Council land	This direction does not currently apply to the Coffs Harbour LGA.	N/A	This direction does not currently apply to the Coffs Harbour LGA.
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 contain provisions that contradict or hinder the application of this direction.

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S9.1 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 would rezone the subject sites from Zone RU2 Rural Landscape to Zone R5 Large Lot Residential under Coffs Harbour LEP 2013 to permit the subdivision and development of the land for residential purposes. The planning proposal will not impose any development standards or requirements in addition to those already contained in the principal environmental planning instrument being amended

Focus area 1: Planning Systems – Place Based
Directions 1.5 – 1.17 do not apply to the Coffs Harbour LGA.

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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 and Environment which gives consideration to the objective of this direction, or (d) is of minor significance.	N/A	No conservation zones or land would be affected by the proposed LEP amendment.

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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 *National Parks and Wildlife Act 1974*, 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.	No	**European Heritage** The proposed LEP amendment does not impact any items currently listed in Schedule 5 Environmental Heritage of Coffs Harbour LEP 2013. **Aboriginal Cultural Heritage** The proposed LEP amendment does not contain any provisions for the conservation of matters listed at 4(a) to (c). This inconsistency is of minor significance. An Aboriginal Cultural Heritage Assessment (ACHA) was prepared by Everick Heritage (2021) for the subject sites. The assessment concluded that works at 9-9A Gaudrons Road, particularly in relation to the ridge crest, has the potential to impact on Aboriginal objects. As such additional consultation and archaeological investigation would be required during the subdivision stage. The indigenous heritage significance of the item, area, object or place is however conserved by existing or draft environmental planning instruments, legislation, or regulations that apply to the land. The assessment also concluded that future subdivision works within 148-158 Gaudrons Road are unlikely to impact on Aboriginal objects are will not impact on any known places or sites of cultural significance to the Aboriginal community. As such additional consultation and archaeological investigation would not be required.
3.3 Sydney Drinking Water Catchments	This direction does not currently apply to the Coffs Harbour LGA.	N/A	This direction does not currently apply to the Coffs Harbour LGA.
3.4 Application of C2 and C3 Zones and Environmental Overlays in Far	This direction does not currently apply to the Coffs Harbour LGA.	N/A	This direction does not currently apply to the Coffs Harbour LGA.

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North Coast LEPs			
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 *Recreation Vehicles Act 1983*): (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 Guidelines for the Selection, Establishment and Maintenance of Recreation Vehicle Areas, Soil Conservation Service of NSW, September 1985, and ii. the provisions of the guidelines entitled Recreation Vehicles Act 1983, Guidelines for Selection, Design and Operation of Recreation Vehicle Areas, State Pollution Control Commission, September 1985. 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 and Environment which gives consideration to the objective of this direction, or (d) of minor significance.	N/A	The proposed LEP amendment will not facilitate recreation vehicle areas.

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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 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,	Yes	The sites are not affected by riverine flooding. Stormwater related flows/ inundation and associated water quality would need to be considered at the subdivision stage.

	(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 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 *Floodplain Development Manual 2005*, or (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 *Floodplain Development Manual 2005* 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 Floodplain Development Manual 2005* 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 *Coastal Management Act 2016* -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 *State Environmental Planning Policy (Biodiversity and Conservation) 2021.* (1) A planning proposal must include provisions that give effect to and are consistent with: (a) the objects of the *Coastal Management Act 2016* 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 *Coastal Protection Act 1979* that continues to have effect under clause 4 of Schedule 3 to the *Coastal Management Act 2016*, 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 *State Environmental Planning Policy (Resilience and Hazards) 2021*; or	N/A	The subject sites are not located within the coastal zone.

	(b) that has been identified as land affected by a current or future coastal hazard in a local environmental plan or development 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 *State Environmental Planning Policy (Biodiversity and Conservation) 2021.* (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 *State Environmental Planning Policy (Resilience and Hazards) 2021*: (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 *Coastal Zone Management Plan* under the *Coastal Protection Act 1979* that continues to have effect under clause 4 of Schedule 3 to the *Coastal Management Act 2016*. 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.		

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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 *Planning for Bushfire Protection 2019*, (b) introduce controls that avoid placing inappropriate developments in hazardous areas, and (c) ensure that bushfire hazard reduction is not prohibited within the Asset Protection Zone (APZ). 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, for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service. If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the *Rural Fires Act 1997*), the APZ provisions must be complied with, contain provisions for two-way access roads which link to perimeter roads and/or to fire trail networks, contain provisions for adequate water supply for firefighting purposes, minimise the perimeter of the area of land interfacing the hazard which may be developed,	Yes	Bushfire Assessments have been prepared that have regard to Planning for Bushfire Protection 2019 and provide recommendations for development within the land. The planning proposal and future subdivision will meet the requirement of Planning for Bushfire Protection 2019. The PP is inconsistent with this Direction until the City consults with the Commissioner of the NSW Rural Fire Service (RFS) following the issue of a Gateway determination. Until this consultation has occurred the inconsistency with the Direction is unresolved.

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	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 *Contaminated Land Management Act 1997*, (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 (or will be suitable, after remediation) for all the purposes for which land in the zone concerned is permitted to be used, and	Yes	The subject sites have a history of agricultural land use including banana cultivation. Earth Water Consulting (2021) prepared an Environmental Site Assessment including soil testing for the subject land. The assessment concluded that the subject sites are suitable for residential development.

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	(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 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	Yes	The proposed LEP amendment will facilitate a reduction in the minimum lot size to enable the creation of additional large lot residential lots. 9 -9A Gaudrons Road is mapped as Class 5 Acid Sulfate soils. A Preliminary Acid Sulfate Soil Assessment was prepared by Earth Water Consulting (2020) which did not identify any acid sulfate soils on the lot. 148-158 Gaudrons Road is not mapped as containing acid sulfate soils.

	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 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,	N/A	Mine subsidence issues have not been identified at either site.

	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 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, 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:	Yes	The planning proposal would alter a provision relating to rural land proposed to be zoned residential, by reducing the applicable minimum lot size. The proposal is consistent with the Improving Transport Choice – Guidelines for planning and development (DUAP 2001), and The Right Place for Business

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	(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 and Environment which gives consideration to the objective of this direction, or (d) of minor significance.		and Services – Planning Policy (DUAP 2001). The 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 in traffic due to the limited number of potential lots.
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 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	N/A	The proposed LEP amendment will not affect and land reserved for a public purpose.

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	(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 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	N/A	The sites are not located near to a regulated airport or defence airfield.

	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 *Airports (Protection of Airspace) Regulation 1996*, 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 *Airports Act 1996*. 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 *Defence Regulations 2016 – Defence Aviation Areas* for that airfield; or ii. no height provisions exist in the *Defence Regulations 2016 – Defence Aviation Areas* 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		

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	meets *Australian Standard 2021 – 2015, Acoustic-Aircraft Noise Intrusion – Building siting and construction* 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 te 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 Plan prepared by the Department of Planning and Environment and 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:	N/A	The sites do not lie adjacent to or adjoining an existing shooting range.

	(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.		
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: (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	Yes	The proposed LEP amendment will facilitate the creation of additional R5 Large Lot Residential zoned lots. Future R5 Large Lot Residential lots will contribute to the supply of vacant large lot residential land and increase lifestyle choices in the Coffs Harbour LGA. The Planning Controls contained within Coffs Harbour DCP 2015 will apply to future development proposals to ensure that any subsequent housing development will be of good design.

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	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 and Environment which gives consideration to the objective of this direction, or (d) of minor significance.		
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 *Crown Land Management Act 2016,* except Crown land reserved for accommodation purposes, or land dedicated or reserved under the *National Parks and Wildlife Act 1974.* (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 *Standard Instrument (Local Environmental Plans)*	Yes	Caravan Parks and Manufactured Home Estates are not permissible land uses within the R5 Large Lot Residential zone. This planning proposal does not seek to facilitate the permissibility of either land use on this land.

	Order 2006 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 *State Environmental Planning Policy (Housing)* as to where MHEs should not be located, (b) take into account the principles listed in clause 9 Schedule 5 of *State Environmental Planning Policy (Housing)*(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 *Community Land Development Act 1989* 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 (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 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	N/A	This planning proposal does not affect land within an existing or

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	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 (c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan prepared by the Department of Planning and Environment which gives consideration to the objective of this direction, or (d) of minor significance.		proposed business or industrial zone.
7.2 Reduction in non-hosted short-term rental accommodation period	This direction does not currently apply to the Coffs Harbour LGA.	N/A	
7.3 Commercial and Retail Development along the	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.	N/A	This planning proposal does not constitute commercial and/or retail development along the Pacific Highway.

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Pacific Highway, North Coast	(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 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.		

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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: 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	N/A	This planning proposal does not prohibit or restrict mining or extractive resource activities..

	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: 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 and Environment which gives consideration to the objective of this direction, or (d) is of minor significance.	Yes	The planning proposal involves the rezoning of land from a rural to a residential zone. The proposal is supported by the Coffs Harbour LGMS which: (i) gives consideration to the objectives of this direction, (ii) (identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), and (iii) is approved by the Director-General of the Department of Planning In relation to Clause 5(b) of the direction, the proposal is justified by studies which give consideration to the objectives of the direction. Several studies have been undertaken which are referenced in this document. The studies show that the proposed LEP amendment has a low potential for negative impacts.
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	Yes	This direction is applicable as the proposal affects land within an existing rural zone.

	Greater Sydney Commission Act 2015) 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 (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 *State Environmental Planning Policy (Primary Production) 2021* 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,		In relation to clause (4) of the direction, the planning proposal: (a) Is consistent with all applicable strategic plans (c) Identifies and protects environmental values, including but not limited to, maintaining biodiversity, the protection of native vegetation, cultural heritage, and the importance of water resources (d) Considers the natural and physical constraints of the land, including but not limited to, topography, size, location, water availability and ground and soil conditions (g) Prioritises 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 uses (i) Considers the social, economic and environmental interests of the community.

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	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.		
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 *NSW Oyster Industry Sustainable Aquaculture Strategy* (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	N/A	The planning proposal is not located within a Priority Oyster Aquaculture Area or an area identified in the *NSW Oyster Industry Sustainable Aquaculture Strategy*.

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	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 (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	

Biodiversity Assessment

Gaudrons Road, Sapphire Beach – Proposed Rezoning

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APPENDIX 3 - BIODIVERSITY ASSESSMENT

UPR	*Description*	*Date Issued*	*Issued By*
3695-1011	First issue	16/03/2021	David Havilah
3695-1012	Second Issue	25/03/2021	Jessica O'Leary
3695-1013	Third Issue – Final	04/05/2021	Jessica O'Leary

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Executive Summary

GeoLINK has been engaged to prepare a Biodiversity Assessment Report (BAR) to inform a rezoning planning proposal for the following three properties off Gaudrons Road at Sapphire Beach (the site):

- 9-9A Gaudrons Road, Sapphire Beach – Lot 11 DP 1141269
- 148-158 Gaudrons Road, Sapphire Beach – Lot 7 DP 555490
- 189 Gaudrons Road, Sapphire Beach – Lot 2 DP 550362

The proposal is to rezone the subject land from RU2 Rural Landscape to R5 Large Lot Residential. The proposal also seeks to amend the minimum lot size to permit the creation of additional lots with a minimum lot size of 0.5 hectares or less.

No Biodiversity Value mapped areas occur on the sites.

Results of field assessment are as follows:

- The three sites have been historically cleared and used for agricultural pursuits. Currently the sites occur as predominantly cleared lands comprising mostly exotic grasses, landscape and horticultural plantings with some peripheral patches of dry and wet sclerophyll forest.
- One threatened flora species, Scrub Turpentine (*Rhodammnia rubescens*) was detected at Lot 11 DP1141269 with two small saplings identified along the western boundary within forested vegetation. This species is listed as Critically Endangered under the BC Act and EPBC Act. Plants recorded were observed to have signs of past myrtle rust infection. The long-term prognosis for these plants is poor.
- No threatened ecological communities (TECs) occur at the sites.
- No significant habitat for threatened fauna occurs at the site although the site provides potential habitat for a number of locally occurring threatened fauna species.

The rezoning (and future development) of the site may result in the following potential biodiversity impacts, which based on the subdivision concept design may include:

- Loss of native vegetation
- Loss of isolated paddock trees
- Minor loss of preferred Koala feed trees
- Minor loss of hollow-bearing trees
- Minor intensification of human occupation with regard to native fauna (e.g. minor increase in traffic movements).
- Introduction of weed species during the construction period.
- Disturbance to fauna during construction and ongoing occupation.
- Fauna roadkill from a minor increase in vehicular traffic.

Review of statutory instruments relevant to the proposed rezoning was completed as follows:

- *State Environmental Planning Policy (SEPP)* (Koala Habitat Protection) 2020 applies to all LGAs listed under Schedule 1, which includes the Coffs Harbour LGA. Where an approved Comprehensive Koala Plan of Management (CKPoM) is in place the SEPP defers to this plan. The *Coffs Harbour* City Koala Plan of Management (CHCKPoM) was prepared in accordance with the requirements of the SEPP and introduced in January 1995. Koala Habitat mapping indicates no mapped primary or secondary Koala habitat occurs at the site however areas of tertiary habitat are associated with vegetation on the sites. Compensatory plantings are not required for removal of this habitat.

- *Coffs Harbour Development Control Plan - (DCP* - Part E1.2 (1) of the DCP outlines compensatory planting requirements for the removal of high conservation value vegetation. According to Part E1.2 (Compensatory Requirements) of the DCP, some of the vegetation at the subject site is considered high conservation value habitat. Compensatory planting is triggered by the following habitat types on site:

  - Hollow-bearing trees - 1:20 replacement rate required.

- *Biodiversity Conservation Act 2016* (BC Act): As part of any future development application the following additional reporting would be required:

  - For those new lots which require native vegetation clearing of over 0.25 ha the BOS will be triggered and a BDAR will be required. It is noted that this includes impacts associated with APZs and future boundary/ fence lines. The BDAR determines biodiversity credits which are required to be purchased by the proponent to offset impacts of the development.
  - For those lots which don't trigger the BOS (require native vegetation clearing < 0.25 ha) a revised Biodiversity Assessment Report (BAR) will be required to assess impacts of the final subdivision design. This report would be required to include updated statutory assessments including tests of significance (five-part tests) for potentially impacted threatened species.

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act): review of Matters of Environmental Significance (MNES) listed in the Act indicates that rezoning and subsequent development of the site is unlikely to significantly affect threatened species or communities listed in the EPBC Act.

It has been recommended that:

- Impacts to threatened flora (Scrub Turpentine) should be avoided on Lot 11 DP1141269 with a minimum 10 m buffer of retained vegetation to provide protection for these plants.
- Clearing of native vegetation (mapped as intact forested PCTs communities [695 and 1268 as mapped in **Illustration 3.1**] and hollow bearing trees) should be avoided in the final design of subdivision with building envelopes, and associated infrastructure and bushfire APZs to be located within previously cleared areas. The priority would be to retain intact native forest vegetation at the site with the derived grassland communities considered to be of relatively low conservation value.
- Measures to identify and protect intact native vegetation at the site be implemented by way of:

  - Subdivision design to avoid impacts to these areas
  - Adding mapped intact forest vegetation to the CHLEP Prescribed Vegetation map to trigger the requirements of the Vegetation SEPP and Part E1.2 (1) of DCP 2015 which outlines compensatory planting requirements for the removal of high conservation value vegetation.
  - Utilization of Section 88b under the Conveyancing Act to restrict use of forested areas by the landholder.

1. Introduction

1.1 Background

GeoLINK has been engaged to prepare a Biodiversity Assessment Report (BAR) to inform a rezoning planning proposal for three properties off Gaudrons Road at Sapphire Beach (the sites).

On this basis, this assessment has been prepared to:

- Identify any ecological constraints to the proposed rezoning (e.g. habitat for threatened species or communities listed in the *Biodiversity Conservation Act 2016* (BC Act) or *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- Identify any significant trees or fauna habitat features of biodiversity importance; and
- Examine the proposal against relevant statutory requirements.

1.2 The Sites

Site details are summarised below in **Table 1.1** Site Details

Table 1.1 Site Details

Lot/ DP	*Address*	*Area (ha*	*Land use description*
Lot 11 DP 1141269	9-9A Gaudrons Road, Sapphire Beach	5.268	Past and presently used for banana production, the site includes an existing dwelling, sheds and greenhouses.
Lot 7 DP 555490	148-158 Gaudrons Road, Sapphire Beach	2.050	Currently grazed by goats and includes an existing dwelling and sheds.
Lot 2 DP 550362	189 Gaudrons Road, Sapphire Beach	4.475	Currently cleared and occasionally slashed. Includes an existing dwelling.

The sites are currently zoned RU2 (Rural Landscape) under the Coffs Harbour Local Environmental Plan (CHLEP) 2012 with the exception of a small part of 189 Gaudrons Road which is zoned as Environmental (E2).

The location of the sites is shown in **Illustration 1.1**.

1.3 Biodiversity Values Mapping

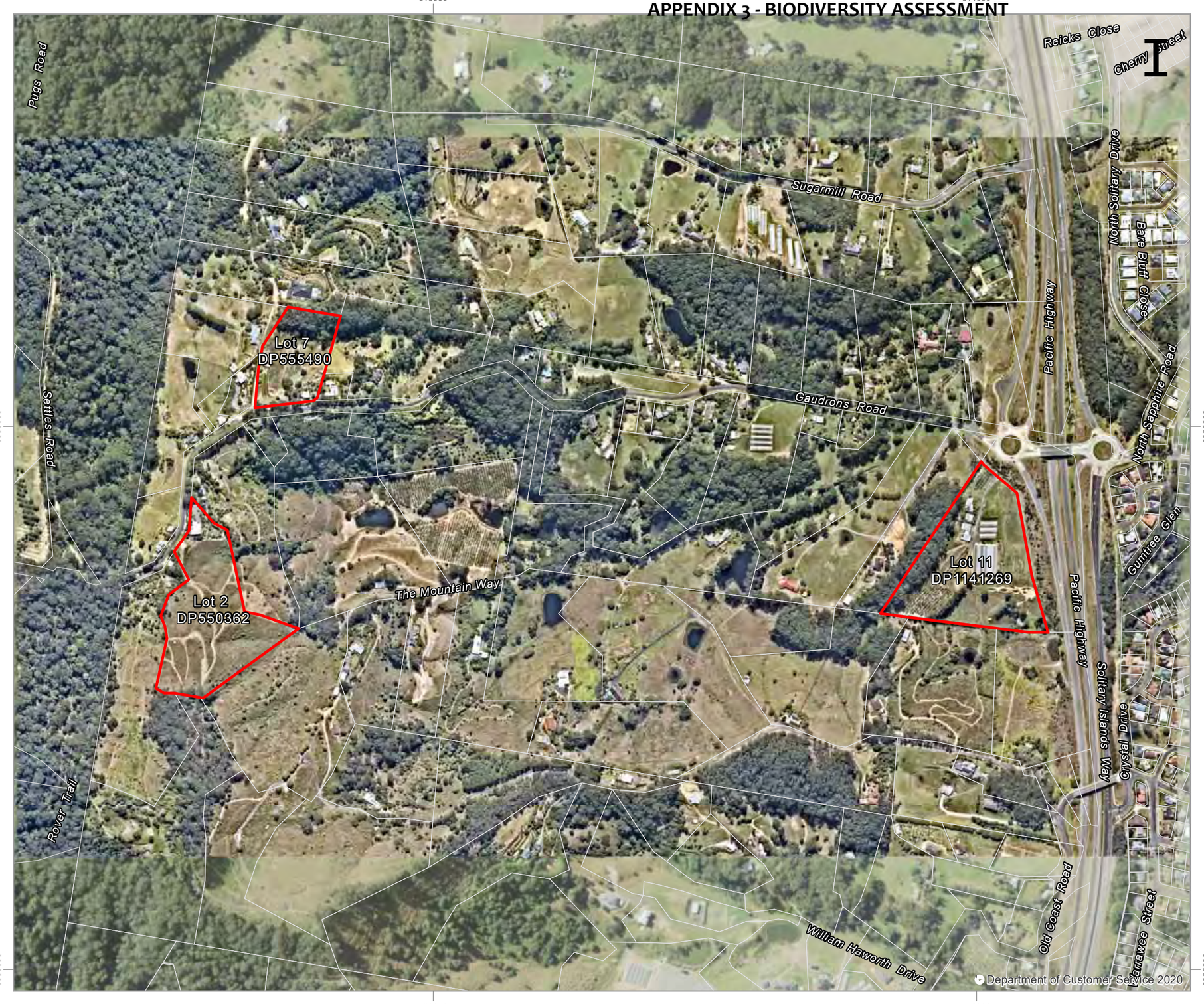
No Biodiversity Values (BV) mapped land occurs at the sites (refer to **Illustration 1.2**).

It is noted that any impact on BV mapped lands trigger the Biodiversity Offset Scheme (BOS) and the need for a Biodiversity Development Assessment Report (BDAR).

1.4 The Proposal

The proposal is to rezone the subject land from RU2 Rural Landscape to R5 Large Lot Residential. The proposal also seeks to amend the minimum lot size to permit the creation of additional lots with a minimum lot size of 0.5 ha or less. Concept subdivision layouts for the sites are included in **Appendix A.**

APPENDIX 3 - BIODIVERSITY ASSESSMENT



LEGEND

- Site boundary
- Cadastre

GDA 1994 MGA Zone 56

0 150 Metres

The Site - Illustration 1.1

Information shown is for illustrative purposes only
Drawn by: AB Checked by: RE Reviewed by: DGH
Source of base data: Nearmap
Date: 19/01/2021

APPENDIX 3 - BIODIVERSITY ASSESSMENT



LEGEND

- Site boundary
- Biodiversity Values mapping
- Watercourse

0 150 Metres

Biodiversity Values Mapping - Illustration 1.2

Information shown is for illustrative purposes only
Drawn by: AB Checked by: RE Reviewed by: DGH
Source of base data: Nearmap
Date: 19/01/2021

2. Methodology

2.1 Desktop Review

The following desktop review was completed prior to field assessment:

- A search of the BioNet Wildlife Atlas (10 km x 10 km grid centred on the site); completed February 2021.
- A search of the Protected Matters Search Tool (PMST) for Matters of National Environmental Significance (MNES) within a 5 km radius of the site; completed February 2021.
- Review of Biodiversity Value mapping (as per the OEH Biodiversity Values Map and Threshold Tool).

Details of the methodology used for field assessment are provided in **Section 2.2**. Results of database searches are attached at **Appendix B**.

2.2 Field Assessment

Field assessment was completed on 29 October 2020, using the following methodology:

- Walking survey to identify/ map native vegetation types and identify threatened flora or ecological communities listed in the BC Act or EPBC Act.
- GPS location of isolated paddock trees.
- Searches for Koala scats beneath primary Koala feed trees.
- Identification of hollow-bearing trees (or other significant habitat features) and potential habitat for threatened fauna.
- Opportunistic fauna survey.

Given that the site is relatively disturbed and generally lacking high quality vegetation/ fauna habitat, the scope of assessment is considered adequate.

3. Flora Results

3.1 Desktop Analysis

3.1.1 Database Search Results

BioNet search results identified records of 16 threatened flora species (including seven species also listed in the EPBC Act) and up to 12 threatened ecological communities (seven of which are listed under the EPBC Act) within the locality. PMST results identified habitat for 19 threatened flora species and four threatened ecological communities within the locality. Search results are provided at Error! Reference source not found..

3.2 Site Features

3.2.1 Vegetation

The three sites have been historically cleared and used for agricultural pursuits. Currently the sites occur as predominantly cleared lands comprising mostly exotic grasses, landscape and horticultural plantings with some peripheral patches of dry and wet sclerophyll forest (refer to **Illustration 3.1**). Descriptions of native vegetation at each site are provided in **Table 3.1**. Native vegetation communities are classified in accordance with plant community types (PCTs) in the BioNet Vegetation Classification based on characteristic species and geographical distribution.

Table 3.1 Native Vegetation at the Sites

9-9A Gaudrons Road	
Community	***PCT***
Open forest (Blackbutt, Turpentine, Tallowwood) An area of open sclerophyll forest occurs along the western boundary of the property. This vegetation is dominated by Blackbutt (*Eucalyptus pilularis*), Tallowwood (*Eucalyptus microcorys*) and Small-fruited Grey Gum (*Eucalyptus propinqua*) with infrequent Grey Ironbark (*Eucalyptus siderophloia*) and Brush Box (*Lophostemon confertus*). The midstorey comprises Creek Sandpaper Fig (*Ficus coronata*), Hairy Psychotria (*Psychotria loniceroides*), Three-veined Laurel (*Cryptocarya triplinervis*) and Narrow-leaved Palm Lily (*Cordyline stricta*). The ground layer is sparse comprising occasional Spiny-headed Mat-rush (*Lomandra longifolia*), Blue Flax-lily (*Dianella caerulea*) and Gristle Fern (*Blechnum cartilagineum*).	*PCT 695 - Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central NSW North Coast Bioregion*
Native Grassland (Blady Grass/ Kangaroo Grass) A cleared area comprising regularly mown/ slashed grassland including mostly Blady Grass (*Imperata cyclindrica*) and Kangaroo Grass (*Themeda triandra*) with less occasional Kikuyu Grass and Setaria Grass (*Setaria sphacelata*) occurs in the southern portion of the site.	*Derived PCT 695 - Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central NSW North Coast Bioregion*
Slash Pine and Brush Box/ Swamp Oak regrowth An area of Slash Pine (*Pinus elliottii*) and regenerating Swamp Oak (*Casuarina glauca*) and Brush Box (*Lophostemon confertus*) occurs in the south east corner of the site.	*Derived PCT 695 - Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central NSW North Coast Bioregion*

148-158 Gaudrons Road, Sapphire Beach		
Community		**PCT**
	Open forest (Blackbutt, Turpentine, Tallowwood) Areas of open sclerophyll forest occur in the northern portion of the site and fringing the site along its southern boundary. This vegetation is dominated by Blackbutt (*Eucalyptus pilularis*), Tallowwood (*Eucalyptus microcorys*) and Small-fruited Grey Gum (*Eucalyptus propinqua*) with infrequent Grey Ironbark (*Eucalyptus siderophloia*) and Brush Box (*Lophostemon confertus*). The midstorey comprises Creek Sandpaper Fig (*Ficus coronata*), Hairy Psychotria (*Psychotria loniceroides*), Three-veined Laurel (*Cryptocarya triplinervis*) and Narrow-leaved Palm Lily (*Cordyline stricta*). The ground layer is sparse comprising occasional Spiny-headed Mat-rush (*Lomandra longifolia*), Blue Flax-lily (*Dianella caerulea*) and Gristle Fern (*Blechnum cartilagineum*).	*PCT 695 - Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central NSW North Coast Bioregion*
189 Gaudrons Road, Sapphire Beach		
Community		**PCT**
3	**Open forest (Thick-leaved Mahogany, Tallowwood, Pink Bloodwood)** Open sclerophyll forest dominated by Thick-leaved Mahogany (*Eucalyptus carnea*), Pink Bloodwood (*Corymbia intermedia*) and Tallowwood fringes the site along its southern boundary. The midstorey is sparse and includes Creek Sandpaper Fig and Forest Oak (*Allocasuarina torulosa*). The ground layer is sparse comprising occasional Spiny-headed Mat-rush (*Lomandra longifolia*), Blue Flax-lily (*Dianella caerulea*) and Gristle Fern (*Blechnum cartilagineum*).	*PCT 1268 – Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion*

3.2.2 Threatened Flora

One threatened flora species, Scrub Turpentine (*Rhodammnia rubescens*) was detected at Lot 11 DP1141269 with two small saplings identified along the western boundary within forested vegetation. This species is listed as Critically Endangered under the BC Act and EPBC Act. Plants recorded were observed to have signs of past myrtle rust infection. The long-term prognosis for these plants is poor.

3.2.3 Threatened Ecological Communities (TECs)

Vegetation on the subject sites is not indicative of any TEC.

3.2.4 Weeds

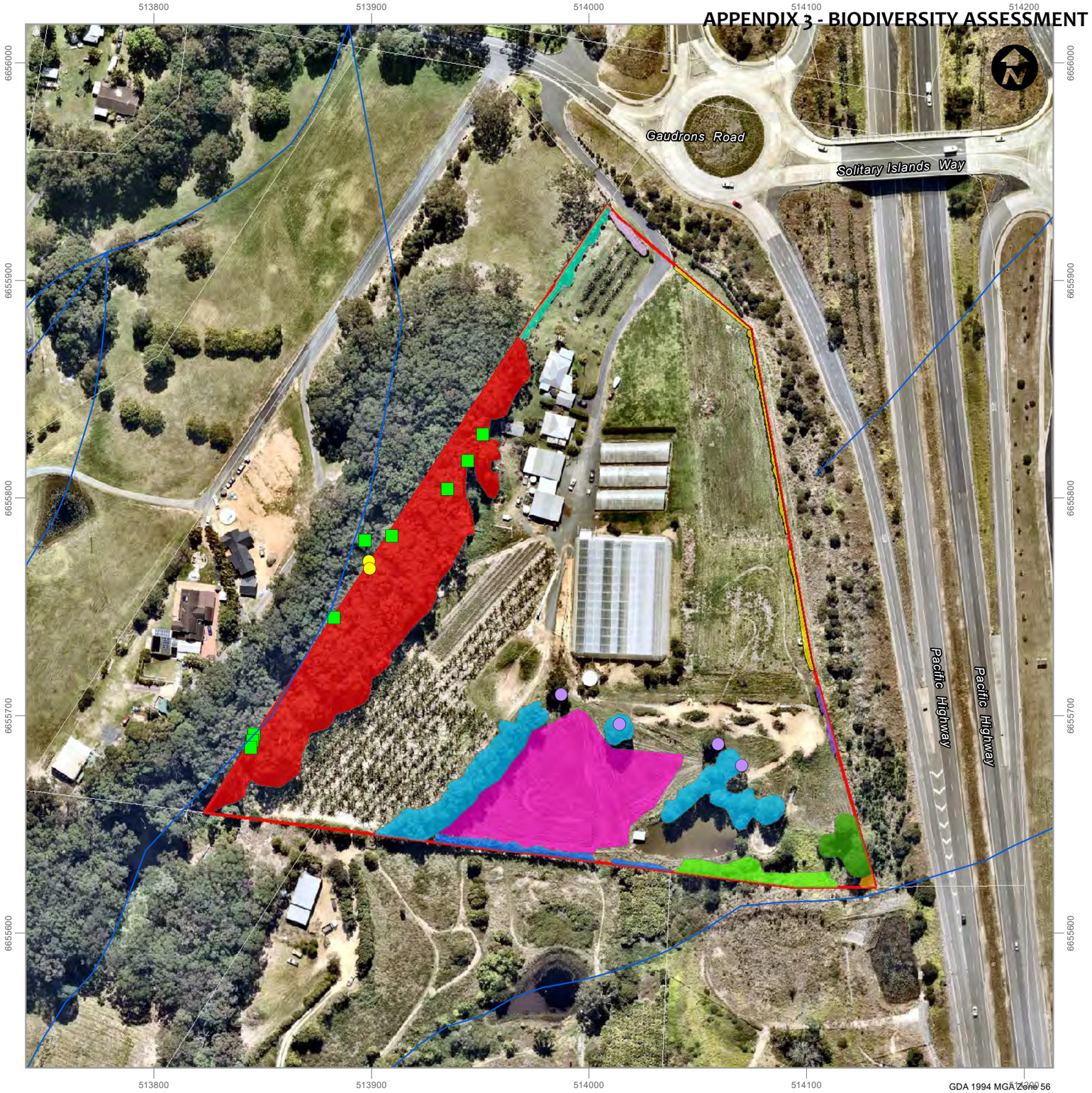
A number of agricultural and environmental weeds occur as well as the following Priority Weeds as listed in the *Biosecurity Act 2015*:

- Lantana (*Lantana camara*).

Relevant biosecurity duties must be enacted by land managers for weeds listed as Priority Weeds under the Biosecurity Act. Lantana is listed in the *Biosecurity Act 2015* as having a biosecurity duty of 'Prohibition of dealings' and "Must not be imported into the State or sold".

3.2.5 Condition

The sites are highly modified and disturbed from historic clearing and ongoing residential maintenance. Areas of eucalypt forest associated with the sites are in moderate condition with weed incursion present.



LEGEND

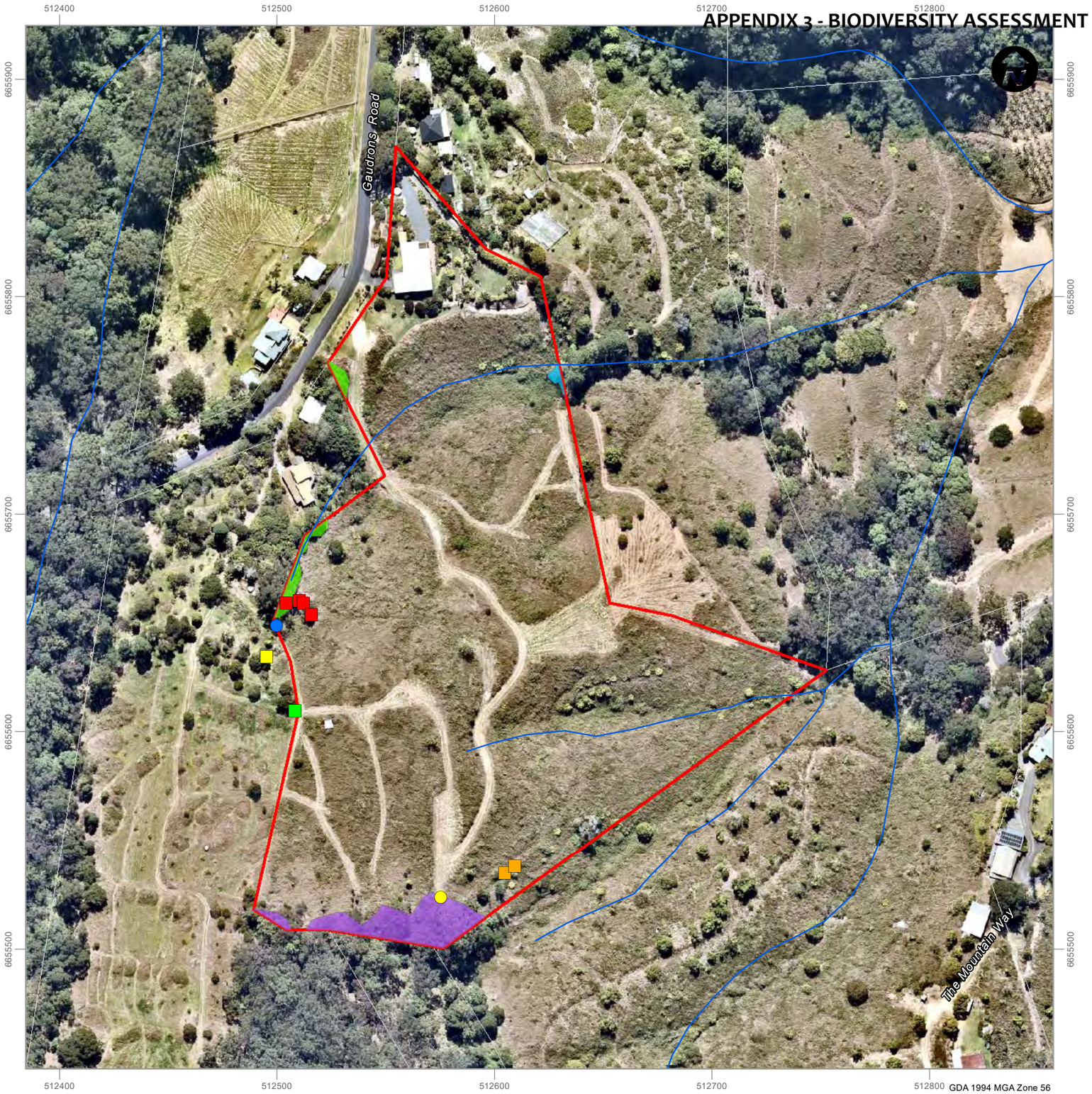
- Site boundary
- Cadastre
- Bamboo hedge
- Blady Grass/ Kangaroo Grass. Derived - PCT 695 Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central NSW North Coast Bioregion
- Blueberry Ash hedge
- Common Reed. Derived PCT 780 Coastal floodplain sedgelands, rushlands and forblands of the North Coast
- PCT 695 Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central NSW North Coast Bioregion
- Photinia hedge
- Planted Bangalow Palms
- Slash Pine
- Slash Pine and Brush Box/ Swamp Oak regrowth. Derived - PCT 695 Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central NSW North Coast Bioregion
- Slash Pine regrowth
- Slash Pine / Lantana (regrowth)
- Watercourse
- Habitat tree
- Scrub Turpentine (Threatened species)
- Slash Pine

0 40 Metres

Lot 11 / DP1141269 - Biodiversity Constraints Mapping
Illustration 3.1 - Sheet 1 of 3

Information shown is for illustrative purposes only
Drawn by: AB Checked by: RE Reviewed by: DGH
Source of base data: Nearmap
Date: 09/03/2021

APPENDIX 3 - BIODIVERSITY ASSESSMENT



LEGEND

- Site boundary
- Cadastre
- Garden escapees and regrowth natives. Derived PCT 1268 Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion
- PCT 1268 Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion
- Slash Pine
- Watercourse
- Acacia
- Callicoma
- Creek Sandpaper Fig
- Flooded Gum
- Silky Oak
- Tallowwood

0 40 Metres

Lot 2 / DP550362 - Biodiversity Constraints Mapping
Illustration 3.1 - Sheet 2 of 3

Information shown is for illustrative purposes only
Drawn by: AB Checked by: RE Reviewed by: DGH
Source of base data: Nearmap
Date: 09/03/2021



LEGEND

- Site boundary
- Cadastre
- Garden plantings
- PCT 695 Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central NSW North Coast Bioregion
- Watercourse
- Angophora
- Blackwood
- Bunya pine
- Canary Island Palm
- Cocos Palm
- Coral Tree
- Exotic Tree
- Fig
- Golden Penda
- Jacaranda
- Kapok Tree
- Mango
- Mexican Bean Tree
- Norfolk Island Palm
- Red Cedar
- Strangler Fig
- Sweet Pittosporum
- Weeping Bottlebrush
- White Cedar

0 20 Metres

Lot 7 / DP555490 - Biodiversity Constraints Mapping
Illustration 3.1 - Sheet 3 of 3

Information shown is for illustrative purposes only
Drawn by: AB Checked by: RE Reviewed by: DGH
Source of base data: Nearmap
Date: 09/03/2021

4. Fauna Habitat Results

4.1 Desktop Analysis

4.1.1 Database Search Results

BioNet search results identified records of 54 threatened fauna species (including 13 species also listed in the EPBC Act) within the locality. PMST results identified habitat for 63 threatened fauna species and 60 migratory fauna species within the locality (refer to search results at **0**).

4.2 Site Features

4.2.1 Habitat Values

Areas of eucalypt forest and paddock trees associated with the sites provide foraging, roosting and nesting resources for locally occurring native fauna including birds, mammals, megachiropteran bats and micro chiropteran bats associated with seasonally fruiting/ flowering trees.

Hollowing-bearing trees on the sites (refer to **Illustration 3.1**) contain a small number of small to medium sized hollows which provides potential resources for hollow-obligate species such as nesting birds, arboreal mammals and microbats.

Aquatic habitat is largely absent from the sites with the exception of a farm dam on 9-9A Gaudrons Road which has minor potential to provide habitat for aquatic fauna including native fish, eels and turtles.

4.2.2 Threatened and Significant Fauna Habitat

No threatened fauna species were detected at the sites.

Primary Koala feed trees (Tallowwood) are associated with the sites. No Koalas or scats were detected at the sites suggesting a low level of Koala activity at the sites.

Due to the occurrence of several flowering and fruiting trees in the myrtaceae family, potential foraging habitat for the Grey-headed Flying-fox occurs. Several species of microchiropteran bats may forage within the site on an opportunistic or seasonal basis as part of broader areas of similar foraging habitat occurring within the locality.

4.2.3 Potential for Threatened Species Occurrence

Based on the desktop analysis and habitat present, the following threatened fauna species are considered to have a high potential to occur at the site on an opportunistic or seasonal basis (refer to potential occurrence assessment at **0**):

- Little Bentwing-Bat
- Grey-headed Flying-fox.

5. Impacts and Mitigation

5.1 Biodiversity Constraints

Biodiversity constraints at the site include:

- Threatened flora species
- Areas of native vegetation
- Associated areas of fauna habitat
- Hollow-bearing trees.

The rezoning proposal would be been designed to avoid and minimise impacts to biodiversity constraints with a focus on retaining mapped intact forested vegetation described as PCT 695 and 1268 (refer to **Illustration 3.1**).

5.2 Potential Impacts of Rezoning and Development

5.2.1 Clearing of Native Vegetation

Based on the current concept subdivision layouts (refer to **Appendix A**) rezoning and future development of the site would incur loss of native vegetation including areas of forested vegetation and isolated paddock trees. Whilst it may be possible to site infrastructure within cleared areas it is likely that some clearing would be required to facilitate new access, Asset Protection Zones (APZs) and new lot boundary (fence lines). Recommendations to avoid or minimise impacts to intact forest vegetation have been provided in **Sections 5.3** and **5.4** of this report and should be incorporated into subsequent subdivision design prior to finalising.

Native vegetation clearing would potentially include:

- Minor loss of preferred Koala feed trees comprising mature Tallowwood
- Minor loss of hollow-bearing trees (n= <10).

Clearing areas would need to be determined at the time of submitting a development application based on final subdivision designs.

5.2.2 Indirect Impacts

Indirect impacts are development related activities not associated with clearing for the development footprint and may include matters such as increased noise, dust, light spill, weeds and pathogens and edge effects that can be reasonably attributed to the development. Based on the construction requirements and nature of the proposed development (residential development), anticipated indirect development may include:

1. Minor short-term disturbance (noise, human activity, machine operations) to locally occurring urban-adapted fauna species during development, construction and operation.
2. Minor potential for reduced water quality and altered hydrology due to works.
3. Minor increased risk of roadkill from increased vehicular movements on surrounding roads. It is noted that this is likely to be very minor given the small number of additional residents likely.

4. Ongoing disturbance to local fauna during occupation of the site from noise, light, human presence.
5. Potential for weeds to be imported to the site and surrounding environments during the construction stage of the proposal.
6. Potential for additional minor impacts on native fauna from additional roaming domestic animals.

5.2.3 Prescribed Impacts

Prescribed impacts are those that may affect biodiversity values in addition to, or instead of, impacts from clearing vegetation, and include (as per cl. 6.1 of the BC Regulation):

- *the impacts of development on the habitat of threatened species or ecological communities associated with:*
  - *karst, caves, crevices, cliffs and other geological features of significance*
  - *rocks*
  - *human made structures*
  - *non-native vegetation*
- *the impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range*
- *the impacts of development on movement of threatened species that maintains their life cycle*
- *the impacts of development on water quality, waterbodies and hydrological processes that sustain threatened species and threatened ecological communities (including from subsidence or upsidence resulting from underground mining or other development)*
- *the impacts of wind turbine strikes on protected animals*
- *the impacts of vehicle strikes on threatened species of animals or on animals that are part of a threatened ecological community.*

An analysis of prescribed impacts is detailed in **Table 5.1**

Table 5.1 Prescribed impacts

Prescribed impact	***Response***
the impacts of development on the habitat of threatened species or ecological communities associated with: - *karst, caves, crevices, cliffs and other geological features of significance* - *rocks* - *human made structures* - *non-native vegetation*	The site does not support karst geology and no rock features are evident. Human-made structures occur on the site but do not represent habitat for threatened species. Non-native vegetation includes landscaping plantings, gardens and lawns associated with existing residences. This vegetation does not represent likely habitat for any threatened species.
the impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	The proposed rezoning and future subdivision of the site represents a relatively minor intensification of existing land uses on the site. Additional clearing may be required in parts of the sites. The proposal is considered unlikely to adversely affect connectivity for locally occurring threatened species.
the impacts of development on movement of threatened species that maintains their life cycle	Refer above

Prescribed impact	*Response*
the impacts of development on water quality, waterbodies and hydrological processes that sustain threatened species and threatened ecological communities (including from subsidence or upsidence resulting from underground mining or other development)	No natural waterbodies occur on the subject sites.
the impacts of wind turbine strikes on protected animals	The Proposal is not a wind farm development.
the impacts of vehicle strikes on threatened species of animals or on animals that are part of a threatened ecological community	The Proposal may result in a very minor increase in vehicular traffic on surrounding roads however this given the additional small volume of traffic the change in risk of vehicle strike is considered to be negligible.

5.3 Recommendations

To minimise biodiversity impacts which may result from the proposed rezoning and future development of the site, the following measures should be considered:

- Impacts to threatened flora (Scrub Turpentine) should be avoided on Lot 11 DP1141269 with a minimum 10 m buffer of retained vegetation to provide protection for these plants.
- Clearing of native vegetation (mapped as intact forested PCTs communities [695 and 1268 as mapped in Illustration 3.1] and hollow bearing trees) should be avoided in the final design of subdivision with building envelopes, and associated infrastructure and bushfire APZs to be located within previously cleared areas. The priority would be to retain intact native forest vegetation at the site with the derived grassland communities considered to be of relatively low conservation value.
- Where native vegetation, tree hollows are to be cleared, compensation will be required (refer to **Section 5.2**).

5.4 Future Requirements

Based on the site assessment the proposed rezoning and future redevelopment of the sites would have relatively low impacts on biodiversity, assuming that future development avoids most areas of intact forested vegetation. In the event the rezoning proposal is accepted, the following requirements would need to be addressed for any future proposal to develop the site:

- Incorporate the recommendations in this assessment (**Section 5.3**) as part of future design.
- Based on the Northern Council's E Zone criteria none of the vegetation on the subject sites represents suitable land for E zones. However, it is recommended that the mapped PCTs 695 and 1268 be added to Councils Prescribed Vegetation mapping to trigger the requirements of the Vegetation SEPP and Part E1.2 (1) of DCP 2015 which outlines compensatory planting requirements for the removal of high conservation value vegetation at the following replacement rates:

- Native old growth, hollow-bearing or ecologically/aesthetically significant tree (1:20)
- Endangered Ecological Community, Over-Cleared Vegetation Types and High Value Arboreal Habitats (1:10)
- Primary Koala Habitat (1:5)
- Secondary Koala Habitat (adjacent to primary koala habitat) (1:5)
- Secondary Koala Habitat (not adjacent to primary koala habitat) (1:3)
- Riparian Zones (1:10)
- Steep Land (1:3)
- Other (1:2)

- Alternatively, forested areas on the land may be protected on title under Section 88b of the Conveyancing Act 'Restriction as to User'. This would serve to exclude intact native vegetation at the site as part of the developable land use area. An example of where this could be implemented is Lot 11 where the new lot boundary (if fenced) would dissect the existing intact vegetation in the north of the proposed lots (and where significant vegetation clearing would likely be required).

- As part of any future development application the following additional reporting would be required:

  - For those new lots which require clearing of native vegetation over 0.25 ha the BOS will be triggered and a BDAR will be required. It is noted that this includes impacts associated with APZs and future boundary/ fence lines. The BDAR determines biodiversity credits which are required to be purchased by the proponent to offset impacts of the development.
  - For those lots which don't trigger the BOS (require native vegetation clearing < 0.25 ha) a revised Biodiversity Assessment Report (BAR) will be required to assess impacts of the final subdivision design. This report would be required to include updated statutory assessments including tests of significance (five-part tests) for potentially impacted threatened species.

- Both the BDAR and revised BARs to be prepared for a future development application will need to address Council's DCP and as such will need to determine compensation requirements and/or vegetation management measures to offset the loss of native vegetation where relevant.

6. Statutory Requirements

The following sections examine the findings of the site assessment with regard to relevant statutory requirements which require consideration for the development application.

6.1 State Environmental Planning Policy (SEPP) Koala Habitat Protection 2019

State Environmental Planning Policy (Koala Habitat Protection) 2020 applies to all LGAs listed under Schedule 1, which includes the Coffs Harbour LGA. Where an approved Comprehensive Koala Plan of Management (CKPoM) is in place the SEPP defers to this plan. The *Coffs Harbour* City Koala Plan of Management (CHCKPoM) was prepared in accordance with the requirements of the SEPP and introduced in January 1995.

Koala Habitat mapping for the sites as per the CHCKPoM is shown in **Figure 6.1 – Figure 6.3**. No mapped primary (red) or secondary (blue) Koala habitat occurs at the sites however areas of tertiary (green) habitat occur on the periphery of all sites. Under the Coffs Harbour DCP compensatory offset plantings are not required for impacts to tertiary Koala habitat (**refer to Section 6.2**).



Figure 6.1 CHCKPoM Koala Habitat Mapping for 9-9A Gaudrons Road



Figure 6.2 CHCKPoM Koala Habitat Mapping for 148-158 Gaudrons Road

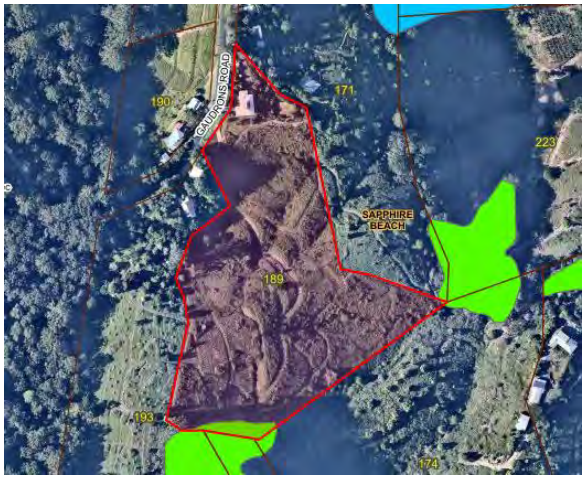


Figure 6.3 CHCKPoM Koala Habitat Mapping for 189 Gaudrons Road

6.2 Coffs Harbour Development Control Plan (DCP) 2015

Part E1.2 (1) of DCP 2015 outlines compensatory planting requirements for the removal of high conservation value vegetation (refer to definitions in **Table 6.1**). According to Part E1.2 (Compensatory Requirements) of the DCP, some vegetation at the subject sites is considered high conservation value habitat. Compensatory planting may be triggered by the following habitat types on the sites:

- Hollow-bearing trees - 1:20 replacement rate required.
- Steep Land - 1:3 replacement rate required.

Table 6.1 High Conservation Value Vegetation Types (as per DCP 2015)

Description of Habitat Type	*Replacement Rate*	*Does the vegetation to be impacted align with the high conservation value vegetation type description or require compensatory planting?*
Native old growth, hollow-bearing or ecologically/ aesthetically significant tree	1:20	**Possible** – a number of hollow-bearing trees occur at the sites. Clearing of hollow-bearing trees would require compensatory plantings at a ratio of 1:20. Numbers of compensatory plantings will be determined at a later stage.
Endangered Ecological Community, Over-Cleared Vegetation Types and High Value Arboreal Habitats	1:10	No – the vegetation occurring on the sites does not align with this habitat type description and would not trigger the need for compensatory plantings.
Primary Koala Habitat	1:5	No – the vegetation occurring on the sites does not align with this habitat type description and would not trigger the need for compensatory plantings.
Secondary Koala Habitat (adjacent to primary koala habitat)	1:5	No – the vegetation occurring on the sites does not align with this habitat type description and would not trigger the need for compensatory plantings.
Secondary Koala Habitat (not adjacent to primary koala habitat)	1:3	No – the vegetation occurring on the sites does not align with this habitat type description and

Description of Habitat Type	*Replacement Rate*	*Does the vegetation to be impacted align with the high conservation value vegetation type description or require compensatory planting?*
		would not trigger the need for compensatory plantings.
Riparian Zones	1:10	No – the sites do not include any riparian zones.
Steep Land	1:3	**Possible** – Much of 189 Gaudrons Road is mapped as 'steep and erodible lands' under the DCP and as such would require compensatory plantings. Numbers of compensatory plantings will be determined at a later stage.
Other	1:2	n/a

6.3 Biodiversity Conservation Act 2016 (BC Act)

As part of any future development application the following additional reporting would be required:

- For those new lots which require native vegetation clearing of over 0.25 ha the BOS will be triggered and a BDAR will be required. It is noted that this includes impacts associated with APZs and future boundary/ fence lines. The BDAR determines biodiversity credits which are required to be purchased by the proponent to offset impacts of the development.
- For those lots which don't trigger the BOS (require clearing of native vegetation < 0.25 ha) a revised Biodiversity Assessment Report (BAR) will be required to assess impacts of the final subdivision design. This report would be required to include updated statutory assessments including tests of significance (five-part tests) for potentially impacted threatened species/ TECs as required under the BC Act.

6.4 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The EPBC Act protects/ regulates matters of national environmental significance (MNES), including:

- World heritage properties
- National heritage places
- Wetlands of international importance
- Nationally threatened species and ecological communities
- Migratory species
- Commonwealth marine areas
- The Great Barrier Reef Marine Park
- Nuclear actions (including uranium mining)
- A water resource, in relation to coal seam gas development and large coal mining development.

Based on the search results and site assessment, significant impacts to any MNES would not be likely to result from the proposal (refer to **Table 6.2**).

Table 6.2 Assessment of MNES

Matter	*Potential impact*
Any impact on a World Heritage property?	
No World Heritage properties occur within a 5 km radius of the site.	Nil
Any impact on a National Heritage place?	
No National Heritage places occur within a 5 km radius of the site.	Nil
Any impact on a Wetland of International Importance?	
No wetlands of international importance (Ramsar sites) occur within a 5 km radius of the site.	Nil
Any impact on the Great Barrier Reef Marine Park?	
The Great Barrier Reef Marine park is distant from the site.	Nil
Any impact on a Commonwealth marine area?	
No Commonwealth marine areas occur within a 5 km radius of the site.	Nil
Any impact on nationally threatened species and ecological communities?	
Habitat for four threatened ecological communities and 82 threatened species is identified within a 5 km radius of the site. No EPBC listed ecological communities occur at the site. No listed threatened fauna species were recorded; the Grey-headed Flying-fox may use the sites on an opportunistic or seasonal basis when myrtaceous trees are in flower. Given the relatively fragmented and disturbed habitat within the site, the proposal would be unlikely result in the removal of habitat important to any threatened fauna species in a local context and would not contribute significantly to any listed key threatening processes.	Minor
Any impact on Migratory species?	
Habitat for 60 migratory species is identified within a 5km radius 10 of the site. Given the relatively fragmented and disturbed habitat present at the sites, migratory species are unlikely to be significantly affected by the proposal.	Minor

References

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Coffs Harbour Development Control Plan (2015). Viewed February 2021. https://chcc-icon.saas.t1cloud.com/public/pages/plan/book.aspx?exhibit=chcc_standard_exhibition_dcp_2015

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Lunney, D., Moon, C., Matthews, A. & Turbill, J. (1999). *Coffs Harbour City Koala Plan of Management (Part A: The Plan).* National Parks and Wildlife Service and Coffs Harbour City Council, NSW.

NSW Department of Planning, Industry and Environment (2020). *NSW BioNet Database Search Tool*. [Accessed 29/01/2021]. http://www.bionet.nsw.gov.au/

NSW Department of Planning, Industry and Environment (2020). *Threatened Species Profiles.* [Accessed February 2021]. https://www.environment.nsw.gov.au/threatenedspeciesapp/

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Appendix A

Concept Subdivision Layouts

APPENDIX 3 - BIODIVERSITY ASSESSMENT



APPENDIX 3 - BIODIVERSITY ASSESSMENT

PLAN 'D'



BS - BUILDING SITE

ALL DIMENSIONS AND AREAS ARE SUBJECT TO SURVEY

SCALE:	ORIGINAL SHEET SIZE	PLAN NO.	SHEET NO.	NO. OF SHEETS
1:2000	A3	D	5	5

DATUM: AHD	JOB No: 6511	
ORIGIN:	DATE: 22-07-2020	DRAWN: IGE
R.L.:		

REVISIONS	
DATE	DETAILS

IAN G EVISON & PARTNERS
CONSULTING SURVEYORS, ENGINEERS AND PLANNERS

2 SEMAPHORE STREET
EMERALD BEACH NSW 2456
PO BOX 6136
COFFS HARBOUR NSW 2450

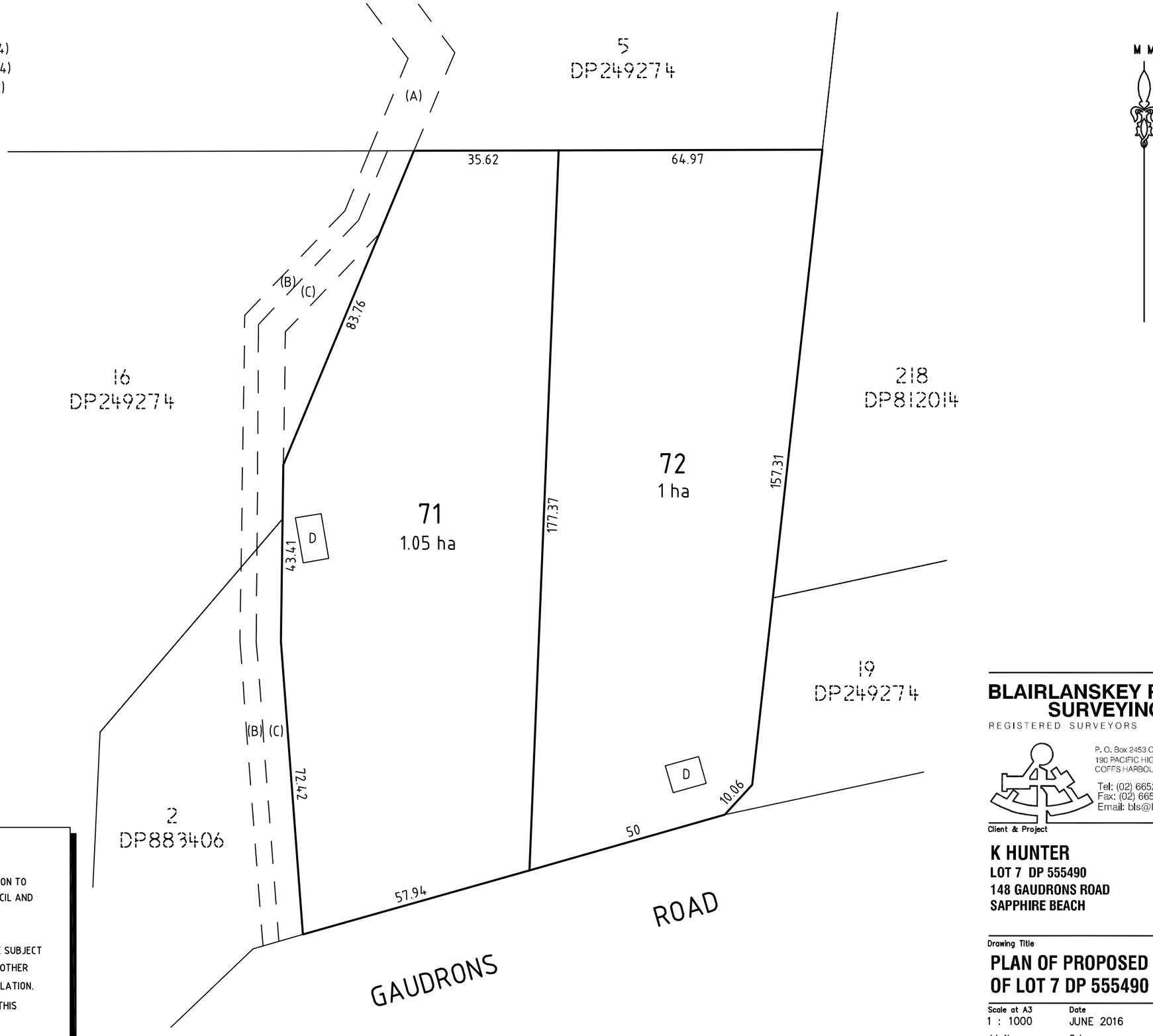
Mobile 0408 655 191
Email ige@aapt.net.au

PLAN OF PROPOSED SUBDIVISION OF LOT 2 DP 550362 – 189 GAUDRONS ROAD SAPPHIRE BEACH

SURVEYOR'S REFERENCE: 6511

(A) RIGHT OF CARRIAGEWAY 10.06 WIDE (DP249274)
(B) RIGHT OF CARRIAGEWAY 4.025 WIDE (DP249274)
(C) RIGHT OF CARRIAGEWAY 6.035 WIDE (DP539132)

D DENOTES DWELLING



DEVELOPMENT APPLICATION PLAN

THIS PLAN WAS PREPARED FOR KERRIE HUNTER AS A PROPOSED SUBDIVISION TO ACCOMPANY A DEVELOPMENT APPLICATION TO COFFS HARBOUR CITY COUNCIL AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE.

THE DIMENSIONS, AREAS AND TOTAL NUMBER OF LOTS SHOWN HEREON ARE SUBJECT TO FINAL SURVEY AND ALSO TO THE REQUIREMENTS OF COUNCIL AND ANY OTHER AUTHORITY WHICH MAY HAVE REQUIREMENTS UNDER ANY RELEVANT LEGISLATION. IN PARTICULAR NO RELIANCE SHOULD BE PLACED ON THE INFORMATION ON THIS PLAN FOR ANY FINANCIAL DEALINGS INVOLVING THE LAND.

BLAIRLANSKEY RUSSELL SURVEYING
REGISTERED SURVEYORS ABN 66 365 526 230
P. O. Box 2453 COFFS HARBOUR N.S.W. 2450
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Client & Project

K HUNTER
LOT 7 DP 555490
148 GAUDRONS ROAD
SAPPHIRE BEACH

Drawing Title

PLAN OF PROPOSED SUBDIVISION OF LOT 7 DP 555490

Scale at A3	Date	Approved
1 : 1000	JUNE 2016	
Job No.	Datum	Field Book No.
9194		
Drawing No.	Revision No.	
01	A	

Appendix B

Database 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: 19/02/21 13:49:06

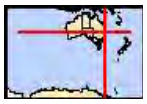
Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015

Coordinates
Buffer: 5.0Km



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:	82
Listed Migratory Species:	60

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:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	90
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:	6
Regional Forest Agreements:	1
Invasive Species:	40
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

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
Atrichornis rufescens Rufous Scrub-bird [655]	Endangered	Species or species habitat may 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
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
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may 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
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may 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 known to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	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
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 [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

Name	Status	Type of Presence
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	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 steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis cucullatus cucullatus Hooded Plover (eastern), Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat may occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area
Fish		
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat likely to occur within area
Frogs		
Litoria olongburensis Wallum Sedge Frog [1821]	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

Name	Status	Type of Presence
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
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 likely to occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Plants		
Acronychia littoralis Scented Acronychia [8582]	Endangered	Species or species habitat likely to occur within area
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to 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
Haloragis exalata subsp. velutina Tall Velvet Sea-berry [16839]	Vulnerable	Species or species habitat may occur within area
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat known to 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 known to occur within area

Name	Status	Type of Presence
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
Plectranthus nitidus Nightcap Plectranthus, Silver Plectranthus [55742]	Endangered	Species or species habitat may occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat known to occur within area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat known to occur within area
Samadera sp. Moonee Creek (J.King s.n. Nov. 1949) [86885]	Endangered	Species or species habitat known to occur within area
Sarcochilus fitzgeraldii Ravine Orchid [19131]	Vulnerable	Species or species habitat may 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 likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Coeranoscincus reticulatus Three-toed Snake-tooth Skink [59628]	Vulnerable	Species or species habitat may 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

Name	Status	Type of Presence
		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]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	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 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
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		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	Breeding 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

Name	Threatened	Type of Presence
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat known to 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
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 may 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

Name	Threatened	Type of Presence
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area
Gallinago megala Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to 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
Numenius minutus Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area
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 - Australian Telecommunications Commission

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]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
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
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Catharacta skua Great Skua [59472]		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 likely to occur within area
Gallinago megala Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to 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
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area

Name	Threatened	Type of Presence
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 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
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	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]		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]	Endangered*	Species or species habitat likely to occur within area
Sterna albifrons Little Tern [813]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within

Name	Threatened	Type of Presence area
Thalassarche cauta Shy Albatross [89224]	Endangered	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 habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	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
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

Name	Threatened	Type of Presence 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, Flat-faced Seahorse [66720]		Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	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

Name	Threatened	Type of Presence
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		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding 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

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

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Bruxner Park	NSW
Coffs Coast	NSW
Kororo	NSW
Moonee Beach	NSW
Split Solitary Island	NSW
UNE 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

Name	Status	Type of Presence 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 habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		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

Name	Status	Type of Presence
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
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
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]		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
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		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		

Name	Status	Type of Presence
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Caveat

APPENDIX 3 - BIODIVERSITY ASSESSMENT

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

-30.22691 153.14159

Acknowledgements

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

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

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

Please feel free to provide feedback via the Contact Us page.

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APPENDIX 3 - BIODIVERSITY ASSESSMENT

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Threatened (listed on BC Act 2016) or Commonwealth listed Communities in selected area [North: -30.18 West: 153.09 East: 153.19 South: -30.28] returned 0 records for 12 entities.
Report generated on 19/02/2021 1:41 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Community				*Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*		Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3	V	K	
Community				*Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*		Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K	
Community				*Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*		Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3	CE	K	
Community				*Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions*		Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	E3	CE	K	
Community				*Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion*		Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion	E3	CE	K	
Community				*Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions*		Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions	E3	E	K	
Community				*Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion*		Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion	E3		K	
Community				*Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*		Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3	E	K	
Community				*Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*		Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K	
Community				*Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions*		Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions	E3		K	
Community				*White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and*		White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and	E4B	CE	P	
Community				*White Gum Moist Forest in the NSW North Coast Bioregion*		White Gum Moist Forest in the NSW North Coast Bioregion	E3		K	

APPENDIX 3 - BIODIVERSITY ASSESSMENT

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Threatened (listed on BC Act 2016) or Commonwealth listed Plants in selected area [North: -30.18 West: 153.09 East: 153.19 South: -30.28] returned a total of 980 records of 16 species.
Report generated on 19/02/2021 1:39 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Plantae	Flora	Apocynaceae	1233	*Marsdenia longiloba*		Slender Marsdenia	E1	V	68	
Plantae	Flora	Apocynaceae	9505	*Parsonsia dorrigoensis*		Milky Silkpod	V	E	1	
Plantae	Flora	Araceae	10749	^^*Typhonium sp. aff. brownii*		Stinky Lily	E1,3		1	
Plantae	Flora	Fabaceae (Faboideae)	2897	*Kennedia retrorsa*			V	V	2	
Plantae	Flora	Fabaceae (Faboideae)	11644	*Pultenaea maritima*		Coast Headland Pea	V		9	
Plantae	Flora	Fabaceae (Faboideae)	3032	*Sophora tomentosa*		Silverbush	E1		5	
Plantae	Flora	Lindsaeaceae	8128	^^*Lindsaea incisa*		Slender Screw Fern	E1,3		20	
Plantae	Flora	Myrtaceae	4283	*Rhodamnia rubescens*		Scrub Turpentine	E4A		31	
Plantae	Flora	Myrtaceae	4284	*Rhodomyrtus psidioides*		Native Guava	E4A		15	
Plantae	Flora	Orchidaceae	9027	^*Diuris praecox*		Rough Doubletail	V,P,2	V	1	
Plantae	Flora	Poaceae	8979	*Alexfloydia repens*		Floyd's Grass	E1		8	
Plantae	Flora	Rutaceae	9496	*Zieria prostrata*		Headland Zieria	E1	E	3	
Plantae	Flora	Rutaceae	5847	*Zieria smithii*		Low growing form of Z. smithii, Diggers Head	E2		2	
Plantae	Flora	Santalaceae	5871	*Thesium australe*		Austral Toadflax	V	V	8	
Plantae	Flora	Sapotaceae	11957	*Niemeyera whitei*		Rusty Plum, Plum Boxwood	V		221	
Plantae	Flora	Simaroubaceae	9497	*Quassia sp. Moonee Creek*		Moonee Quassia	E1	E	585	

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Report generated on 19/02/2021 1:37 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Amphibia	Myobatrachidae	3075	*^Mixophyes iteratus*		Giant Barred Frog	E1,P,2	E	31	
Animalia	Amphibia	Hylidae	3169	*Litoria brevipalmata*		Green-thighed Frog	V,P		3	
Animalia	Reptilia	Cheloniidae	2004	*Caretta caretta*		Loggerhead Turtle	E1,P	E	2	
Animalia	Reptilia	Cheloniidae	2007	*Chelonia mydas*		Green Turtle	V,P	V	3	
Animalia	Reptilia	Cheloniidae	2008	*Eretmochelys imbricata*		Hawksbill Turtle	P	V	3	
Animalia	Reptilia	Elapidae	2677	*Hoplocephalus stephensii*		Stephens' Banded Snake	V,P		9	
Animalia	Aves	Casuariidae	0001	*Dromaius novaehollandiae*		Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area	E2,P		1	
Animalia	Aves	Columbidae	0025	*Ptilinopus magnificus*		Wompoo Fruit-Dove	V,P		64	
Animalia	Aves	Columbidae	0021	*Ptilinopus regina*		Rose-crowned Fruit-Dove	V,P		18	
Animalia	Aves	Apodidae	0334	*Hirundapus caudacutus*		White-throated Needletail	P	V,C,J,K	55	
Animalia	Aves	Procellariidae	0971	*Pterodroma solandri*		Providence Petrel	V,P		1	
Animalia	Aves	Ciconiidae	0183	*Ephippiorhynchus asiaticus*		Black-necked Stork	E1,P		6	
Animalia	Aves	Ardeidae	0196	*Ixobrychus flavicollis*		Black Bittern	V,P		6	
Animalia	Aves	Accipitridae	0226	*Haliaeetus leucogaster*		White-bellied Sea-Eagle	V,P		43	
Animalia	Aves	Accipitridae	0225	*Hieraaetus morphnoides*		Little Eagle	V,P		6	
Animalia	Aves	Accipitridae	0230	*^^Lophoictinia isura*		Square-tailed Kite	V,P,3		3	
Animalia	Aves	Accipitridae	8739	*^^Pandion cristatus*		Eastern Osprey	V,P,3		23	
Animalia	Aves	Gruidae	0177	*Grus rubicunda*		Brolga	V,P		1	
Animalia	Aves	Burhinidae	0175	*Esacus magnirostris*		Beach Stone-curlew	E4A,P		3	
Animalia	Aves	Haematopodidae	0131	*Haematopus fuliginosus*		Sooty Oystercatcher	V,P		21	
Animalia	Aves	Haematopodidae	0130	*Haematopus longirostris*		Pied Oystercatcher	E1,P		10	
Animalia	Aves	Laridae	0117	*Sternula albifrons*		Little Tern	E1,P	C,J,K	2	
Animalia	Aves	Cacatuidae	0268	*^^Callocephalon fimbriatum*		Gang-gang Cockatoo	V,P,3		1	
Animalia	Aves	Cacatuidae	0265	*^Calyptorhynchus lathami*		Glossy Black-Cockatoo	V,P,2		63	
Animalia	Aves	Psittacidae	0260	*Glossopsitta pusilla*		Little Lorikeet	V,P		29	
Animalia	Aves	Psittacidae	0309	*^^Lathamus discolor*		Swift Parrot	E1,P,3	CE	19	
Animalia	Aves	Strigidae	0246	*^^Ninox connivens*		Barking Owl	V,P,3		1	
Animalia	Aves	Strigidae	0248	*^^Ninox strenua*		Powerful Owl	V,P,3		4	
Animalia	Aves	Tytonidae	0252	*^^Tyto longimembris*		Eastern Grass Owl	V,P,3		1	
Animalia	Aves	Tytonidae	0250	*^^Tyto novaehollandiae*		Masked Owl	V,P,3		1	
Animalia	Aves	Tytonidae	9924	*^^Tyto tenebricosa*		Sooty Owl	V,P,3		10	
Animalia	Aves	Climacteridae	8127	*Climacteris picumnus victoriae*		Brown Treecreeper (eastern subspecies)	V,P		1	
Animalia	Aves	Meliphagidae	0603	*Anthochaera phrygia*		Regent Honeyeater	E4A,P	CE	3	
Animalia	Aves	Neosittidae	0549	*Daphoenositta chrysoptera*		Varied Sittella	V,P		11	
Animalia	Aves	Campephagidae	0428	*Coracina lineata*		Barred Cuckoo-shrike	V,P		4	
Animalia	Aves	Artamidae	8519	*Artamus cyanopterus cyanopterus*		Dusky Woodswallow	V,P		4	
Animalia	Aves	Petroicidae	0380	*Petroica boodang*		Scarlet Robin	V,P		2	
Animalia	Mammalia	Dasyuridae	1008	*Dasyurus maculatus*		Spotted-tailed Quoll	V,P	E	1	
Animalia	Mammalia	Dasyuridae	1017	*Phascogale tapoatafa*		Brush-tailed Phascogale	V,P		1	
Animalia	Mammalia	Dasyuridae	1045	*Planigale maculata*		Common Planigale	V,P		2	
Animalia	Mammalia	Phascolarctidae	1162	*Phascolarctos cinereus*		Koala	V,P	V	104	
Animalia	Mammalia	Petauridae	1136	*Petaurus australis*		Yellow-bellied Glider	V,P		11	
Animalia	Mammalia	Petauridae	1137	*Petaurus norfolcensis*		Squirrel Glider	V,P		8	
Animalia	Mammalia	Pseudocheiridae	1133	*Petauroides volans*		Greater Glider	P	V	1	
Animalia	Mammalia	Pteropodidae	1280	*Pteropus poliocephalus*		Grey-headed Flying-fox	V,P	V	33	
Animalia	Mammalia	Pteropodidae	1294	*Syconycteris australis*		Common Blossom-bat	V,P		9	
Animalia	Mammalia	Emballonuridae	1321	*Saccolaimus flaviventris*		Yellow-bellied Sheathtail-bat	V,P		2	
Animalia	Mammalia	Molossidae	1329	*Micronomus norfolkensis*		Eastern Coastal Free-tailed Bat	V,P		3	
Animalia	Mammalia	Vespertilionidae	1357	*Myotis macropus*		Southern Myotis	V,P		7	
Animalia	Mammalia	Vespertilionidae	1369	*Phoniscus papuensis*		Golden-tipped Bat	V,P		4	

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Animalia	Mammalia	Miniopteridae	1346	*Miniopterus australis*	Little Bent-winged Bat	V,P		24	
Animalia	Mammalia	Miniopteridae	3330	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V,P		4	
Animalia	Mammalia	Balaenopteridae	1575	*Megaptera novaeangliae*	Humpback Whale	V,P	V	2	
Animalia	Insecta	Hesperiidae	I023	*Ocybadistes knightorum*	Black Grass-dart Butterfly	E1		29	

Appendix C

Potential for Threatened Fauna Occurrence

Table C.1 Threatened Fauna Potential Occurrence Assessment*

***Migratory/pelagic marine species identified in the search results are not assessed as no habitat occurs at the site**

Scientific name	*Common name*	*BC Act*	*EPBC Act*	*Habitat requirement*	*Suitability of site habitat*	*Potential occurrence*	*Need for five-part test*
Amphibians							
Litoria brevipalmata	Green-thighed Frog	V	-	Rainforest, moist to dry eucalypt forest and heath, typically where surface water gathers after rain.	Marginal habitat associated with forested parts of the sites.	Low – scarce local records	No
Mixophyes iteratus	Giant Barred Frog	E	E	Deep, damp leaf litter in rainforests, moist eucalypt forest and near dry eucalypt forest.	No appropriate riparian habitat at the site.	Low	No
Aves							
Anthochaera phrygia	Regent Honeyeater	CE	CE	Dry open forest and woodland with an abundance of nectar-producing eucalypts, particularly box-ironbark woodland, swamp mahogany forests, and riverine sheoak woodlands.	Marginal foraging habitat associated with the site.	Low	No
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	Woodlands and dry open sclerophyll forests, usually dominated by eucalypts; also recorded in shrublands, heathlands and various modified habitats.	Marginal foraging habitat associated with the site.	Low	No
Callocephalon fimbriatum	Gang-gang Cockatoo	V	-	Wetter forests and woodlands, timbered watercourses, coastal scrub.	Low quality habitat at the site.	Low – no local records	No
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	-	Sheoaks in coastal forests and woodlands, timbered watercourses, and moist and dry eucalypt forests of the coast and the Great Divide up to 1,000 m.	Foraging habitat associated with occasional Forest Oaks on the site.	Moderate	No – negligible impacts likely
Climacteris picumnus	Brown Treecreeper	V	-	Eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range, and less commonly on coastal plains and ranges.	Marginal foraging habitat associated with forested parts of the site.	Low – only one local record not proximate to the site	No
Coracina lineata	Barred Cuckoo-shrike	V	-	Rainforest, eucalypt woodlands, swamp woodlands and timber along watercourses.	Suitable foraging habitat associated with forested areas.	Moderate	No – negligible impacts likely

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Scientific name	Common name	BC Act	EPBC Act	Habitat requirement	Suitability of site habitat	Potential occurrence	Need for five-part test
Daphoenositta chrysoptera	Varied Sittella	V	-	Inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Suitable foraging habitat associated with the site.	Low – no recent local records proximate to the site	No – negligible impacts likely
Dromaius novaehollandiae	Emu population in the NSW North Coast Bioregion and Port Stephens LGA	E	-	Open forest, woodland, coastal heath, coastal dunes, wetland areas, tea tree plantations and open farmland, and occasionally in littoral rainforest.	No suitable habitat at the site	Low – no local records	No
Ephippiorhynchus asiaticus	Black-necked Stork	E	-	Swamps, mangroves, mudflats, dry floodplains.	No suitable habitat at the site	Low	No
Esacus magnirostris	Beach Stone-curlew	CE	-	Tidal flats at the mouth of estuaries or on open beaches.	No suitable habitat at the site	Low	No
Glossopsitta pusilla	Little Lorikeet	V	-	Forages in open Eucalyptus forest and woodland; also feeds on Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity.	Suitable foraging habitat at the site	Moderate	No – negligible impacts likely
Grus rubicunda	Brolga	V	-	Shallow swamps, floodplains, grasslands and pastoral lands, usually in pairs or parties.	No suitable habitat at the site	Low	No
Haematopus fuliginosus	Sooty Oystercatcher	V	-	Intertidal rocky and coral reefs, mostly ocean shores.	No suitable habitat at the site	Low	No
Haematopus longirostris	Pied Oystercatcher	E	-	Open beaches, intertidal flats, sandbanks and occasionally rocky headlands.	No suitable habitat at the site	Low	No

Scientific name	Common name	BC Act	EPBC Act	Habitat requirement	Suitability of site habitat	Potential occurrence	Need for five-part test
Haliaeetus leucogaster	White-bellied Sea-eagle	V	-	Coastal habitats and around terrestrial wetlands characterised by the presence of large areas of open water (larger rivers, swamps, lakes, ocean). Habitats may include freshwater swamps, lakes, reservoirs, billabongs, saltmarsh and sewage ponds in addition to bays and inlets, beaches, reefs, lagoons, estuaries and mangroves.	Potential to occur foraging over the site	Moderate	No – unlikely to be impacted as a highly mobile species
Hieraaetus morphnoides	Little Eagle	V	-	Open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used.	Potential to occur foraging over the site	Moderate	No – unlikely to be impacted as a highly mobile species
Hirundapus caudacutus	White-throated Needletail	-	V	Most often recorded aerial foraging above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy. Breeding does not occur in Australia.	Potential to occur foraging over the site	Moderate	No – unlikely to be impacted as a highly mobile species
Ixobrychus flavicollis	Black Bittern	V	-	Dense vegetation fringing and in streams, swamps, tidal creeks and mudflats, particularly amongst swamp sheoaks and mangroves.	Marginal habitat associated with Sugar Mill Creek.	Low	No
Lathamus discolor	Swift Parrot	E	CE	On mainland Australia foraging occurs where eucalypts are flowering profusely or where abundant lerp infestations occur. Favoured feed trees include winter flowering species such as Swamp Mahogany Eucalyptus robusta, Spotted Gum Corymbia maculata, Red Bloodwood C. gummifera, Forest Red Gum E. tereticornis, Mugga Ironbark E. sideroxylon, and White Box E. albens. Commonly used lerp infested trees include Inland Grey Box E. microcarpa, Grey Box E. moluccana, Blackbutt E. pilularis and Yellow Box E. melliodora.	Suitable foraging habitat at the site	Moderate	No – negligible impacts likely

Scientific name	Common name	BC Act	EPBC Act	Habitat requirement	Suitability of site habitat	Potential occurrence	Need for five-part test
Lophoictinia isura	Square-tailed Kite	V	-	Dry woodland and open forest, particularly along major rivers and belts of trees in urban or semi-urban areas. Home ranges can extend over at least 100 km2.	Potential to occur foraging over the site	Moderate	No – unlikely to be impacted
Ninox connivens	Barking Owl	V	-	Eucalypt woodland, open forest, swamp woodlands and timber along watercourses.	No suitable nesting habitat on the site. Suitable foraging habitat present.	Moderate	No
Ninox strenua	Powerful Owl	V	-	Woodland and open forest to tall moist forest and rainforest. Requires large tracts of forest or woodland habitat but may also occur in fragmented landscapes.	No suitable nesting habitat on the site. Suitable foraging habitat present.	Moderate	No
Pandion cristatus	Eastern Osprey	V	-	Littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. Typically occur in coastal areas but occasionally travel inland along major rivers. Wetland habitats include inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes and waterholes.	The site does not represent permanent habitat for this species.	Low	No
Petroica boodang	Scarlet Robin	V	-	Dry eucalypt forests and woodlands with an open and grassy understorey with few scattered shrubs. Both mature and regrowth vegetation are utilised; habitat usually contains abundant logs and fallen timber.	Very marginal habitat at the site	Low	No
Ptilinopus magnificus	Wompoo Fruit-dove	V	-	Rainforests, low-elevation moist eucalypt forest, and Brush Box forests.	Marginal foraging habitat associated with the site.	Moderate	No
Ptilinopus regina	Rose-crowned Fruit-dove	V	-	Subtropical and dry rainforest, moist eucalypt forest and swamp forest.	Suitable habitat associated with the site	Moderate	No

Scientific name	Common name	BC Act	EPBC Act	Habitat requirement	Suitability of site habitat	Potential occurrence	Need for five-part test
Sternula albifrons	Little Tern	E	-	Coastal waters, bays, shallow inlets, salt or brackish lakes.	No suitable habitat at the site	Low	No
Tyto longimembris	Eastern Grass Owl	V	-	Areas of tall grass, including tussocks in swampy areas, grassy plains, swampy heath, cane grass, sedges on flood plains.	No suitable habitat at the site	Low	No
Tyto novaehollandiae	Masked Owl	V	-	Dry eucalypt forest and woodlands.	No suitable nesting habitat on the site. Suitable foraging habitat present.	Moderate	No
Tyto tenebricosa	Sooty Owl	V	-	Dry, subtropical and warm temperate rainforests and wet eucalypt forests. Nest in large tree hollows.	No suitable nesting habitat on the site. Suitable foraging habitat present.	Moderate	No
Mammals							
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Near cave entrances and crevices in cliffs.	No caves/ cliffs near the site	Low	No
Dasyurus maculatus	Spotted-tailed Quoll	V	E	Dry and moist eucalypt forests and rainforests, fallen hollow logs, large rocky outcrops.	Small areas of marginal foraging habitat associated with the site	Low	No
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V	-	Occurs in dry sclerophyll forest and woodland east of the Great Dividing Range. Roosts in tree hollows.	Potential aerial foraging habitat associated with the site	Moderate	No – negligible impact likely
Miniopterus australis	Little Bent-winged Bat	V	-	Moist eucalypt forest, rainforest and dense coastal scrub.	Suitable foraging habitat present	High	**Yes**
Myotis macropus	Southern Myotis	V	-	Bodies of water, rainforest streams, large lakes, reservoirs.	Suitable foraging habitat associated with Sugar Mill Creek	Moderate	No – habitat would not be impacted
Petauroides volans	Greater Glider	-	V	Ranges and coastal plains of eastern Australia, where it inhabits a variety of eucalypt forests and woodlands.	Marginal habitat - no suitable denning hollows present	Low	No

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Scientific name	Common name	BC Act	EPBC Act	Habitat requirement	Suitability of site habitat	Potential occurrence	Need for five-part test
Petaurus australis	Yellow-bellied Glider	V	-	Tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Dens in tree hollows of large trees, often in family groups. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south.	Marginal habitat - no suitable denning hollows present	Low	No
Petaurus norfolcensis	Squirrel Glider	V	-	Blackbutt, bloodwood and ironbark eucalypt forest with heath understorey in coastal areas, and box-ironbark woodlands and River Red Gum forest inland.	Marginal habitat associated with the site. Scarce recent local records.	Low	No
Phascogale tapoatafa	Brush-tailed Phascogale	V	-	Drier forests and woodlands with hollow-bearing trees and sparse ground cover.	Marginal habitat associated with the site and no proximal records.	Low	No
Phascolarctos cinereus	Koala	V	V	Appropriate food trees in forests and woodlands, and treed urban areas.	Suitable feed trees at the site but scarce recent local records.	Moderate	No – negligible impact likely
Phoniscus papuensis	Golden-tipped Bat	V	-	Rainforest and adjacent sclerophyll forest. Roosts in abandoned hanging Yellow-throated Scrubwren and Brown Gerygone nests.	Potential aerial foraging habitat associated with the site	Moderate	No – negligible impact likely
Planigale maculata	Common Planigale	V	-	Rainforest, eucalypt forest, heathland, marshland, grassland and rocky areas with surface cover close to water.	Suitable foraging habitat associated with Sugar Mill Creek	Moderate	No – habitat would not be impacted
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	Suitable foraging habitat present	High	**Yes**

Scientific name	Common name	BC Act	EPBC Act	Habitat requirement	Suitability of site habitat	Potential occurrence	Need for five-part test
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	Forages in a variety of habitats, roosts in tree hollows and buildings.	Potential aerial foraging habitat associated with the site	Moderate	No – negligible impact likely
Syconycteris australis	Common Blossom-bat	V	-	Feeds in heathland and paperbark swamps; roosts in littoral rainforest. Also recorded in subtropical rainforest, wet sclerophyll forest and other coastal forests.	Suitable foraging habitat associated with Sugar Mill Creek	Moderate	No – habitat would not be impacted
Reptiles							
Hoplocephalus stephensii	Stephens' Banded Snake	V	-	Rainforest and eucalypt forests and rocky areas up to 950 m.	Poor quality habitat at the site and no local records.	Low	No
Insects							
Ocybadistes knightorum	Black Grass-dart Butterfly	E	-	Confined to coastal stands of Swamp Oak and Paperbark where Floyd's Grass grows edging the upper tidal areas of mangroves.	Floyds Grass was not detected at the site.	Low	No

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Gaudrons Road Subdivision Sapphire Beach

Aboriginal Cultural Heritage Assessment

Written for Stephen Sawtell

Everick Heritage Pty Ltd

February 2021



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Report Reference:

Hill, T. and M. Finlayson 2021. *Gaudrons Road Sapphire Beach Subdivision: Aboriginal Cultural Heritage Assessment: Sapphire Beach NSW.* Everick Heritage Pty Ltd unpublished report prepared for Stephen Sawtell.

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Executive Summary

The following is a report detailing the results of an Aboriginal Cultural Heritage Assessment ('ACHA') and for the planning proposal and future development application for three residential subdivisions at Gaudrons Road, Sapphire Beach NSW ('the Proposed Works'), being the following properties (the Project Area);

- 9 Gaudrons Road (Lot 11 DP1141269)
- 148 Gaudrons Road (Lot 7 DP 555490); and
- 189 Gaudrons Road (Lot 2 DP 5550362 (PN1505300)).

The assessment has been identified as a requirement for the planning proposal by Coffs Harbour City Council.

The methods used for this assessment are in compliance with the Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (DECCW 2010) ('CoPAI') and all relevant legislation as described in Section 2 of this Report. The following are the broad requirements for compliance with the CoPAI;

a) consultation with the Coffs Harbour and District Local Aboriginal Land Council ('LALC');

b) searches of applicable heritage registers;

19 Aboriginal Sites were identified by AHIMS in proximity to the Project Area

c) review of ethnographic and historic resources relevant to the region;

d) review previous archaeological work and the landscape context;

e) summarise the local and regional character of Aboriginal land use and its material traces;

f) formulate a predictive model;

g) conduct an archaeological survey with representatives of the Coffs Harbour and District LALC to identify the potential for harm to Aboriginal objects and appropriate management response; and

h) report on findings and recommended management strategies.

Results

A site inspection of the Project Area was undertaken on Wednesday 4 November 2020 by the following:

- Uncle Ian Brown (Sites Officer, Coffs Harbour and District LALC)
- Tim Hill (Principal, Everick Heritage);
- Matt Finlayson (Archaeologist, Everick Heritage); and
- Alex Dent (Graduate Archaeologist, Everick Heritage.

The site inspection aimed to identify the potential for Proposed Works to impact on Aboriginal objects (Table 4). The survey aimed to identify the nature and extent of previous soil disturbance and locate intact soils with the potential to contain archaeological sites.

As a result of the desktop study, field inspection and consultation with Coffs Harbour and District LALC, the following can be concluded:

a) One (1) Aboriginal object was identified on the western boundary of Lot 11 DP1141269 (9 Gaudrons Road). This object is a unifacial greywacke chopper and has been recorded as Gaudrons Road IF01 (#22-1-0602).

b) No Aboriginal objects or sites of cultural significance, including archaeological sites, are known to occur within Lots 2 and 7.

c) The extant topsoils with potential to contain Aboriginal objects have been substantially disturbed by historic clearing, banana plantations, cut and fill works and structures.

d) Due to the steep slope of Lot 2 and Lot 7, it is unlikely that the Proposed Works in these two (2) lots will impact on Aboriginal objects.

e) Having consideration for the predictive model and the results of the site inspection it is considered that the broad ridge crest within Lot 11 DP1141269 has the potential to contain Aboriginal objects, being a stone artefact scatter located throughout the topsoils along the ridge crest.

The assessment has concluded that subdivision works within 148 and 189 Gaudrons Road are unlikely to impact on Aboriginal objects are will not impact on any known places or sites of cultural significance to the Aboriginal community. As such additional consultation and archaeological investigation are not required for these two parcels of land. However, it is determined that works at 9 Gaudrons Road, particularly in relation to the ridge crest, have the potential to impact on Aboriginal objects. As such additional consultation and archaeological investigation are required. The following recommendations are provided to mitigate impacts to potential Aboriginal heritage values.

Recommendation 1: Aboriginal Objects Find Procedure

It is recommended that if suspected Aboriginal material has been uncovered because of development activities within the Project Area:

a) work in the surrounding area is to stop immediately;

b) a temporary fence is to be erected around the site, with a buffer zone of at least 10 metres around the known edge of the site;

c) an appropriately qualified archaeological consultant is to be engaged to identify the material; and

d) should the works be deemed to have harmed the Aboriginal objects Heritage NSW should be notified immediately via the EPA Enviro Hotline.

One (1) greywacke chopper was identified on Lot 11

Recommendation 2: Aboriginal Human Remains

Although it is unlikely that Aboriginal Human Remains will be located at any stage during earthworks within the Project 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 (Bellingen), the Coffs Harbour and District LALC and the Heritage NSW Regional Office (Coffs Harbour) 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 Heritage NSW should be consulted as to how the remains should be dealt with. Work may only resume after agreement is reached between all notified parties, provided it is in accordance with all parties' statutory obligations.

It is also recommended that in all dealings with Aboriginal Human Remains, workers or contractors should use respectful language, bearing in mind that they are the remains of Aboriginal people rather than scientific specimens.

Recommendation 3: Further Archaeological Investigations (9 Gaudrons Road)

It is recommended that a test pitting program in accordance with the Code of Practice for Archaeological Investigations in New South Wales (DECCW 2010) be carried out at 9 Gaudrons Roads to further establish the potential of topsoils on the ridge crest and saddle to contain Aboriginal objects.

Subsequent additional archaeological investigation should include at least 12 1m^2 'test-pits' spread across the ridge crest to determine the potential for the topsoil layer to contain Aboriginal objects.

DEFINITIONS

The following definitions apply to the terms used in this report:

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 Place means any place declared to be an Aboriginal Place (under s. 84 of the NPW Act) by the Minister administering the NPW Act, by order published in the NSW Government Gazette, because the Minister is of the opinion that the place is or was of special significance with respect to Aboriginal culture. It may or may not contain Aboriginal Objects.

ACHAR means Aboriginal Cultural Heritage Assessment Report

ACHCRP Guidelines means the Aboriginal Cultural Heritage Consultation Requirements for Proponents (2010).

AHIMS means Aboriginal Heritage Information Management System

AHIP means Aboriginal Heritage Impact Permit.

CoPAI means the Code of Practice for Archaeological Investigation in New South Wales (2010).

Due Diligence Code means the Due Diligence Code for the Protection of Aboriginal Objects in NSW (2010).

Heritage NSW means Heritage Council of New South Wales.

LALC means Local Aboriginal Land Council.

LEP means Local Environment Plan

NPW Act means the National Parks and Wildlife Act 1974 (NSW).

NSW means New South Wales.

Project Area means 9 Gaudrons Road (Lot 11 DP 1141269), 148 Gaudrons Road (Lot 7 DP 555490), 189 Gaudrons Road (Lot 2 DP 5550362), Sapphire Beach, NSW.

Proponent means Stephen Sawtell and all associated employees, contractors and subcontractors of the same.

RAP means Registered Aboriginal Party

The Consultant means qualified archaeological staff and/or contractors of Everick Heritage Pty Ltd.

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1. INTRODUCTION

1.1. Scope of this Assessment

The following is a report detailing the results of an Aboriginal Cultural Heritage Assessment ('ACHA') and for the planning proposal and future development application for residential subdivisions at Gaudrons Road, Saphire Beach NSW ('the Proposed Works'), being the following properties (the Project Area) (Figure 1);

- 9 Gaudrons Road (Lot 11 DP1141269)
- 148 Gaudrons Road (Lot 7 DP 555490); and
- 189 Gaudrons Road (Lot 2 DP 5550362 (PN1505300)).

The assessment has been identified as a requirement for the planning proposal by Coffs Harbour City Council.

1.2. Assessment Methodology

The methods used for this assessment are in compliance with the Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (DECCW 2010) ('CoPAI') and all relevant legislation as described in Section 2 of this Report. The following are the broad requirements for compliance with the CoPAI;

a) consultation with the Coffs Harbour and District Local Aboriginal Land Council ('LALC');

b) searches of applicable heritage registers;

c) review of ethnographic and historic resources relevant to the region;

d) review previous archaeological work and the landscape context;

e) summarise the local and regional character of Aboriginal land use and its material traces;

f) formulate a predictive model;

g) conduct an archaeological survey with representatives of the Coffs Harbour and District LALC to identify the potential for harm to Aboriginal objects and appropriate management response; and

h) report on findings and recommended management strategies.

1.3. Project Description

The ACHA has been commissioned by the following landowners to support a planning proposal and future development application (the 'Proponent');

- 9 Gaudrons Road (Chris and Chris Bowen)
- 148 Gaudrons Road (Kerrie Hunter); and
- 189 Gaudrons Road (Grenville Duce).

The planning proposal will provide for the following lots and building envelopes;

- 9 Gaudrons Road (8 Lots, 6 building envelopes)
- 148 Gaudrons Road (2 Lots); and
- 189 Gaudrons Road (4 Lots, 3 building envelopes).

The Proposed Works likely involve the following ground activities which have the potential to harm Aboriginal objects;

- Construction of roads and driveways;
- Construction of building pads for residential houses and ancillary buildings including pools;
- Construction of onsite waste management systems; and
- Landscaping and gardens.

1.4. Report Authorship

The ACHA was prepared by Principal Consultant (Northern NSW) Tim Hill, Archaeologist Matt Finlayson, and Graduate Archaeologist Alex Dent. The Aboriginal community consultation was conducted by Tim Hill.

EVERICK HERITAGE



Figure 1: Location of Proposed Works.

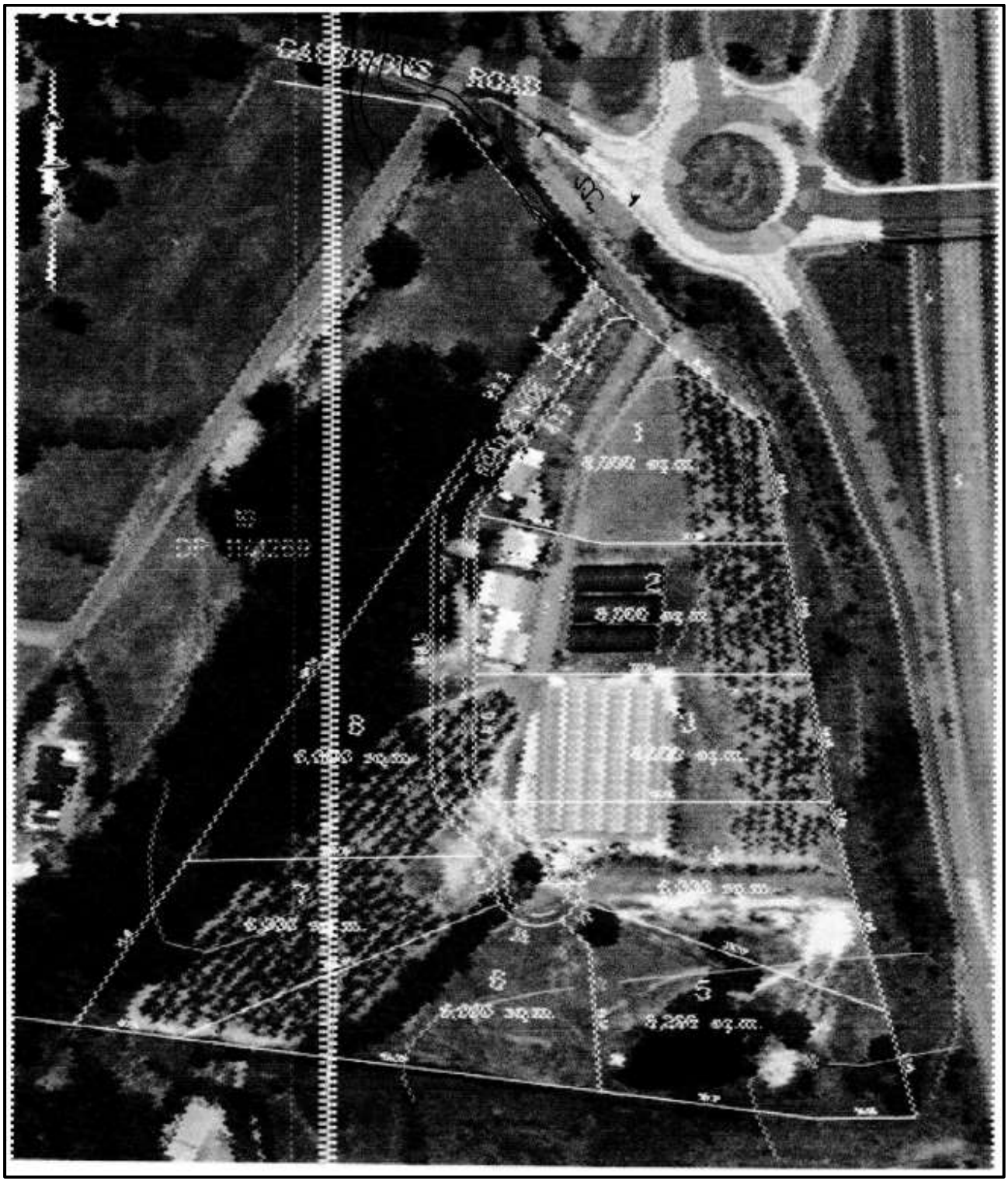


Figure 2: Proposed layout 9 Gaudrons Road.



Figure 3: Proposed subdivision layout 148 Gaudrons Road.

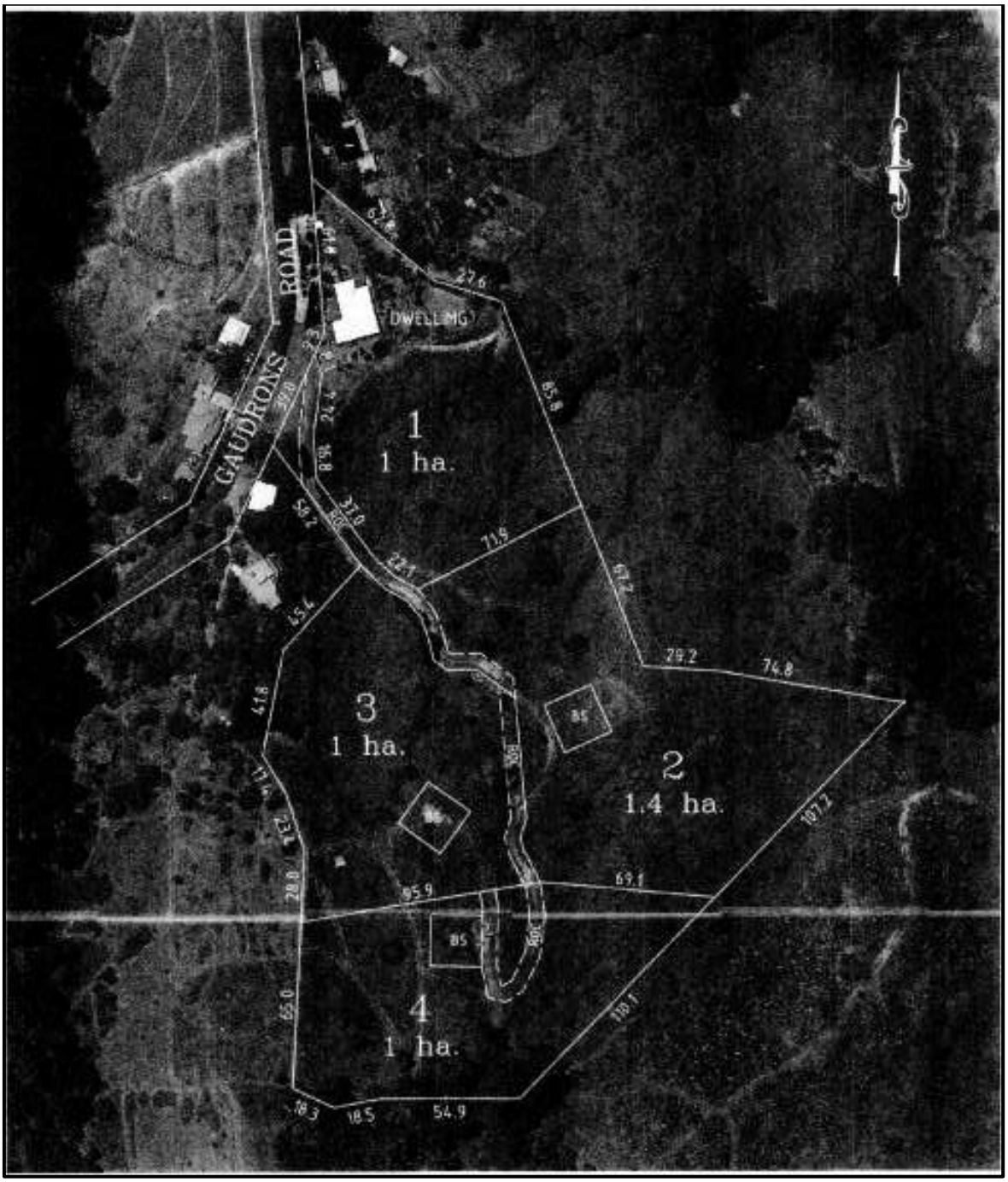


Figure 4: Proposed layout 189 Gaudrons Road.

2. LEGISLATIVE AND PLANNING CONTEXT

The primary State legislation concerning cultural heritage in NSW is the National Parks and Wildlife Act 1974 (NSW) (NPW Act) and Local Environment Plans (LEP) made under the Environmental Planning & Assessment Act 1979 (NSW). The Commonwealth also has a role in the protection of nationally significant cultural heritage through the Environmental Protection and Biodiversity Conservation Act 1999 (Cth), The Protection of Movable Cultural Heritage Act 1986 (Cth) and the Historic Shipwrecks Act 1976 (Cth).

For the purposes of this assessment the State and local legislation are most relevant. The consent authority will be the Coffs Harbour City Council. The information below lists the legislative and policy framework within which this assessment is set.

2.1. The National Parks and Wildlife Act 1974 (NSW)

The NPW Act is the primary legislation concerning the identification and protection of Aboriginal cultural heritage. It provides for the management of both Aboriginal Objects and Aboriginal Places. Under the NPW Act, an Aboriginal Object is any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area, regardless of whether the evidence of habitation occurred before or after non-Aboriginal settlement of the land. This means that every Aboriginal Object, regardless of its size or seeming isolation from other Objects, is protected under the Act.

An Aboriginal Place is an area of particular significance to Aboriginal people which has been declared an Aboriginal Place by the Minister. The drafting of this legislation reflects the traditional focus on Objects, rather than on areas of significance such as story places and ceremonial grounds. However, a gradual shift in cultural heritage management practices is occurring towards recognising the value of identifying the significance of areas to Indigenous peoples beyond their physical attributes. With the introduction of the National Parks and Wildlife Amendment Act 2010 (NSW) the former offence provisions under Section 86 of 'disturbing', 'moving', 'removing' or 'taking possession' of Aboriginal Objects or Places have been replaced by the new offence of 'harming or desecrating'. The definition of 'harm' is 'destroying, defacing or damaging an Object'. Importantly, in the context of the management recommendations in this assessment, harm to an Object that is 'trivial or negligible' will not constitute an offence.

The amendments also significantly strengthen the penalty provisions. The issue of intent to harm Aboriginal cultural heritage has been formally addressed by separating it from inadvertent harm. The penalty for individuals who inadvertently harm Aboriginal Objects has been set at up to $55,000, while for corporations it is $220,000. Also introduced is the concept of 'circumstances of aggravation' which allows for harsher penalties (up to $110,000) for individuals who inadvertently harm Aboriginal heritage in the course of undertaking a commercial activity or have a record for committing similar offences. For those who knowingly harm Aboriginal cultural heritage, the penalty will rise substantially. The maximum

penalty will be set at $275,000 or one year imprisonment for individuals, while for corporations it will rise to $1,100,000.

Where a land user has or is likely to undertake activities that will harm Aboriginal Objects, the Director General of the Department of Planning, Infrastructure and Environment ('DPI&E') has a range of enforcement powers, including stop work orders, interim protection orders and remediation orders. The amended regulations also allow for a number of penalties in support of these provisions. The NPW Act also now includes a range of defense provisions for unintentionally harming Aboriginal Objects:

a) Undertaking activities that are prescribed as 'Low Impact'.

b) Acting in accordance with the Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW (2010) (the 'Due Diligence Code').

c) Using a consulting archaeologist who correctly applies the CoPAI.

d) Acting in accordance with an AHIP.

The regulations allow for a range of low impact activities to be undertaken without the need to consult the DPI&E or a consulting archaeologist. Generally, those who undertake activities of this nature will not be committing an offence, even if they inadvertently harm Aboriginal Objects. For the purposes of this assessment it is not considered that the proposed management works are 'low impact activities'.

2.2. Due Diligence Code

The Due Diligence Code operates by posing a series of questions for land users before they commence development. These questions are based around assessing the potential for an area of land to contain Aboriginal Objects and previous ground disturbance. An activity will generally be unlikely to harm Aboriginal Objects where it:

a) will cause no additional ground disturbance; or

b) is in a developed area; or

c) in a significantly disturbed area.

Where these criteria are not fulfilled, further assessment for Aboriginal cultural heritage will typically be required prior to commencing the activity.

2.3. The ACHCRP Guidelines (2010) and Community Consultation.

The ACHCRP Guidelines provide an acceptable framework for conducting Aboriginal community consultation in preparation for impacts to Aboriginal cultural heritage. Proponents are required to follow them where a Project is likely to impact on cultural heritage and where they require an Aboriginal Heritage

Impact Permit ('AHIP'). However, it has been standard practice to undertake consultation with Aboriginal sites officers from the Local Aboriginal Land Council ('LALC') to assist the proponent to understand their requirements for additional consultation which may include Elders Groups, native title applicant groups or other knowledge holders who might have a particular type of knowledge about an area.

The ACHCRP Guidelines typically take a minimum of 90 days to complete. However, in complicated Projects this period may need to be extended by several months. The Guidelines require public notice of the assessment, preparation of a proposed methodology, undertaking site meetings and excavations where required, the production of a draft report, which is distributed to the registered Aboriginal parties and the production of a final report.

Although not strictly required, a thorough consultation process will treat the ACHCRP Guidelines as a minimum standard of community consultation where impacts to Aboriginal objects cannot reasonably be avoided. Generally, consultants must go to further effort to identify the significance of a given site to the Aboriginal community. This will likely include undertaking additional site inspections if requested by Aboriginal stakeholders, fully resourcing the community by providing copies of past archaeological and environmental assessments in the region and meeting with community members to seek their opinions of the site.

2.4. The Coffs Harbour Local Environmental Plan 2013

LEPs are made under the Environmental Planning and Assessment Act 1979 (NSW) to guide planning decisions by local councils, such as development applications. In relation to heritage, the LEPs general objectives are to conserve the heritage of the respective Local Government Areas ('LGA') through the protection of the significance of heritage items, conservation areas, archaeological sites and Aboriginal objects and Aboriginal places of heritage significance.

Part 5 Section 5.10 of the Coffs Harbour LEP 2013 deals with heritage conservation within the area covered by the LEP. The objectives of this section are as follows:

a) to conserve the environmental heritage of Coffs Harbour LGA;

b) to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views;

c) to conserve archaeological sites; and

d) to conserve Aboriginal objects and Aboriginal places of heritage significance.

Development consent is required for any of the following:

a) demolishing or moving any of the following or altering the exterior of any of the following (including, in the case of a building, making changes to its detail, fabric, finish or appearance):

    i. a heritage item;

ii. an Aboriginal object;

iii. a building, work, relic or tree within a heritage conservation area;

b) altering a heritage item that is a building by making structural changes to its interior or by making changes to anything inside the item that is specified in Schedule 5 in relation to the item;

c) disturbing or excavating an archaeological site while 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;

d) disturbing or excavating an Aboriginal place of heritage significance;

e) erecting a building on land:

i. on which a heritage item is located or that is within a heritage conservation area; or

ii. on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance;

f) subdividing land:

i. on which a heritage item is located or that is within a heritage conservation area; or

ii. on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance.

However, development consent under this clause is not required if:

a) the applicant has notified the consent authority of the proposed development and the consent authority has advised the applicant in writing before any work is carried out that it is satisfied that the proposed development:

i. is of a minor nature or is for the maintenance of the heritage item, Aboriginal object, Aboriginal place of heritage significance or archaeological site or a building, work, relic, tree or place within the heritage conservation area; and

ii. would not adversely affect the heritage significance of the heritage item, Aboriginal object, Aboriginal place, archaeological site or heritage conservation area; or

b) the development is in a cemetery or burial ground and the proposed development:

i. is the creation of a new grave or monument, or excavation or disturbance of land for conserving or repairing monuments or grave markers; and

ii. would not cause disturbance to human remains, relics, Aboriginal objects in the form of grave goods, or to an Aboriginal place of heritage significance; or

c) the development is limited to the removal of a tree or other vegetation that the Council is satisfied is a risk to human life or property; or

d) the development is exempt development.

The consent authority must, before granting consent under this clause in respect of a heritage item or heritage conservation area, consider the effect of the proposed development on the heritage significance of the item or area concerned. This subclause applies regardless of whether a heritage management document is prepared under subclause (5) or a heritage conservation management plan is submitted under subclause (6).

3. ABORIGINAL COMMUNITY CONSULTATION

The DPI&E have issued their consultation requirements (ACHCRP Guidelines), which act as a guide for conducting the community consultation process. It contains a number of minimum consultation standards, one of which requires the preparation of a methodology for conducting the Cultural Heritage Assessment. This methodology outlines the basic steps that need to be undertaken to determine the nature of the cultural heritage of the site, and the approaches required to manage that heritage.

3.1. Community Knowledge

We will work with the Aboriginal community to identify and address their concerns; not only about known sites in the region, but also cultural values such as historic and spiritual significance, and other values relating to flora and fauna of the area. We recognise that there may be Traditional knowledge that would have to be treated in a confidential manner, and we would be seeking advice from Aboriginal Parties as to the appropriate protocols to be adopted, in regard to such knowledge.

Everick makes a commitment to the Aboriginal community to document the consultation process as fully as possible. We will include all written comments we receive from the Aboriginal community in our final report. This is regardless of whether they are critical of the process we have undertaken or our final recommendations. In doing so, we hope to make an informed and accurate assessment of the significance of any cultural heritage within the Project Area.

Email correspondence was provided to Nathan Brennan at Coffs Harbour and District LALC on 2 November 2020 which confirmed the site inspection on 4 November 2020 with Uncle Ian Brown (see Appendix A).

4. DESKTOP ASSESSMENT: ABORIGINAL CULTURAL HERITAGE

4.1. Environmental Context

The Gaudrons Road is located on the eastern side of the East Coast Range, which extends from the Korara Basin north to Corindi (see Figure 5). The following describes the topography and hydrology of the Project Area (Table 1)

Table 1: Summary of Topography and Hydrology.

Property	Topography	Hydrology
9 Gaudrons Road	A moderate to narrow ridge crest at approximately 30 m asl. Runs approximately north-south through the Project Area. This	The mapped creek is to the north-west of the Project Area and the drainage flow north into Sugarmill Creek and the Moonee Creek estuary.
148 Gaudrons Road	The slope is step to moderately steep with an easterly aspect. The main ridge crest comprises Gaudrons Road. A small spur crest is located in the north-western corner of the Project Area.	A mapped drainage line runs north-east into Sugarmill Creek and the Moonee Estuary. However, given the steepness of the slope this tributary does not hold water.
189 Gaudrons Road	The slope is step to moderately steep with a north- easterly aspect. The main ridge crest comprises Gaudrons Road. A small spur crest is located in the north-western corner of the Project Area.	Two mapped tributary of Sugarmill Creek runs eastward into the southern branch of Sugarmill Creek. However, given the steepness of the slope this tributary does not hold water.

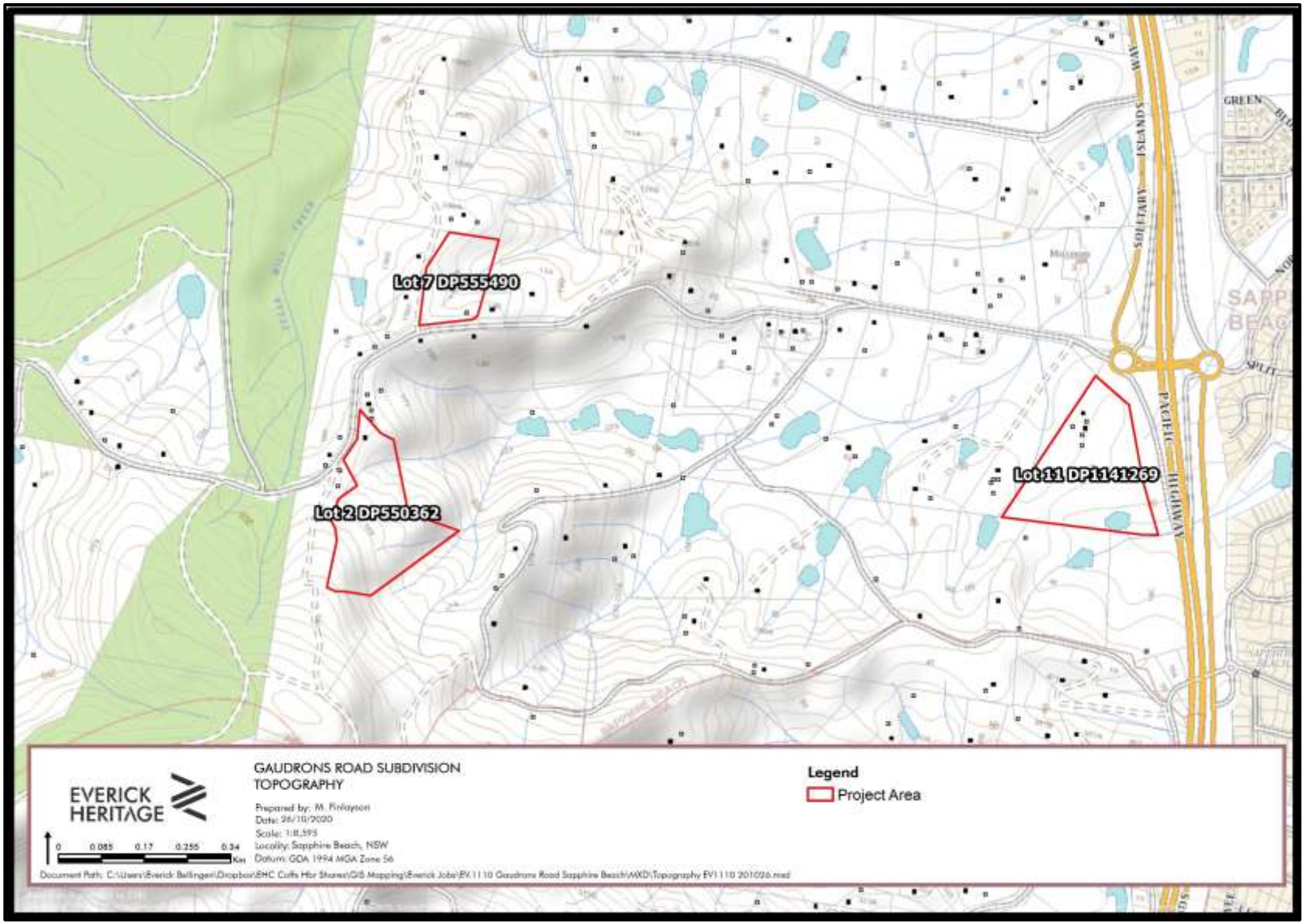


Figure 5: Topography of the Project Area.

4.1.1. Soil Landscapes

The soil landscape descriptions for the Project Area include the following (see Table 2 for additional detail and Figure 6).

- 9 Gaudrons Road (Megan);
- 148 Gaudrons Road (Suicide); and
- 189 Gaudrons Road (Bobo).

Table 2: Summary of soil landscape descriptions.

Megan (Milford 1999:63)	Landscape— rolling low hills to hills on Late Carboniferous metasediments of the Coffs Harbour association in the Coast Range and Gleniffer-Bonville Hills. Local relief to 90 m, occasionally to 200 m; slopes typically 5 - 20%, occasionally to 33%; elevation to 317 m.	Tall open-forest (wet sclerophyll forest) dominated by tallowwood (*Eucalyptus microcorys*) and Sydney blue gum (*E. saligna*) [Forest Types 46 and 47] occurs extensively on crests and slopes. The drier exposed crests are occupied by tall open-forest dominated by narrow-leaved white mahogany (*E. acmenoides*), spotted gum (*Corymbia maculata*), grey ironbark (*E. paniculata*) and small-fruited grey gum (*E. propinqua*) [Forest Types 60 and 74]. Moderately sheltered valley floors are dominated by brush box (*Lophostemon confertus*) [Forest Type 53] with a dense rainforest understorey, whilst the most sheltered gullies harbour various types of depauperate rainforest…The boundary between tall open-forest and tall closed-forest on lower valley sides is often abrupt and pronounced. Rainforest becomes more prevalent towards the south.
Suicide (Milford 199:51-52)	Landscape— steep hills and dissected valleys on Late Carboniferous metasediments of the Coffs Harbour association along the Coast Range. Local	Partially cleared, tall closed-forest grading to tall, open-forest on more exposed crests and north-facing slopes. Tall closed-forest (subtropical rainforest) … occupies the most favourable locations on

	relief 100 - 300 m; slopes 33 - 56%; elevation up to 590 m.	lower slopes… pes. Upslope, tall open-forest (wet sclerophyll forest] dominated by tallowwood (Eucalyptus microcorys) and Sydney blue gum (E. saligna) [Forest Type 47] is common, grading to tall open-forest (dry sclerophyll forest) dominated by blackbutt (E. pilularis) [Forest Type 37] on ridges and north-facing upper slopes
Bobo (Milord 1999:176)	Landscape— very steep to precipitous hills on late Carboniferous metasediments of the Coffs Harbour association in the Coast Range and Great Escarpment. Local relief to 260 m; slopes >50%; elevation up to 590 m.	Partially cleared, tall closed-forest grading to tall open-forest on more exposed crests and north-facing slopes. On steep to very steep valley sides, a tall open-forest (wet sclerophyll forest) exists dominated by narrow-leaved white mahogany… The drier north-west facing slopes are occupied by a tall open-forest… The most sheltered, moistest gullies harbour localised patches of tall closed-forest (subtropical rainforest) dominated by corkwood…

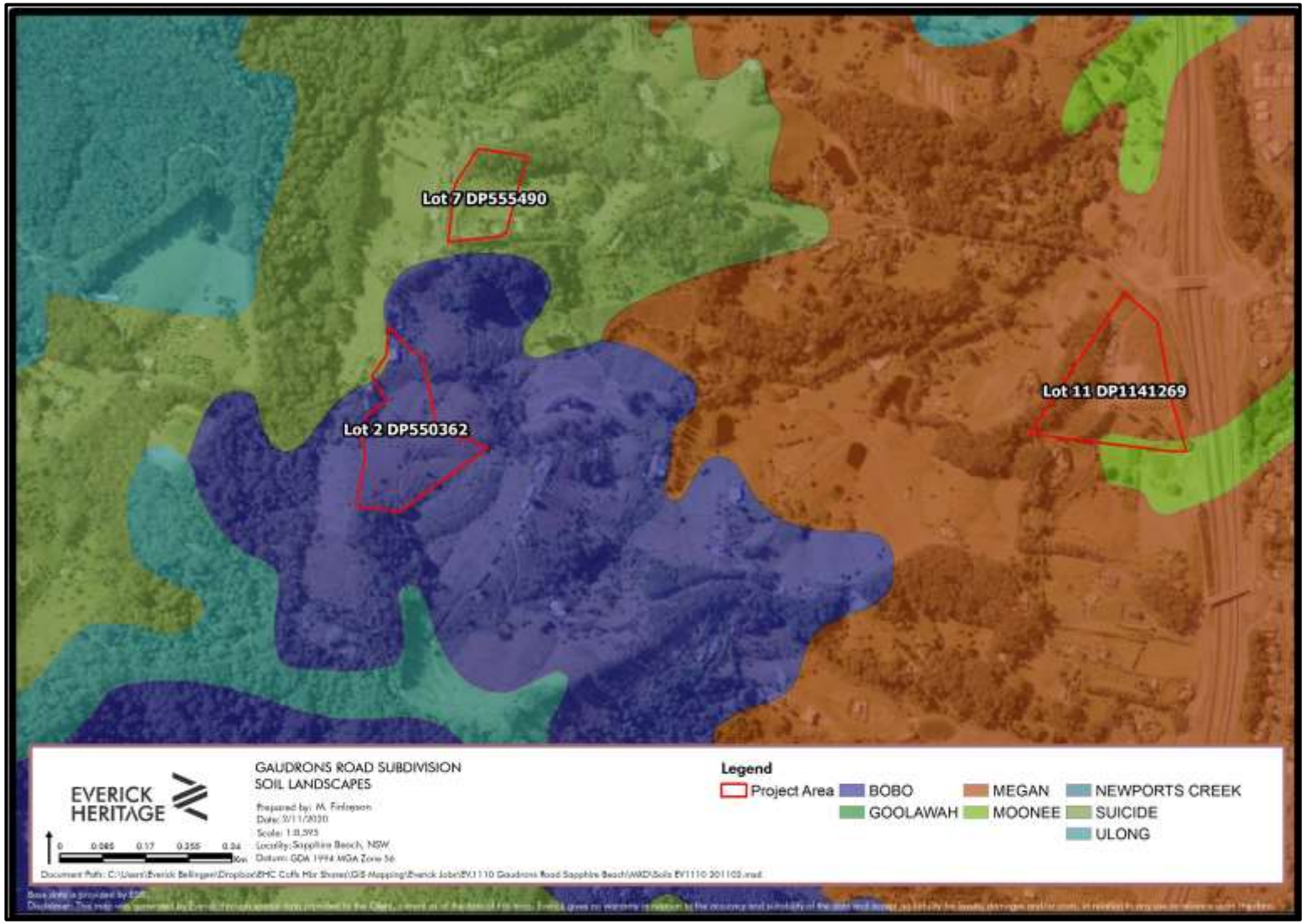


Figure 6: Project Area soil landscape mapping.

4.2. The Aboriginal Heritage Information Management System (AHIMS)

An 'Extensive' search was undertaken of the AHIMS database (Reference #545516) on 27 October 2020 (**Error! Reference source not found.** and Appendix B). The search area was defined as Lat, Long from -3 0.23981, 153.1219 - Lat, Long to -30.2153, 153.1595 with a buffer of 50 meters. 19 previously recorded Aboriginal sites were indicated within the search result. Numerous sites have been recorded in the AGD datum and converted at a later point in time to the GDA 1994 datum. As such the accuracy of the search may not reflect the actual location of each site. Of the results, the S2W-2 (#21-1-0212) site is located immediately north of 9 Gaudrons Road and is located within the Sapphire interchange roundabout (see Figure 7). The S2W-s site was described as "low-density scatter of four stone artefacts in a highly disturbed context at a property gate and along the edge of a banana plantation south of Gaudrons Road. The site is located on the low-gradient upper northern slope of a broad spur. No additional artefacts were found despite a thorough search of the exposed plantation area (then free of bananas)" (Collins 2007:37)

Table 3: AHIMS search results (Reference #545516)

Site ID	Site name	Easting	Northing	Site status	Site features
22-1-0143	CHSS-2	513800	6657190	Valid	Artefact : 3
22-1-0166	ISF 2 + PAD	514435	6656700	Valid	Artefact : 1, Potential Archaeological Deposit (PAD) : 1
22-1-0167	ISF 1	514800	6656250	Valid	Artefact : 1
22-1-0168	MSB2 + PAD	514450	6656450	Valid	Artefact : 6, Potential Archaeological Deposit (PAD) : 1
22-1-0169	MSB1 + PAD	514500	6656200	Valid	Artefact : 15, Potential Archaeological Deposit (PAD) : 1
22-1-0194	MSB4 Moonee Beach	514250	6656200	Valid	Potential Archaeological Deposit (PAD) : -
22-1-0192	Sapphire One	514145	6655639	Valid	Artefact : 4

22-1-0193	Sapphire Two	514091	6654676	Valid	Artefact : 1
22-1-0198	Moonee Beach_03	514434	6657029	Valid	Aboriginal Resource and Gathering : -, Artefact : -
22-1-0212	S2W-2	514083	6655959	Destroyed	Artefact : 4
22-1-0296	Sugar Mill Creek 2 (SMC 2)	514526	6656631	Valid	Artefact : 20
22-1-0364	Korara 2 and PAD	513424	6654719	Valid	Artefact : 1, Potential Archaeological Deposit (PAD) : -
22-1-0374	S2W-15	514167	6657059	Valid	Artefact : 1
22-1-0391	S2W-20	514000	6654705	Valid	Artefact : -
22-1-0399	Sartor OS1	513905	6654924	Destroyed	Artefact : 1
22-1-0400	Sartor ISO 2	514004	6654746	Destroyed	Artefact : 1
22-1-0437	S2W-2 Redeposit	514221	6656185	Valid	Artefact : -
22-1-0525	Settles Road	511854	6656947	Valid	Artefact : -
22-1-0566	Old Coast Road	513888	6654946	Valid	Artefact : -

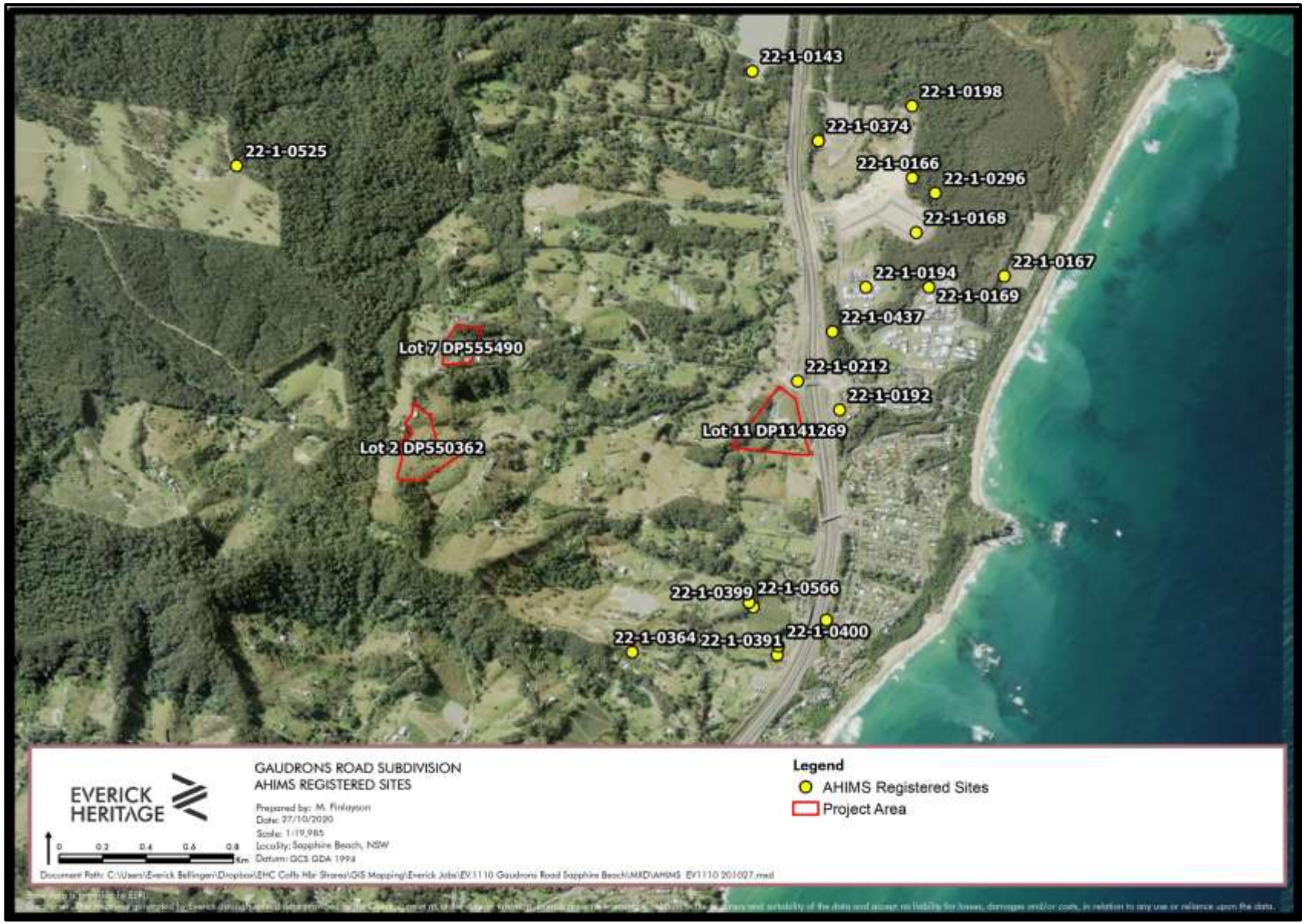


Figure 7: AHIMS search results (#545516).

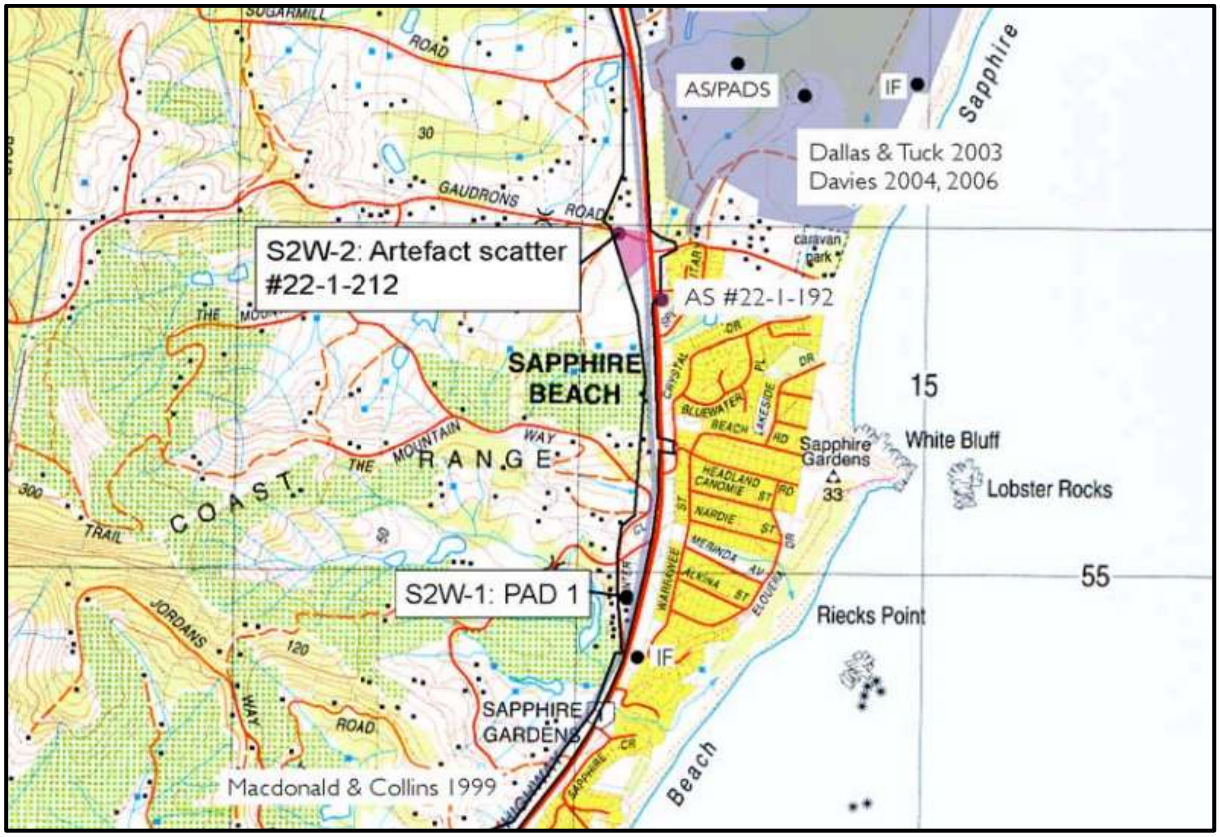


Figure 8: Location of S2W-2 Artefact Scatter.

4.3. Other Heritage Registers

The following heritage registers were accessed on 27 October 2020:

- **The National Heritage List (Australian Heritage Council):** Contains no Aboriginal heritage listings within or within close proximity to the Project Area.
- **Commonwealth Heritage List (Australian Heritage Council):** Contains no Aboriginal heritage listings within or within close proximity to the Project Area.
- **The State Heritage Register**:
    a) contains no Aboriginal heritage listings in Section 1 (Items listed under the NSW Act as Aboriginal Places) within or within close proximity to the Project Area;
    b) contains no Aboriginal heritage listings in Section 2 (Items listed under the NSW Heritage Act) within or within close proximity to the Project Area;
    c) contains no Aboriginal heritage listings in Section 3 (Items listed by Local Government and State Agencies) within or within close proximity to the Project Area.
- **Coffs Harbour LEP (2013):** Contains no heritage listings in proximity to the Project Area.

5. SELECTED ARCHAEOLOGICAL SYNTHESIS AND PREDICTIONS

5.1. Ethnohistory

Coffs Harbour is located within the Gumbayngirr Language area, which is generally mapped south to the Nambucca River and west to the escarpment of the upper Kalang River (see Godwin 1990 for a regional overview of language areas). In general Aboriginal groups in the Gumbayngirr and adjoining areas formed relatively discrete 'clans' (earlier known as 'hordes') however in effect movement between of individuals between these groups was common (see Calley 1959 for a detailed analysis of the neighbouring Bandjalang social organisation). Given the problematic nature of population estimates- the latter and more 'general' observations of Mathews (1898) for the broader Northern NSW coastline are more relevant;

> In the well watered coastal districts of New South Wales, where fish and game are abundant, their hunting grounds would be comparatively small" (Mathews 1898:66.)

Radcliffe Brown (in Lane 1970:V.8) concludes for the coastal areas that population densities would be in the order of 'one person to every three square miles'. Estimates of tribal groups in the order of 200 individuals are relatively common amongst ethnohistoric and anthropological literature (i.e. Lane 1970 for the Nambucca River district immediately south). An additional element to this discussion of population density is the differentiation of the coastal and the escarpment areas where it is generally accepted had lower and much more mobile Aboriginal populations. For the larger River systems (Nambucca, Clarence and Macleay) the concept of more intensive use of the coast as compared to the up-river and escarpment is generally accepted (i.e. McBryde 1974, Godwin 1990).

A high diversity of resources available to the Gumbaynggir peoples in the bioregion of the North Coast resulted in this high density of Aboriginal occupation of the coastal plain, particularly in the Northern Rivers. A rich marine environment in conjunction with a lush vegetated coastline at the interface of a temperature southern climate and a tropical north provided a rich environment for occupation (NPWS 2003).

A unique feature of the Coffs Harbour area is the close proximity of the Great Dividing Range to the Coast. No other 'district' on the North Coast has such a narrow coastal zone- or such a short distance between the very different environments of coast and elevated/cold forests. The extent to which this affected land-use is not known. However, the absence of historic information about the Coffs Harbour hinterland indicates that this narrow intermediate zone was not intensively used or was secondary to

occupation of the coastal and estuarine areas. There is however great potential for pathways and routes between the coast and escarpment/hinterland.

There are no historical accounts of 'massacres' within the study area, although that is not to say they didn't happen along the coastal zone -such as the documented massacre at Red Rock (Goulding 2001:63). Unlike the larger properties and permanent building of European settlers, most Aboriginal living areas from the contact period tended to be very small shacks made from remnant and scavenged materials located usually on Crown Land. Historic living areas tended also to be seasonal, be it for seasonal bush resources such as fish runs of for seasonal work within the horticulture industry.

Historic fringe camps, such as those in vicinity to Coffs CBD, tended to be on Public land and nearby to small townships where there was access to water either naturally occurring or at a public tap. The main camping areas identified by Goulding (2001:64,65) area Corindi Lake, Inland from Arrawarra, Nana Glen (junction of Orara River and Bucca Bucca Creek), Happy Valley in Coffs Harbour, Coffs Creek/Fitzroy Oval, Wongala Estate and Yellow Rock. Generally speaking the historical experiences of Aboriginal people has been one of exclusion up until the 1960's (Calley 1956:201). The nature of historic Aboriginal camps and economy within the historic period is such that it is unlikely these types of 'sites' will be present in the Project Area.

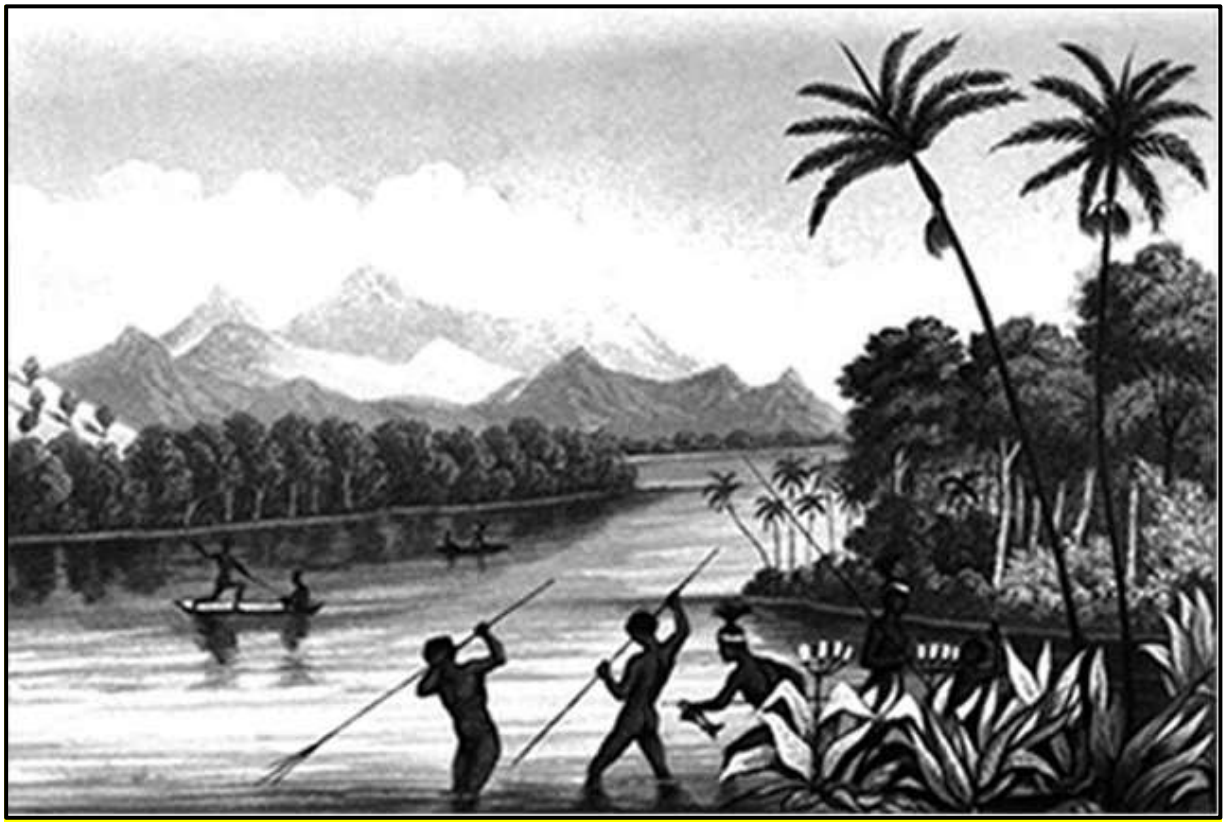


Figure 9: 'Aboriginals spearing fish on the Bellinger' (Hodgkinson 1845 source Bellingen Historical Society).



Figure 10: 'Yellow Rock Mission' (source gumbayngirr.weebly.com).

5.2. Previous Archaeological Research

The majority of archaeological research in the Coffs Harbour region has focused on the coastal margins and are often reports commissioned in preparations for residential or tourist developments (Piper 1976; Smith 1998a, 1998b, 1999; Murphy 2000; Dallas 2008). Of the coastal hinterland studies, most have been surface surveys undertaken in preparation for infrastructure corridors and highway / bypass routes (Godwin 1982; Rich 1989; Davies 1991, 1993, 2004; Kuskie 1993a, 1993b; Mills 1997; Macdonald and Collins 1999; Connell Wagner 2004).

5.2.1. North Sapphire Beach (Davis 2004)

Davis (2004) completed an archaeological assessment for a proposed residential development at North Sapphire Beach to the north of the Project Area. Cultural material was found generally within the topsoil to a depth of approximately 200 mm. Significant disturbance of soil profiles were noted in all test excavations. Analysis of the lithic assemblages demonstrated one or two flaking episodes indicating that the surveyed sites represent 'work areas' rather than camp sites. The lack of shellfish and bone remains within the assemblage and the fact that the location was in close proximity to the beach is argued to identify the locations as transitory camps or places for specific tasks such as artefact manufacture.

5.2.2. Coffs Harbour- Urunga Forestry Management Areas (Davies and Stewart Zerba 1995)

The Coffs Harbour- Urunga Forestry Management study provides the most comprehensive regional assessment of the archaeological values and potential of the Coffs Coast hinterland. Whilst it is acknowledged that the sub-coastal zone which comprises the Project Area is not included within the Davies study, some of its findings have practical application as the study was structured around 'land systems' (Davies and Stewart Zerba 2005). Overall, the sampling strategy employed by the study was biased towards the location of open campsites, stone artefact scatters and isolated finds. However, the study found a strong correlation between archaeological sites; the degree of slope and the sandiness of soils and concluded that most archaeological sites occurred on the crests of spurs in areas which would have been dry sclerophyll or open forest. Regionally, most archaeological sites in the study area were associated with the dissected escarpment and ranges with relatively few sites found on near coastal low hills and rises. However, the study found that whilst 'site density' was greater in the escarpment area the number of artefacts per site was much lower when compared to coastal and sub-coastal sites. This finding supports a model of greater mobility through the escarpment and a relative absence of permanent camps when compared resource rich marine and estuarine areas of the coastline.

5.2.3. Coffs Harbour Bypass (Kelleher Nightingale 2020)

The archaeological assessment for the Coffs Harbour Bypass provides the largest replicable study for the ACHA as it traverses a range of landforms which are similar to the Project Area. The following models are extracted from the ACHA report

Within the study area, ridgelines and crests were identified as displaying generally good archaeological potential,…Within the hinterland, many of these landscape features have suffered disturbance as a result of European land use including intensive agriculture; however, test excavation and Aboriginal community consultation have confirmed that artefacts and sites can still occur through the landscape. This includes intangible cultural heritage features as well as artefact sites.

The majority of the newly identified sites were dispersed, low-density subsurface deposits within a variably disturbed landscape. The presence of low artefact densities in these areas may reflect transitory or low-intensity landscape use as people moved across Country. Lower-lying landforms and slopes within the coastal plain have also been more heavily affected by sustained European land use, erosion and colluvial mixing, flooding, and more landscape disturbance, potentially affecting the survivability of intact deposits. Several of the PADs subject to testing were located on slopes which showed the effects of colluvial movement, negatively impacting the survivability of intact archaeological deposit. The more intact and stable deposits identified during the test program occurred on level spur crests and saddles, particularly in the more elevated foothills/hinterland below the escarpment. Despite evident disturbance (particularly from banana cultivation), some intact deposits exhibiting at least moderate archaeological information were found to remain, and have the potential to provide important information on Aboriginal landscape use of these elevated landforms.

5.2.4. Lakes Estate (Bonhamme Craib and Associates 2011; Collins 2008).

Collins (2008) completed archaeological investigations (excavations) on a series of ridge crests within the proposed Lakes Estate. This study confirmed the presence of open campsites/ stone artefact scatters (LE-1 and LE- 2) within the topsoil layer of two ridge crests. The study (Collins 2008:3) concluded;

> The test excavations revealed Aboriginal stone artefacts within the topsoil on both LE- PAD 1 and LE- PAD 2. With the exception of a discrete artefact cluster identified on the LE- PAD 2 spur saddle, the artefact distributions are of a low-density nature only, and are believed to have been discarded on an itinerant basis during transit along the descending spurs between the Roberts Hill ridge and alluvial valley flat ecosystems rich in rainforest and swamp resources.
>
> The LE- PAD 1 and 2 artefacts have been substantially disturbed by historic/recent land-uses, including tree clearing, ploughing, and/or activities connected with banana cultivation. Such is the level of disturbance that it is uncertain whether any of the topsoil remains intact. Of the 33

> test pits dug during the investigations, more than half provided unequivocal evidence for topsoil disturbance by way of plough tine marks at the topsoil/basal clay interface, mixed topsoil/basal clay sediments or the inclusion of modern materials (gravel, glass, concrete, bricks, plastic) in stratigraphic association with or below the artefacts.

A series of archaeological investigations have been undertaken for the 'Highland' Estate project (Bonhomme Craib and Associates 2011). This study identified a number of stone artefact scatters within the surrounding areas including site #22-1-0377. A total of 410 artefacts were recovered from 58.5 m2 of test-pit excavations (total 39 test pits). This study of #22-1-0377 concluded;

> The landform types investigated during the sub-surface testing were the ridge crest and upper slope. The stone artefacts were either coarse or fine-grained siliceous material referred to locally as 'greywacke'. Stone artefact types were limited and consisted of five (5) cores, one (1) tool(s), with the remainder being debitage (98%) consisting of complete flakes, broken flakes, flaked pieces. One complete flake had evidence of retouch and is considered a tool.
>
> The density of artefacts across the south hill slope indicates that Aboriginal activity resulting in physical evidence (i.e. the presence of stone tools, hearths or other features or items) was low. The area may have been accessed regularly to procure resources but there is only a low-level physical expression of these activities. The artefact clusters suggest that while artefacts were found there are two locations with material that suggests intense knapping was occurring (Bonhomme Craib & Associates 2011:24).

5.2.5. Halls Road, Coffs Harbour (Hill et al 2015)

Everick (Hill et al 2015) completed an archaeological investigation for a proposed residential subdivision on Halls Road to the south-west of the Project Area which included a series of archaeological test excavations. This survey resulted in the location of an open campsite/artefact scatter in three (3) locations across a single ridge crest and confirms the consistent presence of artefacts on crests along the coastal strip.

5.2.6. The Summit Aspect Coffs Harbour Development (Hill and Robins 2015)

Everick Heritage provided a Cultural Heritage Assessment and Salvage Strategy for the subdivision and development of 29 dwellings on Lot 4 DP270533 to the immediate south of the Big Banana in Coffs Harbour. An artefact scatter and associated PAD were identified during surveys done previously by Navin and Officer (2007), noting the area to be highly disturbed. Salvage methods were utilised including surface collection and recording, mechanical sieving of spoil heaps, excavation of the topsoil layer using

machinery, and excavation of the topsoil transects. 11 stone artefacts were found during surveys of the ridgeline, including flakes, cores, hammerstones, and manuports.

5.2.7. Korora West Sapphire Residential Development (Hill et al. 2015)

Everick Heritage conducted a Cultural Heritage Assessment for a constraints study within the Korora West Sapphire Moonee release area, north of Coffs Harbour. On ground surveys, vehicle-based inspections and database searches found no gazetted Aboriginal Places or Listed Historic Items. The study identified 38 potential archaeological deposits based primarily on topography that identified several broad trends that relate to the distribution of archaeological sites, being;

- there was a high correlation between the known sites and ridge crests and spurs which were identified as PADs;
- larger PADs were grouped towards the north of the Project area as the slope and terrain became generally less steep to the north;
- there was a higher frequency of PADs to the east on the lower slopes and terminations of ridges;
- modern residential dwellings and roads were located mostly on PADs leaving a relatively low number undisturbed.
- the Korora basin and West Sapphire has been historically disturbed by intensive horticulture when compared to the Moonee hinterland.

5.2.8. North Coffs Release Area (Hudson 2009)

The North Coffs Harbour Release Area was subject to a similar archaeological assessment and is located immediately to the south of the current study (Hudson 2009). The study includes the area north of the North Coast Railway Line, east of the Pacific Highway and south of the proposed Coffs Harbour bypass. The effectiveness of the survey was significantly constrained due to vegetation growth, and no Aboriginal sites were recorded. Several trees with indicative marks from historic logging ('board notched stumps') were recorded as evidence of historic European occupation, however these were not identified as being significant.

5.2.9. Pacific Highway Sapphire to Woolgoolga (Collins 2007)

The archaeological investigation of the Pacific Highway Sapphire to Woolgoolga upgrade was undertaken from Sapphire Beach to Arrawarra. The assessment identified low density artefacts scatters and concluded that historic ground disturbance was a significant factor affecting the presence and integrity of Aboriginal

sites within the alignment. The report made the following conclusion which is directly relevant to the study;

> Apart from PADs identified at S2W-9 (potential traditional campsite), S2W-11 (potential traditional ceremonial and/or historic activity area) and S2W-13 (potential historic burial), the recorded archaeological sites and PADs occur on coastal ramp ridges/spurs. Of these, S2W-4 is believed to represent a seasonal base camp used into the European contact period. This site is of high cultural/social significance. The concept design has been revised to preserve this significance. On the basis of past subsurface investigation results, the remaining coastal ramp sites/PADs are probably associated with temporary camping and/or task-specific activities by small groups ranging from S2W-4 and other coastal base camps. These sites either have low, low-moderate or other potential cultural/social significance. (Collins 2007:54-55)

5.3. Aboriginal Site Predictive Model

The following model can be proposed for archaeological sites along the Coast Range and foothills of the Coffs Coast;

- Archaeological sites will likely include stone artefact scatters and open campsites located on ridge crests and spurs with an increased potential for archaeological sites on broad spurs or ridges with a northernly or easterly aspect.

- Aboriginal campsites which existed along elevated ridgelines will be functionally and culturally connected and are best considered 'discontinuous' archaeological sites that have become disconnected by European settlement and ground disturbance.

- While there is a residual potential for shell middens to occur within the Project Area, midden sites are typically associated within coastal headlands, swamps and beachfronts.

- The history of forest clearing and agriculture is such that site types including modified trees will have been removed from the Project Area.

- Burials are considered likely to occur within the banks of smaller creeks and tributaries, however are most common on the sandy soils and low- lying areas to the east of the Project Area and within the Korora basin to the south.

6. FIELD SURVEY: ABORIGINAL CULTURAL HERITAGE

6.1. Constraints to Site Detection

An assessment of the constraints to site detection is made to assist in formulating a view as to the effectiveness of the field inspection to find Aboriginal sites and cultural heritage materials. It also assists in the forming of a view of the likelihood of concealed sites, keeping in mind a site-specific knowledge of the disturbance impacts that European land uses and natural processes may have had on the 'survivability' of Aboriginal sites in a Project Area.

The constraints to site detection are almost always most influenced by post European settlement land uses and seldom by natural erosion processes. The area of surface exposure and the degree of surface visibility within exposed surfaces are usually the product of 'recent' land uses for example land clearing, ploughing, road construction, natural erosion and accelerated (manmade) erosion (McDonald et .al. 1990:92). In this case the major 'manmade' constraints to Aboriginal site survivability and detection are historic clearing of open forest and rainforest vegetation, agricultural enterprise in the form of banana plantations, tilling of soils, cut and fill earthworks and construction of access tracks.

6.2. Site inspection

A site inspection of the Project Area was undertaken on Wednesday 04 November 2020 by the following:

- Uncle Ian Brown (Sites Officer, Coffs Harbour and District LALC)
- Tim Hill (Principal, Everick Heritage);
- Matt Finlayson (Archaeologist, Everick Heritage); and
- Alex Dent (Graduate Archaeologist, Everick Heritage.

The site inspection aimed to identify the potential for Proposed Works to impact on Aboriginal objects (Table 4). The survey aimed to identify the nature and extent of previous soil disturbance and locate intact soils with the potential to contain archaeological sites.

To achieve as thorough and effective an archaeological assessment as possible a systematic ground survey of all the Project Area was undertaken. Surface visibility was limited due to grass coverage, steep slopes and in the case of Lot 11, banana plantations. As such, exposures were targeted that might have the potential to contain visible Aboriginal objects. Exposures were generally within the vehicle access tracks or soil cuttings adjacent to such tracks, comprising disturbed soils. Exposures further from the tracks

generally revealed shale-based soils associated with open forests in Lot 11 and 7 and rainforest soils in Lot 2.

9 Gaudrons Road (Lot 11 DP 1141269) contains a currently operational banana farm, greenhouse sheds and ancillary buildings including additional machinery sheds and an occupational dwelling (Figure 11, Figure 12, Figure 13, Figure 14). The soil profile of Lot 11 is substantially disturbed due to the banana farm operations, cut and fill earthworks, construction of amenities and landscaping. The disturbed topsoil profile however is dark greyish-brown shale-based soils consistent with open forest. The ridge crest within Lot 11 is located in the northeast, comprising the broad flat grassy area adjacent to the driveway. The ridgetop is adjoined to saddle that is oriented north-east to southwest that tapers off at the southern boundary of the Lot 11 Project Area. One (1) Aboriginal stone tool was identified during survey of Lot 11 on the western boundary of the banana plantations, downslope from the saddle top and adjacent to a gully to the west. The object is a unifacial greywacke chopper, transversely broken with one (1) visible negative flake scar, identified as Gaudrons Road IF01and registered in the AHIMS database as #22-1-0602 (Figure 15, Figure 16, Figure 24).

148 Gaudrons Road (Lot 7 DP 555490) is located on a steep north-east to east facing slope currently used as a farm property / goat paddock. The upper slopes are comprised of former agricultural terracing and access paths associated with a banana plantation. GSV was generally constrained to the upper slopes to the west where soils have been disturbed from cut-and fill earthworks associated with the terracing and driveway entrance to the adjoining property.

189 Gaudrons Road (Lot 2 DP 5550362) similarly comprises steep, east facing slopes on former agricultural banana plantation land. In addition to historic clearing and banana plantings, Lot 2 has been subject to dwelling construction, cut and fill earthworks and track culvert construction. Due to vegetation overgrowth and turfing, GSV was limited in Lot 2 to the areas of disturbed track and cut and fill areas in proximity to the house pad.

Having consideration for categories of predictive landforms as indicated under the Due Diligence Code of Practice ('CoPAI') in regards to Lot 2 and 7, it is determined to be unlikely that Lot 2 would contain Aboriginal objects on the ground surface or in the topsoil deposits.

Table 4: Survey coverage

Survey Unit	Landform	Survey Unit Area (m2)	Visibility (%)	Exposure (%)	Effective Coverage Area (m2)	Effective Coverage (%)
9 Gaudrons Road	Ridge Top & Saddle	10000	40	20	800	8
148 Gaudrons Road	Upper Slopes	2000	30	30	180	9

Survey Unit	Landform	Survey Unit Area (m2)	Visibility (%)	Exposure (%)	Effective Coverage Area (m2)	Effective Coverage (%)
189 Gaudrons Road	Upper Slopes	1000	10	10	100	1



Figure 11: General conditions of Lot 11 ridgetop, facing south.



Figure 12: Soil stockpile within Lot 11 adjacent to greenhouse sheds, facing south.



Figure 13: Eastern boundary of Lot 11 banana farm, facing southwest.



Figure 14: GSV and conditions within the Lot 11 banana farm, facing west.



Figure 15: Gaudrons Road IF01 broken greywacke cobble.



Figure 16: Gaudrons Road IF01 location relative to banana farm and sheds, facing northeast.



Figure 17: View from Lot 7 towards the coastline, facing east.



Figure 18: General conditions of Lot 7 including terracing, facing south.



Figure 19: View northeast over Lot 7, former terracing and goat paddock visible.



Figure 20: Cut trees and soil disturbance in Lot 7, southwest corner of property facing south.



Figure 21: View east over Lot 2 from the driveway.



Figure 22: Former plantation track within Lot 7, general GSV and exposures visible, facing south.



Figure 23: Former plantation track going upslope west through Lot 2, general GSV observable, facing south.

7. RESULTS OF ABORIGINAL CULTURAL HERITAGE ASSESSMENT

7.1. Results of consultation and survey

As a result of the desktop study, field inspection and consultation with Coffs Harbour and District LALC, the following can be concluded:

a) One (1) Aboriginal object was identified on the western boundary of Lot 11 DP1141269 (9 Gaudrons Road). This object is a unifacial greywacke chopper and has been recorded as Gaudrons Road IF01 (#22-1-0602).

b) No Aboriginal objects or sites of cultural significance, including archaeological sites, are known to occur within Lots 2 and 7.

c) The extant topsoils with potential to contain Aboriginal objects have been substantially disturbed by historic clearing, banana plantations, cut and fill works and structures.

d) Due to the steep slope of Lot 2 and Lot 7, it is unlikely that the Proposed Works in these two (2) lots will impact on Aboriginal objects.

e) Having consideration for the predictive model and the results of the site inspection it is considered that the broad ridge crest within Lot 11 DP1141269 has the potential to contain Aboriginal objects, being a stone artefact scatter located throughout the topsoils along the ridge crest.

The assessment has concluded that subdivision works within 148 and 189 Gaudrons Road are unlikely to impact on Aboriginal objects are will not impact on any known places or sites of cultural significance to the Aboriginal community. As such additional consultation and archaeological investigation are not required for these two parcels of land. However, it is determined that works at 9 Gaudrons Road, particularly in relation to the ridge crest, have the potential to impact on Aboriginal objects. As such additional consultation and archaeological investigation are required. The following recommendations are provided to mitigate impacts to potential Aboriginal heritage values.

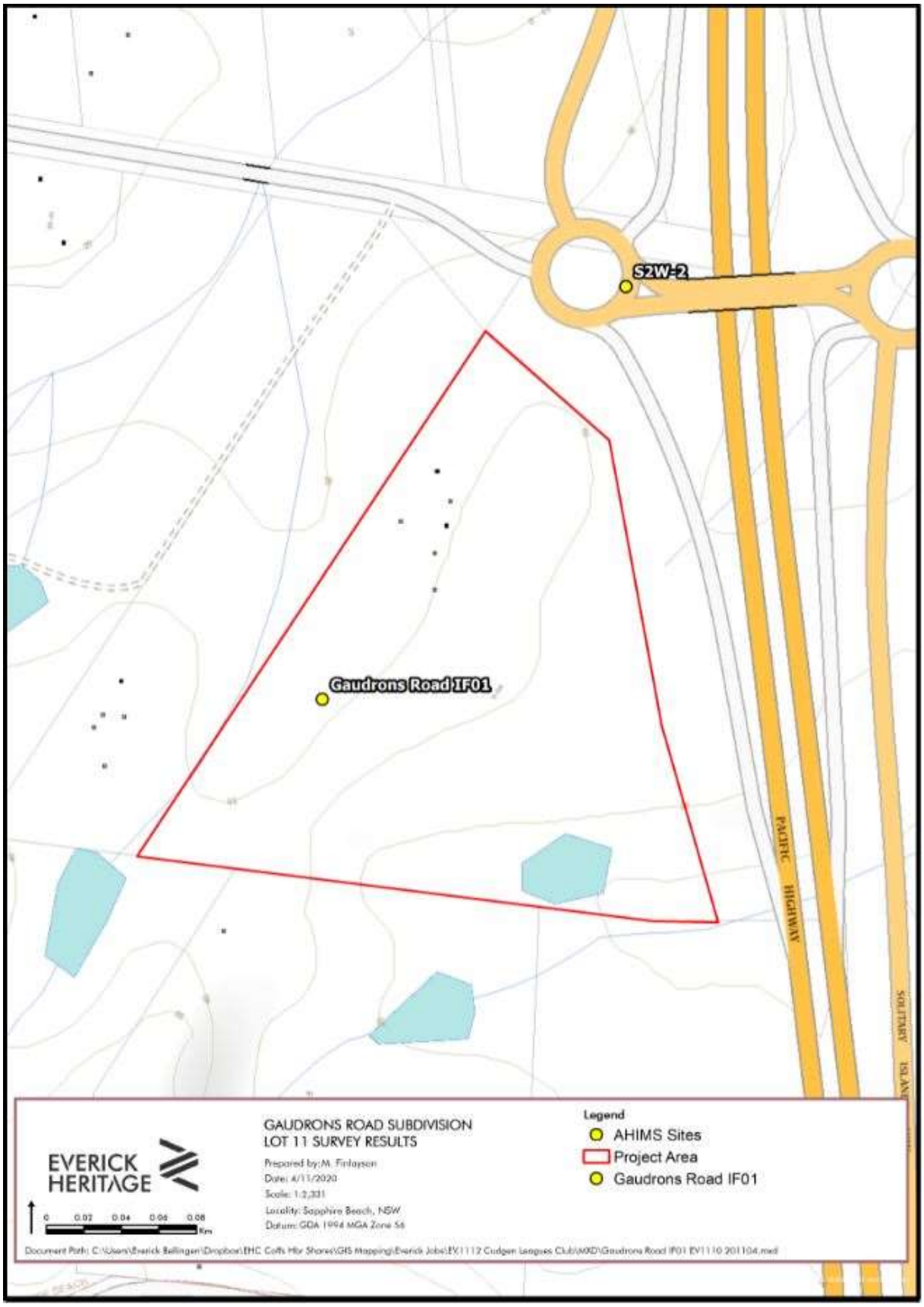


Figure 24: Location of Gaudrons Road IF01.

8. RECOMMENDATIONS

The assessment has concluded that subdivision works within 148 and 189 Gaudrons Road are unlikely to impact on Aboriginal objects are will not impact on any known places or sites of cultural significance to the Aboriginal community. As such additional consultation and archaeological investigation are not required for these two parcels of land. However, it is determined that works at 9 Gaudrons Road, particularly in relation to the ridge crest, have the potential to impact on Aboriginal objects. As such additional consultation and archaeological investigation are required. The following recommendations are provided to mitigate impacts to potential Aboriginal heritage values.

Recommendation 1: Aboriginal Objects Find Procedure

It is recommended that if suspected Aboriginal material has been uncovered because of development activities within the Project Area:

a) work in the surrounding area is to stop immediately;

b) a temporary fence is to be erected around the site, with a buffer zone of at least 10 metres around the known edge of the site;

c) an appropriately qualified archaeological consultant is to be engaged to identify the material; and

d) should the works be deemed to have harmed the Aboriginal objects Heritage NSW should be notified immediately via the EPA Enviro Hotline.

Recommendation 2: Aboriginal Human Remains

Although it is unlikely that Aboriginal Human Remains will be located at any stage during earthworks within the Project 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 (Bellingen), the Coffs Harbour and District LALC and the Heritage NSW Regional Office (Coffs Harbour) 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 Heritage NSW should be consulted as to how the remains should be dealt with. Work may only resume after agreement is reached between all notified parties, provided it is in accordance with all parties' statutory obligations.

It is also recommended that in all dealings with Aboriginal Human Remains, workers or contractors should use respectful language, bearing in mind that they are the remains of Aboriginal people rather than scientific specimens.

Recommendation 3: Further Archaeological Investigations (9 Gaudrons Road)

It is recommended that a test pitting program in accordance with the Code of Practice for Archaeological Investigations in New South Wales (DECCW 2010) be carried out at 9 Gaudrons Roads to further establish the potential of topsoils on the ridge crest and saddle to contain Aboriginal objects.

Subsequent additional archaeological investigation should include at least 12 1m^2 'test-pits' spread across the ridge crest to determine the potential for the topsoil layer to contain Aboriginal objects.

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McDONALD, R.C., ISBELL, R.F., WALKER, J. and HOPKINS S,

1990. Australian Soil and Land Survey Field Handbook Second Edition, Inkata Press, Sydney.

Robins, T. & J. Towers

2014 Coffs Harbour Baseline Survey, Coffs Harbour Airport, NSW: Aboriginal Cultural Heritage Due Diligence Assessment (May 2014). Everick Heritage Consultants Pty Ltd unpublished report prepared for New South Wales Government, Land and Property Information Division.

APPENDIX A: CORRESPONDENCE WITH COFFS HARBOUR AND DISTRICT LALC

From: Nathan Brennan <ceo@coffsharbourlalc.com.au>

Sent: Monday, 2 November 2020 8:14 AM

To: Tim Hill <t.hill@everick.net.au>; Matthew Smith <programs@coffsharbourlalc.com.au>

Subject: Re: Subdivision to 9 Gaudrons Road, Sapphire Beach, Lot 11 DP1141269 (PN 2240155);148 Gaudrons Road, Sapphire Beach, Lot 7 DP 555490 (PN 132690);189 Gaudrons Road, Sapphire Beach, Lot 2 DP 5550362 (PN 1505300).

Great.

Thanks Tim.

Sent from my iPhone

On 2 Nov 2020, at 7:32 am, Tim Hill <t.hill@everick.net.au> wrote:

Giinagay Nathan.

We have been engaged to undertake a ACHA inspection on three properties at Gaudrons Road. Please see attached the Council advise and Plans form the client. I know they aren't great, but we will make up some better ones to use in the field. The key block for cultural heritage will the one near the highway/ Saphire interchange…

I had a chat with Uncle Ian late last week- he says he is available on Wednesday morning, so we will proceed on that basis.

Please invoice Everick and provide the following to identify the job: EV1110 Gaudrons Road Saphire beach.

Ta

EVERICK HERITAGE

Tim Hill

BA (Hons)

Principal (Coffs Harbour)

Ph: (02) 6655 0225

Mob: 0422 309 822

APPENDIX B: AHIMS EXTENSIVE SEARCH RESULTS

Office of Environment & Heritage NSW

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : EV1110
Client Service ID : 545516

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
22-1-0143	CHSS-2	AGD	56	513800	6657190	Open site	Valid	Artefact : 3		103091
	Contact	Recorders	Ms.Jacqueline Collins					Permits		
22-1-0166	ISF 2 + PAD	AGD	56	514435	6656700	Open site	Valid	Artefact : 1, Potential Archaeological Deposit (PAD) : 1		99028,99032,100149,101089
	Contact	Recorders	Mary Dallas Consulting Archaeologists (MDCA)					Permits	1809,2014	
22-1-0167	ISF 1	AGD	56	514800	6656250	Open site	Valid	Artefact : 1		99032
	Contact	Recorders	Mary Dallas Consulting Archaeologists (MDCA)					Permits	2014	
22-1-0168	MSB2 + PAD	AGD	56	514450	6656450	Open site	Valid	Artefact : 6, Potential Archaeological Deposit (PAD) : 1		99028,99032,100149,101089
	Contact	Recorders	Mary Dallas Consulting Archaeologists (MDCA)					Permits	1009,2014	
22-1-0169	MSB1 + PAD	AGD	56	514500	6656200	Open site	Valid	Artefact : 15, Potential Archaeological Deposit (PAD) : 1		99028,99032,100149,101089
	Contact	Recorders	Mary Dallas Consulting Archaeologists (MDCA)					Permits	1809,2014	
22-1-0194	MSB4 Moonee Beach	AGD	56	514250	6656200	Open site	Valid	Potential Archaeological Deposit (PAD) : -		99028,99032
	Contact Coffs Harbour and District Lca	Recorders	Coffs Harbour and District Lcal Aboriginal Land Council,Davies Heritage Consultan					Permits	2014	
22-1-0192	Sapphire One	AGD	56	514145	6655639	Open site	Valid	Artefact : 4		
	Contact	Recorders	Coffs Harbour and District Lcal Aboriginal Land Council					Permits	1986	
22-1-0193	Sapphire Two	AGD	56	514091	6654676	Open site	Valid	Artefact : 1		
	Contact	Recorders	Coffs Harbour and District Lcal Aboriginal Land Council					Permits	1986	
22-1-0198	Moonee Beach_03	AGD	56	514434	6657029	Open site	Valid	Aboriginal Resource and Gathering : -, Artefact : -		
	Contact T Russell	Recorders	Miss.Nicky Owner					Permits		
22-1-0212	S2W-2	GDA	56	514083	6655959	Open site	Destroyed	Artefact : 4		103091
	Contact Searle	Recorders	Ms.Jacqueline Collins,Ms.Jacqueline Collins					Permits		
22-1-0296	Sugar Mill Creek 2 (SMC 2)	AGD	56	514526	6656631	Open site	Valid	Artefact : 20		100424
	Contact S Scanlon	Recorders	Umwelt (Australia) Pty Limited - Individual users					Permits		
22-1-0364	Korara 2 and PAD	GDA	56	513424	6654719	Open site	Valid	Artefact : 1, Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Davies Heritage Consultants Pty Ltd					Permits		
22-1-0374	S2W-15	GDA	56	514167	6657059	Open site	Valid	Artefact : 1		103091

Report generated by AHIMS Web Service on 27/10/2020 for Matthew Finlayson for the following area at Lat, Long From : -30.2391, 153.1219 - Lat, Long To : -30.2153, 153.1595 with a Buffer of 50 meters. Additional Info : arch assessment. Number of Aboriginal sites and Aboriginal objects found is 19

This information is not guaranteed to be free from error omission. Office of Environment and 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 2

Office of Environment & Heritage

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : EV1110

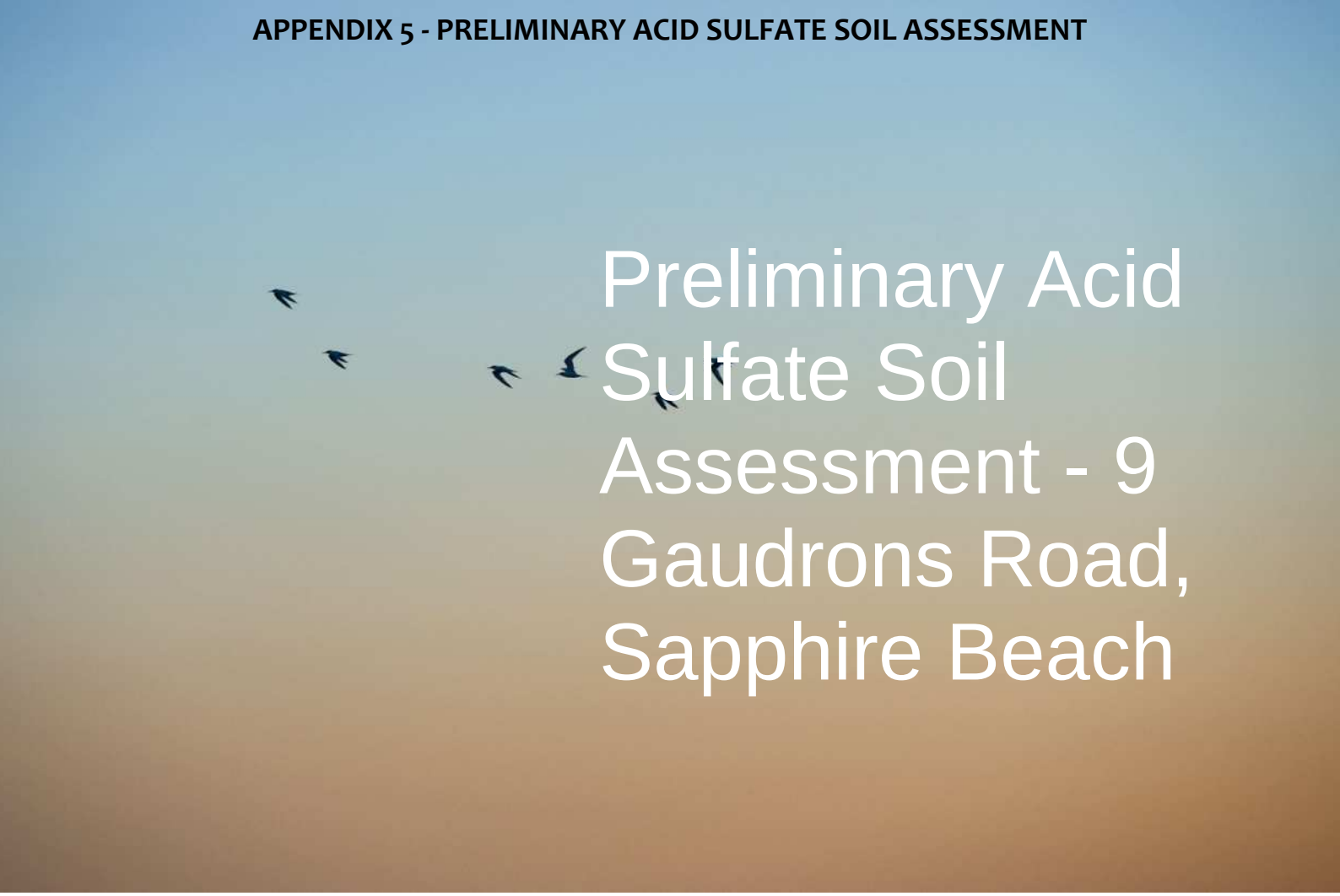
Client Service ID : 545516

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	Ms.Jacqueline Collins					Permits		
22-1-0391	S2W-20	GDA	56	514000	6654705	Open site	Valid	Artefact : -		103091
	Contact	Recorders	ADISE Pty Ltd,Ms.Jacqueline Collins					Permits		
22-1-0399	Sartor OS1	GDA	56	513905	6654924	Open site	Destroyed	Artefact : 1		102485,102653
	Contact	Recorders	Mr.John Appleton,Mr.John Appleton					Permits	3491,3492,3605	
22-1-0400	Sartor ISO 2	GDA	56	514004	6654746	Open site	Destroyed	Artefact : 1		102485,102653
	Contact	Recorders	Mr.John Appleton,Mr.John Appleton					Permits	3491,3492,3605	
22-1-0437	S2W-2 Redeposit	GDA	56	514221	6656185	Open site	Valid	Artefact : -		103091
	Contact	Recorders	Ms.Jacqueline Collins					Permits		
22-1-0525	Settles Road	GDA	56	511854	6656947	Open site	Valid	Artefact : -		
	Contact	Recorders	Coffs Harbour City Council - cnr Coff and Castle Streets,Mr.Marten Bouma					Permits		
22-1-0566	Old Coast Road	GDA	56	513888	6654946	Open site	Valid	Artefact : -		
	Contact	Recorders	Coffs Harbour City Council - cnr Coff and Castle Streets,Mr.Marten Bouma					Permits		

Report generated by AHIMS Web Service on 27/10/2020 for Matthew Finlayson for the following area at Lat, Long From : -30.2391, 153.1219 - Lat, Long To : -30.2153, 153.1595 with a Buffer of 50 meters. Additional Info : arch assessment. Number of Aboriginal sites and Aboriginal objects found is 19

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Page 2 of 2



Preliminary Acid Sulfate Soil Assessment - 9 Gaudrons Road, Sapphire Beach

26 November 2020

For: Chris Bowen

Authored by: Strider Duerinckx

Ref	Ver	Date	Distribution
2021-71-03	A	26/11/20	Client

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3 Scope of Work 3
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7 Subsurface Conditions 8
7.1 Biophysical Indicators 9
7.2 ASS Screening Test Results 9
8 Conclusions and Recommendations 9
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Figure 1 Site Layout and Sample Locations

Appendices

Appendix A Borehole Logs

Appendix B Field Screening Results

1 Introduction

Earth Water Consulting Pty Limited (EWC) was engaged by Chris Bowen (the "Client") to undertake a preliminary Acid Sulfate Soil Assessment (PASS) for 9 Gaudrons Road, Sapphire Beach (the "Site") (Figure 1).

2 Proposed Development

We understand that it is proposed to rezone and subdivide the Site into 8 lots to be used for rural-residential living.

3 Scope of Work

This report presents the results of PASS investigations, undertaken in reference to the Acid Sulfate Soil Manual (ASSMAC, 1998), and CHCC LEP Part 7 Acid Sulfate Soils. The scope of work included:

- A desktop review of surface, geology, hydrogeology, geomorphic and ASS risk conditions;
- A site inspection and walkover to assess for indicative ASS biomes and features;
- Drilling of three hand auger boreholes to the depth of 1.2m;
- Collection of 2 soil samples at various soil profiles present and screening for ASS; and
- Preparation of this report which describes the results of our investigation.

4 Site Description

4.1 Site Identification

The Site details are provided in Table 1 and shown in Figure 1. The Site is zoned RU2, rural landscape.

Table 1 - Site Identification

Address	Lot ID	Approx Area (ha)
9 Gaudrons Road	Lot 11 DP 1141269	53

4.2 Location and Features

The Site is located at the beginning of Gaudrons Road, and comprises an elevated ridgeline at about 32mAHD that slopes down to the northwest and southeast to two unnamed intermittent gullies along the western and southern boundaries. An existing small farm dam is present in the southeastern corner that will be filled in during subdivision works. The groundsurface in the southeastern corner falls to about 10mAHD.

The Site formerly extended further east, but the eastern 100m was resumed by RMS for Pacific Highway upgrade works that were undertaken in the past decade.

As a result of the upgrade works the intermittent gully along the southern boundary has been impacted in natural shape and flows.

The Site is mainly cleared and used for banana and fig tree production. Relic forest is present along the western boundary (Photographs 1-3).



Photograph 1. Looking east across Proposed Lot 1



Photograph 2. Looking south across Proposed Lot 8 and 7 (in background).

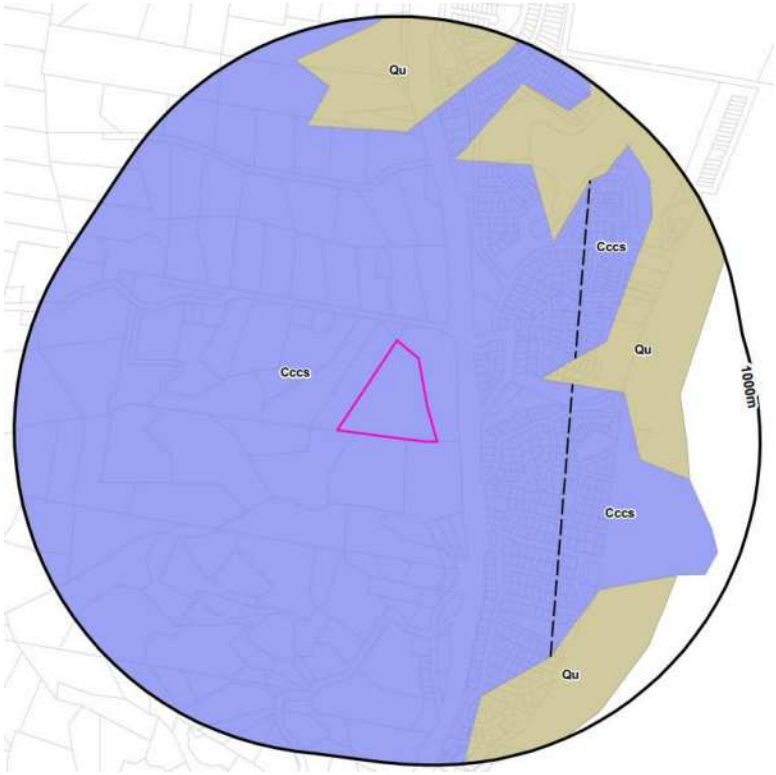


Photograph 3. Looking northwest across existing forest along western boundary.

5 Geology and Hydrogeology

5.1 Geology

The Site is underlain by the Coramba beds (Cccs). These are comprised of lithofeldspathic wacke, minor siltstone, mudstone, metabasalt, jasper and rare calcareous siltstone (**Photograph 4**).



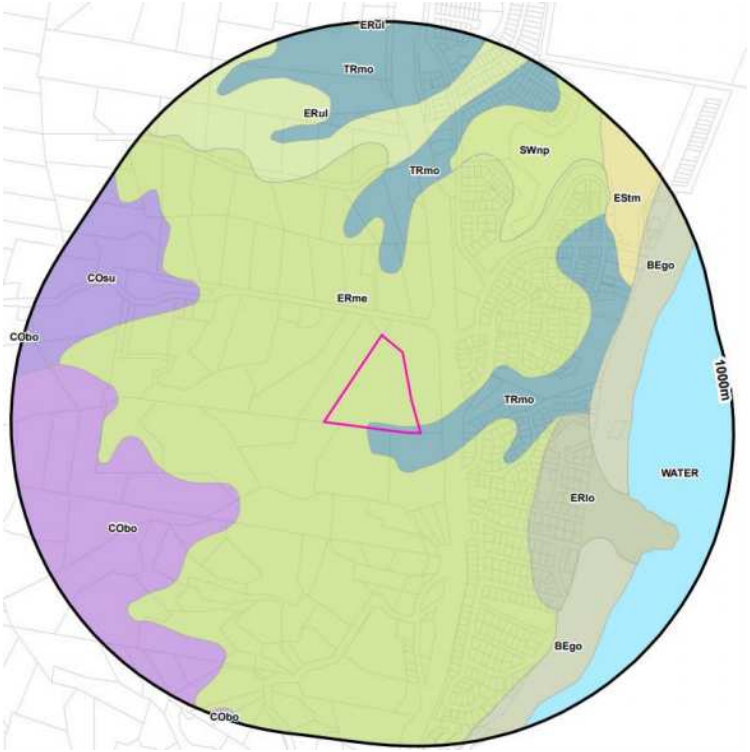
Photograph 4. Mapped geological formation and subject property location (magenta).

5.2 Soils

We reviewed the Soil Landscapes of the Coffs Harbour 1:100,000 Sheet (Milford, 1999), and the Site is underlain by soils of the Megan soil landscape (ERme). The creek line along the southern boundary contains a narrow band of overlying Moonee Soil Landscape (TRmo) (**Photograph 5**).

The Megan soil landscape is an erosional soil type located on rolling low hills to hills on Late Carboniferous-aged metasediments with local relief up to 90mAHD and 200m AHD. Soils are moderately deep (>100cm), well drained structured red or yellow Earths and podsols.

The Moonee soil landscape is a transferral soil type located on undulating rises, footslopes and drainage plains with local relief <30mAHD. Soils are moderately deep to deep poorly drained humic gleys.



Photograph 5. Mapped soil landscape and subject property location (magenta).

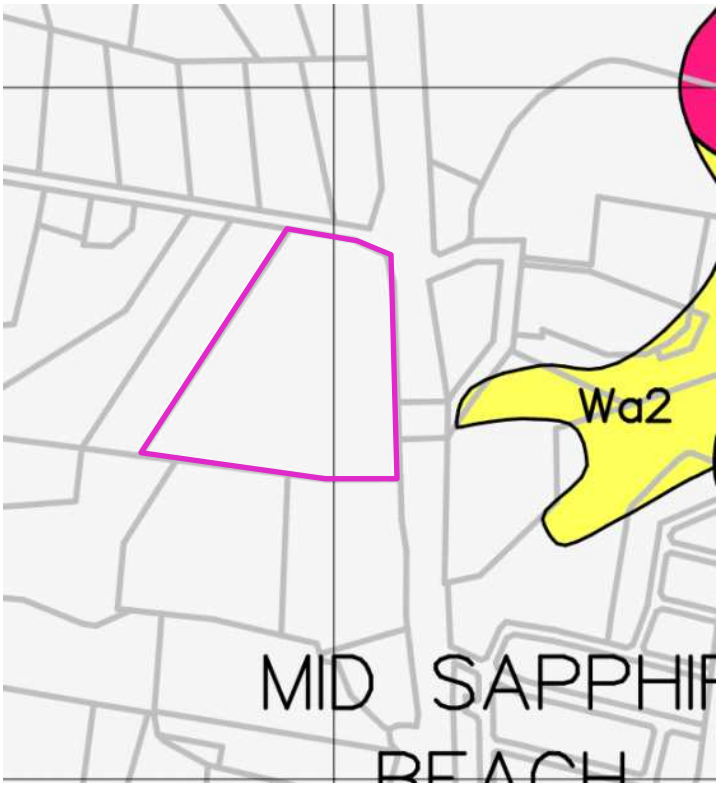
6 Acid Sulfate Soils

6.1 Mapped Occurrences of ASS

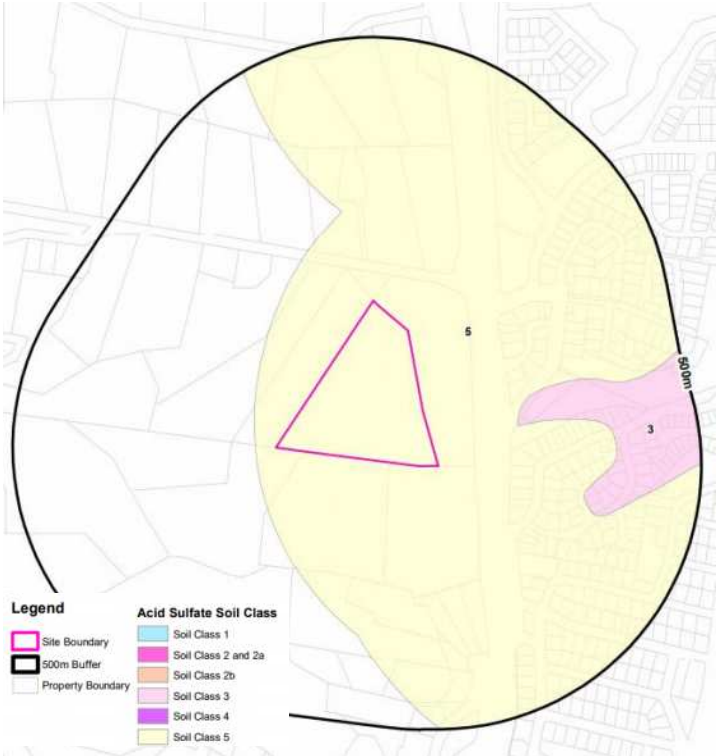
The published Moonee Beach 1:25,000 ASS Risk Map indicates that the Site is not underlain by identified potential ASS (**Photograph 6**). The nearest mapped ASS risk is associated with the intermittent gully along the southern boundary and is of low probability (yellow), lacuastrine swale and sandplain at 2-4mAHD.

Coffs Harbour City Council Local Environmental Plan (LEP, 2013) and Coffs Harbour City Council Planning and Environment Spatial Maps - ASS layers that are derived from the published ASS risk mapping, indicates that the Site is underlain by mapped “Class 5” ASS risk (**Photograph 6**). Class 5 is a 500m wide buffer zone created around mapped ASS risk soils (also yellow but not to be confused with the yellow of published ASS Risk Mapping). The LEP mapped ASS risk is Class 3.

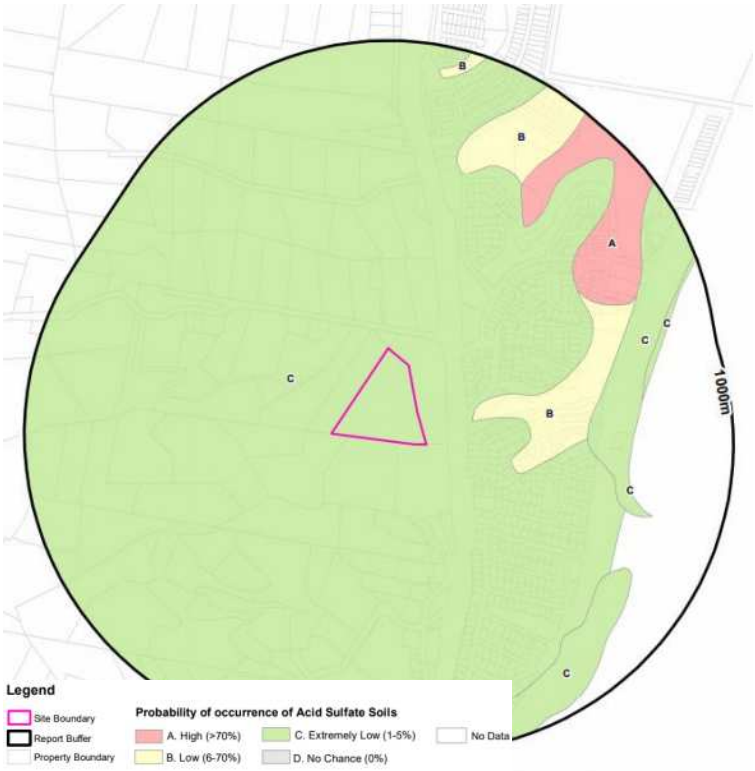
The published Australian ASS Atlas lists the entire property and surrounds up to the ridgelines as extremely low risk (1-5%), a general rating for non ASS areas (**Photograph 8**).



Photograph 6. Mapped ASS risk and subject property location (magenta).



Photograph 7. CHCC LEP Mapped ASS classes.



Photograph 8. Atlas of Australian Acid Sulfate Soils risk mapping.

In accordance with Part 7 of the LEP, development consent is required for the carrying out of the following works;

> **Within Mapped Class 5** – Works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum and by which the watertable is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.

As the lowest point of the Site is around 10mAHD, well above the 5m criteria, standard rural-residential development is not expected to permanently lower groundwater, and the filling of the dam will have no impact on groundwater levels, it is unlikely that the proposed subdivision and future development would trigger any ASS provisions. Notwithstanding, this PASS investigation has been undertaken for confirmation of the local ASS risk.

7 Subsurface Conditions

Site soils were observed by drilling three (3) boreholes (BH1-BH3) across the Site to a maximum depth of 1.2m using a hand auger. The location of the boreholes are shown in Figure 1 and a copy of the borehole logs are presented in Appendix A.

Natural soil profiles were observed in the boreholes, and were found to be representative of the Megan soil landscape, mid slope and lower slope (dry) positions.

The lithology encountered included a pale orange brown clay underlain by strong red brown clay.

Strong jarosite and iron mottling was not observed in the natural soils. No rotten egg odours, shell pieces, dark grey to black anaerobic soils or muds were encountered.

No groundwater inflow was observed in the boreholes to the maximum depth of 1.2m drilled.

7.1 Biophysical Indicators

The proposed development is situated above 5mAHD on a moderately to gently sloping land surface. Dominant tree species in the lower western forested zone included mixed eucalypt species. Grass species are present around the lower southeastern portion of the Site. These are not vegetation strongly associated with ASS soil presence but can be found around ASS soils.

No surface water seepage was observed or standing swampy ground.

7.2 ASS Screening Test Results

Two soil samples collected from BH2 (0.1-0.35 and 0.95-1.2m) were selected for field screening tests to determine their likelihood of containing Potential or Actual ASS (Pass/Aass) and whether further laboratory analyses would be necessary. The selected soil samples were placed in a chilled container (~4 C) and only removed when analysis was conducted.

Samples were analysed inhouse for the initial screening analysis. The screening report is included in Appendix B and summarised in **Table 2**.

Table 2 – Summary of Field Screening

Sample Location	Sample Depth (m)	pH $_f$ (1:5)	pH $_{fox}$ (1:5)	pH Change	Reaction
BH2	0.1-0.35	5.9	4.8	--0.9	Nil
BH2	0.95-1.2	5.7	4.7	-1	Nil

Typically, pHf readings <4.0-4.5 indicate the presence of Aass.

Typically, pHfox readings of <3.0-3.5 can indicate the presence of Potential Acid Sulfate Soils (Pass).

Typically changes of >1 pH unit and preferably >2 pH units can indicate the presence of Pass.

Oxidation reaction rate and intensity can be indicators of Pass.

In summary, the pH_f, pH_{fox} and reaction rate of all analysed samples were found to be below the Aass and Pass indicator threshold limits

8 Conclusions and Recommendations

ASS risk mapping shows no ASS risk in residual clay subsoils, and LEP mapping includes the southeastern corner of the Site only within the buffer (Class 5) around mapped ASS risk soils that are located further east of the Pacific Highway. Biophysical indicators and soil profiles suggest that the Site is not underlain by ASS. Groundwater was not encountered to 1.2m depth.

Field screening indicated no potential or actual ASS in effervescence and pH change.

As such ASS are not present at the Site that would be impacted by the proposed rural-residential development, and no further investigations or plans of management are required.

If dark grey to black, odorous or waterlogged alluvial sands or clays are encountered during development, then works should be halted until confirmation of the presence of ASS is undertaken and/or remedial strategies developed.

9 References

Coffs Harbour City Council Local Environmental Plan 2013.

Milford H.B, (1997), *Moonee Beach 1:25,000 Acid Sulfate Soil Risk Map*. Edition 2. Department of Land & Water Conservation.

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

Stone Y, Ahern C.R., and Blunden B (1998), *Acid Sulfate Soil Manual 1998*. Acid Sulfate Soil Management Advisory Committee (ASSMAC), Wollongbar, NSW, Australia.

FIGURES

APPENDIX 5 - PRELIMINARY ACID SULFATE SOIL ASSESSMENT



0 20 40

Horizontal Scale (metres) 1:1200

LEGEND

- Property Boundary
- Contour Line (2m)
- Drainage Alignment
- Dam to be removed
- Existing Dwelling
- Slope % — Slope Direction
- Borehole Location

EARTH WATER CONSULTING

TITLE: No.9 Gaudrons Road Existing Property Layout			FIGURE: Figure 1
			SHEET: 1 OF1 ISSUE: A
PROJECT: Prelim ASS for Proposed Subdivision of No. 9 Gaudrons Road, Sapphire Beach			CLIENT: Chris Bowen
AUTHOR: SD	DATE: 26/11/20	SCALE: 1:1200	PROJECT: 2021-71

APPENDIX A

APPENDIX 5 - PRELIMINARY ACID SULFATE SOIL ASSESSMENT

Soil Borelog

Borehole No:	**BH1**
Logged by:	SD
Drilling date:	2/11/2020
Drilling method:	Hand auger
Borehole location:	
Borehole coords:	513868, 6655678

Project ref:	2021-97
Client:	Bowen, Duce & Hunter
Address:	No. 9 Gaudrons Road

PROFILE DESCRIPTION

Depth (m)	Sampling depth/name	Graphic Log	Horizon	Texture	Structure	Colour	Mottles	Coarse Fragments	Moisture Condition	Comments
0.1			A1	Clay Loam	Strong	Dark Choc Brown	Nil	<10%	SM	Topsoil
0.2			A2	Clay Loam	Strong	Pale Brown	Slight OB	<10%	SM	Colluvium
0.3	S		B1	Light Clay	Strong	Pale Brown	OB	<10% qtz	SM	Residual
0.4										
0.5			B2	Light Clay	Strong	Orange Brown	Reddish Brown	<5%	SM	Residual
0.6										
0.7	S									
0.8										
0.9			B3	Medium Clay	Strong / Moderate	Pale Grey	Strong RB	<5%	SM	Residual
1.0										
1.1										
1.2										
1.3			Borehole terminated at 1.2m							
1.4										
1.5										

Moisture condition

D	Dry	M	Moist	W	Wet / saturated
SM	Slightly moist	VM	Very moist		

APPENDIX 5 - PRELIMINARY ACID SULFATE SOIL ASSESSMENT

Soil Borelog

Borehole No:	**BH2**
Logged by:	SD
Drilling date:	2/11/2020
Drilling method:	Hand auger
Borehole location:	
Borehole coords:	514062, 6653710

Project ref:	2021-97
Client:	Bowen, Duce & Hunter
Address:	No. 9 Gaudrons Road

PROFILE DESCRIPTION

Depth (m)	Sampling depth/name	Graphic Log	Horizon	Texture	Structure	Colour	Mottles	Coarse Fragments	Moisture Condition	Comments
0.1			A1	Clay Loam	Strong	Dark Choc Brown	Nil	<10%	SM	Topsoil
0.2	S		B1	Light Clay	Strong	Orange Brown	Reddish Brown	<5%	SM	Residual
0.3										
0.4										
0.5										
0.6										
0.7										
0.8			B2	Medium Clay to Silty Clay	Strong / Moderate	Pale Grey	Strong RB	5-30% Phyllite	SM	Residual grading to XW Bedrock
0.9										
1.0	S									
1.1										
1.2										
1.3					Borehole terminated at 1.2m					
1.4										
1.5										

Moisture condition

D	Dry	M	Moist	W	Wet / saturated
SM	Slightly moist	VM	Very moist		

APPENDIX 5 - PRELIMINARY ACID SULFATE SOIL ASSESSMENT

Soil Borelog

Borehole No:	**BH3**
Logged by:	SD
Drilling date:	2/11/2020
Drilling method:	Hand auger
Borehole location:	
Borehole coords:	514046, 6655837

Project ref:	2021-97
Client:	Bowen, Duce & Hunter
Address:	No. 9 Gaudrons Road

PROFILE DESCRIPTION

Depth (m)	Sampling depth/name	Graphic Log	Horizon	Texture	Structure	Colour	Mottles	Coarse Fragments	Moisture Condition	Comments
0.1			A1	Clay Loam	Strong	Dark Choc Brown	Nil	<10%	SM	Topsoil
0.2			B1	Light Clay	Strong	Orange Brown	Reddish Brown	<5%	SM	Residual
0.3										
0.4										
0.5										
0.6										
0.7										
0.8			B2	Medium Clay to Silty Clay	Strong / Moderate	Pale Grey	Strong RB	5-30% Phyllite	SM	Residual grading to XW Bedrock
0.9										
1.0										
1.1										
1.2										
1.3					Borehole terminated at 1.2m					
1.4										
1.5										

Moisture condition

D	Dry	M	Moist	W	Wet / saturated
SM	Slightly moist	VM	Very moist		

APPENDIX B

APPENDIX 5 - PRELIMINARY ACID SULFATE SOIL ASSESSMENT

Results of ASS Field Screening

Client:	**Chris Bowen**	**Project No.: 2021-71**	
Site:	**9 Gaudrons Road, Sapphire Beach**	**Date:**	5/11/20
Notes:		**Recorded by: SD**	

Sample Loc.	Sample Depth (mm)	pH water	pH f (1:5) [1]		pH H2O2 [2]	pH fox (1:5) [3]		pH f - pH fox [4]		Temp (deg) [5]	Colour Change [6]	Eff Reaction [7]	Fragments [8]	Comments
				n/a			n/a	0.0	n/a					
				n/a			n/a	0.0	n/a					
				n/a			n/a	0.0	n/a					
				n/a			n/a	0.0	n/a					
				n/a			n/a	0.0	n/a					
				n/a			n/a	0.0	n/a					
				n/a			n/a	0.0	n/a					
				n/a			n/a	0.0	n/a					
				n/a			n/a	0.0	n/a					
BH2	0.1-0.35	6	5.9		4.5	4.8		0.9		22.0	nil	nil	nil	
	0.95-1.2	6	5.7		4.5	4.7		1.0		22.0	nil	nil	Qtz	

Notes:-

n/a not available
n/t not tested
Ratings based on data in ASSMAC 1998
[1] pH measured on 1:5 soil:water suspensions. <4pH units may indicate AASS
[2] Should be pH 4.5-5.5
[3] pH measured on 1:5 soil:H2O2 suspensions. <3pH PASS, <4pH PASS Likely
[4] pH changes > 1-2 may indicate PASS
[5] Temperatures greater than 70 deg can indicate PASS
[6] Colour change from grey to brown tones can indicate PASS
[7] Nil = Nil, L = some, M = moderate, H = Much, V = Violent
[8] SS = shells, QTZ = quartz, J = jarosite, O = organics, Anthro = anthropogenic

Land & Fire Assessments Pty Ltd

PO BOX 104
Wardell
NSW 2477
ACN 160 897 343
Web: landandfireassessments.com.au

BUSHFIRE ASSESSMENT
FOR PLANNING PROPOSAL

Lot 11 DP1141269
9 Gaudrons Road, Sapphire Beach, NSW



BPAD Bushfire Planning & Design Accredited Practitioner Level 3

Prepared By: Paola Rickard
BPAD – Level 3 Accredited Practitioner – BPAD-21855
Land & Fire Assessments Pty Ltd
For: Chris & Chris Bowen
Report No: LFA20041
Date: 19 February 2021

APPENDIX 6 - BUSHFIRE ASSESSMENT

Disclaimer

Land & Fire Assessments Pty Ltd (LFA) have conducted work concerning the environmental status of the site, which is the subject of this report, and has prepared this report on the basis of that assessment. The work was conducted, and the report has been prepared, in response to specific instructions from the client or a representative of the client and in reliance on certain data and information made available to LFA. The analysis, evaluations, opinions and conclusions presented in this report are based on that information, and they could change if the information is in fact inaccurate or incomplete.

Due consideration has been given to site conditions and to appropriate legislation and documentation available at the time of preparation of the report. As these elements are liable to change over time, the report should be considered current at the time of preparation only. Should further information become available regarding the conditions at the site, LFA reserves the right to review the report in the context of the additional information. LFA has made no allowance to update this report and has not taken into account events occurring after the time its assessment was conducted.

This report is intended for the sole use of the client and only for the purpose for which it was prepared. Any representation contained in the report is made only to the client unless otherwise noted in the report. Any third party who relies on this report or on any representation contained in it does so at his or her own risk

Revision List

Revision No.	Revision Date	Report Title	Report Author	Field Survey By	Status
00	15.01.21	Bushfire Assessment For Planning Proposal, Lot 11 DP1141269, 9 Gaudrons Road, Sapphire Beach, NSW	Main Author: Paola Rickard (LFA - Senior Environmental Planner & BPAD – Level 3 Accredited Practitioner –no. BPAD 21855)	Paola Rickard undertaken on the 04.11.20	Draft
01	19.02.21				Final

Paola Rickard contact detail: 0427 809 352

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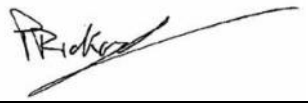
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Summary Compliance Table

Site Details	Lot 11 DP1141269, 9 Gaudrons Road, Sapphire Beach, NSW 2450; Coffs Harbour City Council LGA
Proposal	Rezone the subject land from Zone RU2 Rural Landscape to Zone R5 Large Lot Residential. Change to Minimum Lot Size from 40 ha to 6,000 m^2
Bushfire Prone Land Map	Vegetation Category 1, Category 3 & Buffer - see Fig. 1
Planning context	s. 4.46 of the *Environmental Planning and Assessment Act 1979* and s. 100B of the *Rural Fires Act 1997; section 9.1(2) of the Environmental Planning and Assessment Act 1979 - Directions (specifically Direction 4.4 Planning for Bushfire Protection)*
Bushfire planning guideline and relevant chapter	Planning for Bushfire Protection 2019 (PBP) Chapter 5 - Residential and Rural Subdivision; s. 4.4.1 Consideration of bush fire issues; Appendix 1
Application complies with 'Deemed - to Satisfy' (DtS) provisions	Yes, all DtS provisions can be met by a future residential subdivision
Consultation with RFS Commissioner	Required under s.9.1(2) Directions of the *Environmental Planning and Assessment Act 1979*; specifically, Direction 4.4 Planning for Bushfire Protection
Compliance statement	This Assessment has duly considered the bushfire issues identified in s 4.4.1 of PBP 2019. Accordingly, it has found that the proposed Planning Proposal to amend LEP 2013 to allow large lot residential development on Lot 11 DP1141269 can comply with the s.9.1(2) Directions (specifically Direction 4.4 Planning for Bushfire Protection), and with the specific objectives for the development type and the performance criteria for the various proposed Bushfire Protection Measures in accordance with PBP 2019.
Full Name of Accredited Practitioner	Paola Rickard - Land & Fire Assessments Pty Ltd
Qualification	BPAD – Level 3 Accredited Practitioner - Accreditation no. BPAD-21855, valid to 2/08/2021
Date	19 February 2021
Signature	

1. Introduction

1.1 Background & Planning Context

This Bushfire Assessment report has been prepared by Land & Fire Assessments Pty Ltd (LFA) in accordance with the relevant provisions of Planning for Bushfire Protection (PBP) 2019 in its entirety and future residential development can comply with all relevant Acceptable Solutions in this version of PBP. This assessment has been prepared to support the **Planning Proposal for Lot 11 DP1141269, 9 Gaudrons Road, Sapphire Beach, NSW**. The Site is shown on Figs. 1, 2 & 3. Sapphire Beach is located in the Coffs Harbour City Council (CHCC) Local Government Area (LGA) approximately 10 km north of Coffs Harbour.

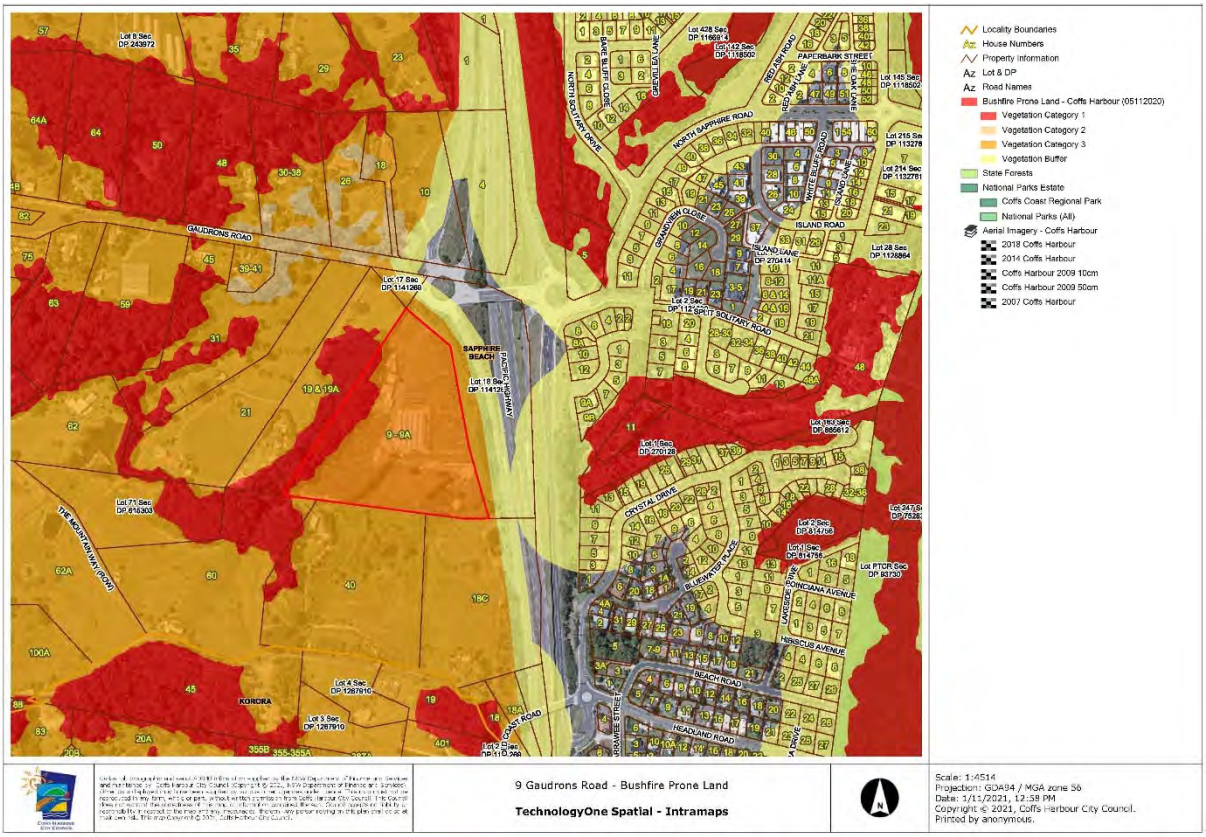


Figure 1. The Site (red boundary) & Bushfire prone land as applicable to the 9 Gaudrons Rd (Lot 11 DP1141269) Site. Source: CHCC Intramaps

This Planning Proposal applies to Lot 11 DP1141269 (the Site), which is zoned RU2 Rural Landscape under the Coffs Harbour Local Environmental Plan (LEP) 2013 (refer to Fig. 4). The purpose of this Planning Proposal is to amend LEP 2013 to allow large lot residential development. The proposal area is wholly affected by the Bush Fire Prone Land mapping, as shown on Fig. 1. Accordingly, the proposal triggers the need to address the bushfire planning provisions.

Section 4.4.1 of PBP 2019 requires consideration of bushfire issues when preparing a draft LEP or planning proposal. The emphasis is on early consultation and inclusion of a bushfire assessment that demonstrate compliance with the s.9.1(2) Directions (specifically Direction 4.4 Planning for Bushfire Protection) and PBP.

The Minister for Planning, under section 9.1(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) issues directions that relevant planning authorities (such as local councils) must follow when preparing planning proposals for new Local Environmental Plans (LEP) and amending LEPs.

Direction 4.4 Planning for Bushfire Protection identifies matters for consideration for rezoning that will affect, or are in proximity to land mapped as bush fire prone.

The key principle is to ensure that future development is capable of complying with PBP. To achieve this, it is necessary to undertake a constraint assessment of the Site to identify potential bush fire risks to the individual site and proposed forms of development. The assessment requirements are detailed in s. 4.4.1 of PBP 2019. These measures, summarised below, will be evaluated for compliance in this assessment:

1. Assessment of the suitability of the land for the proposed development given the bush fire risk and existing land uses
2. The proposal must demonstrate that the required APZs can be met on the development site and that the road network can support evacuation demands numbers in the event of an emergency.
3. It is important that new development does not increase the level of bush fire risk to the existing community. A traffic report prepared by a suitably qualified traffic consultant may be required in circumstances where issues relating to access/egress are identified.
4. In addition to the review of any layout designs, consideration must also be given to the LEP provisions relating to minimum lot sizes to ensure appropriate APZs can be accommodated within future subdivisions.

Under s. 4.46 of the *Environmental Planning and Assessment Act 1979* and s. 100B of the *Rural Fires Act 1997* a Bushfire Safety Authority (BFSA) will be required from the Commissioner of the NSW Rural Fire Service (RFS) for the future subdivision of the land. Clause 44 of the *Rural Fires Regulation 2013* specifies the points to be considered in preparing an application for a Bush Fire Safety Authority (BFSA). In addition, PBP 2019 states that it must be demonstrated that the proposal satisfies the broad aim and objective of PBP, the specific objectives for the development type and the performance criteria for the various proposed Bushfire Protection Measures (BPMs).

Chapter 5 of PBP sets out the specific objectives, and the specifications and requirements for Bushfire Protection Measures for Residential and Rural Subdivision Development. These measures, summarised below, will be assessed for compliance in this assessment:

- Asset Protection Zones/Bushfire Attack Level;
- Access;
- Services; and
- Landscaping and Maintenance

Furthermore, address of Direction 4.4 Planning for Bushfire Protection is undertaken in s.3 of this report.

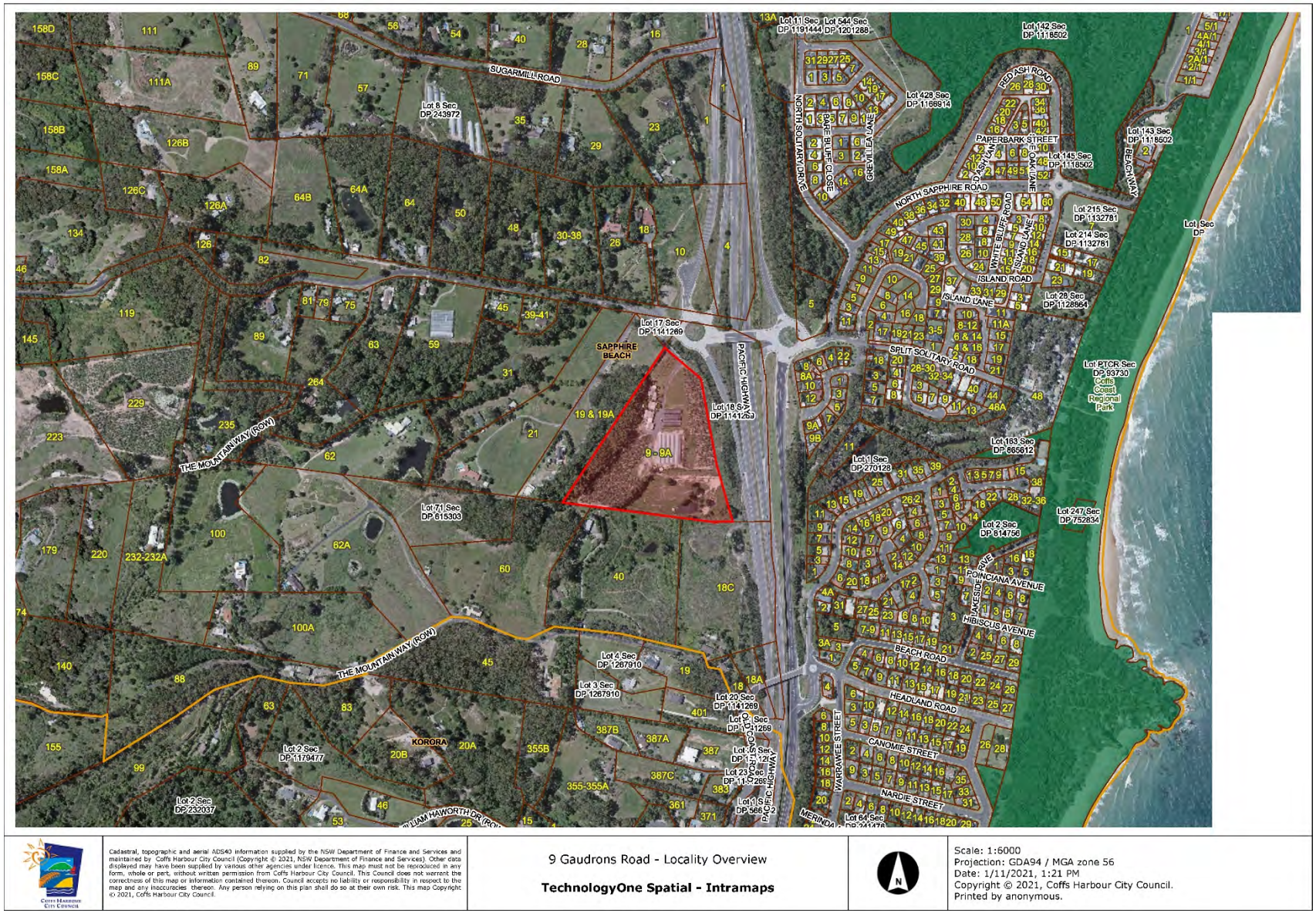


Figure 2. The Site (red boundary) within the locality context. Source: CHCC Intramaps



Figure 3. 9 Gaudrons Road (Lot 11 DP1141269) - Site assessment area, Vegetation, Slope analysis (arrows point up the slope) using 1-2m contours intervals (slopes also verified using Nikon Laser Rangefinder) - site assessment 04/11/20. Source: CHCC Intramaps

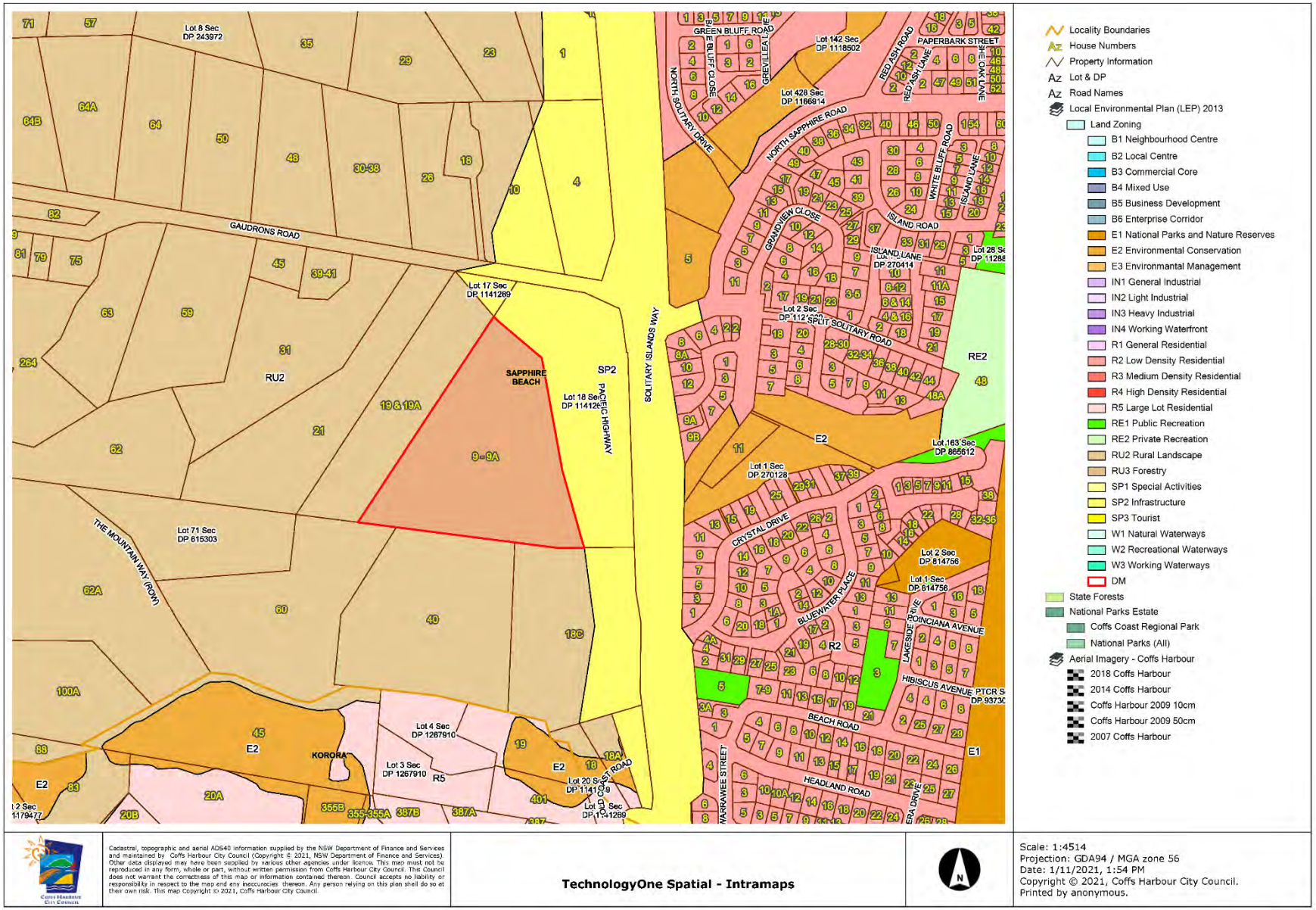


Figure 4. Land zoning applicable to the Site (red boundary). Source CHCC (2019)

1.2 The Subject Site

The Subject Site (i.e. Lot 11 DP1141269), which is 5.268 Ha in size, is directly accessed from Gaudrons Road. The land in context with the locality is shown on Fig. 2. It entails a developed property utilised for horticulture (banana plantation and hydroponics figs). The Site is bounded by Gaudrons Road to the north, the Pacific Motorway to the east, rural lifestyle lots to the west and south. Two residential dwellings are found on Site as well as large greenhouses, sheds, water tanks and sealed driveway access. A dam is found on the south eastern corner of the Site.

The Site is in close proximity (just east of the Motorway) to the established residential areas of Sapphire Beach, as shown on Figs. 2-4. Whilst rural land is found to the north, south and west, the Site is identified in the 'Korora' potential Large Lot Residential (Zone R5) Candidate Areas in the Coffs Harbour LGA. The Site does not contain Biodiversity Values land and it is not located near any sensitive ecosystems.

The Site, which consists of a central ridge with downslopes to the east, west and south, is predominantly cleared with scattered trees and windbreaks on the southern portion (Plates 1-10). A row of Bangalow Palms is found along the southern boundary. A narrow stand of predominantly Wet Sclerophyll Forest (i.e. Forest vegetation formation) is found along the western boundary of the Site, as shown on Fig. 3. The southern eastern portion of the Site is dominated by Grassland with scattered trees, whilst the south western portion is under banana cultivation. The eastern and northeaster portion of the Site consists of Grassland and lawns.





Plates 1 & 2. Looking south west towards the two existing residential dwellings. Note the Forest vegetation in the background, which is found along the western boundary



Plate 3. Looking north along the existing sealed access



Plate 4. Looking south east at the extensive lawn area and the greenhouses in the background



Plate 5. Looking north east across Site towards the Pacific Motorway and beyond is the Sapphire Beach residential area



Plate 6. Looking south west at the horticultural farm infrastructure



Plate 7. Looking south east across the Site- one of the greenhouses to the right



Plate 8. Looking south- south west from the top of the ridge towards southern boundary (marked by row of Bangalow Palms) and neighbouring land. Note the extensive Grassland on an upslope

Plate 9. The banana orchard found to the SW of the Site bounded by windbreak

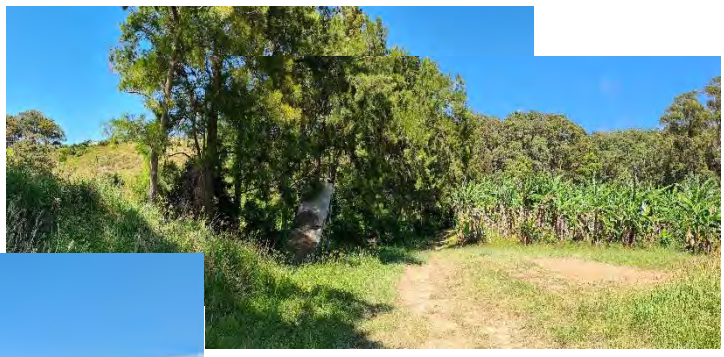




Plate 10. Looking north along western portion of Site with greenhouse to the right and banana orchard to the left

1.3 Proposed Development

The purpose of this Planning Proposal is to amend LEP 2013 to allow large lot residential development on Lot 11 DP1141269. The Planning Proposal will:

- rezone the subject land from Zone RU2 Rural Landscape to Zone R5 Large Lot Residential,
- Change to the Minimum Lot Size (MLS) for the new R5 zoned land from the current 40 hectares. A new MLS of 6,000 m^2, is sought for this precinct.

The proposed subdivision concept layout is shown as Fig. 5.

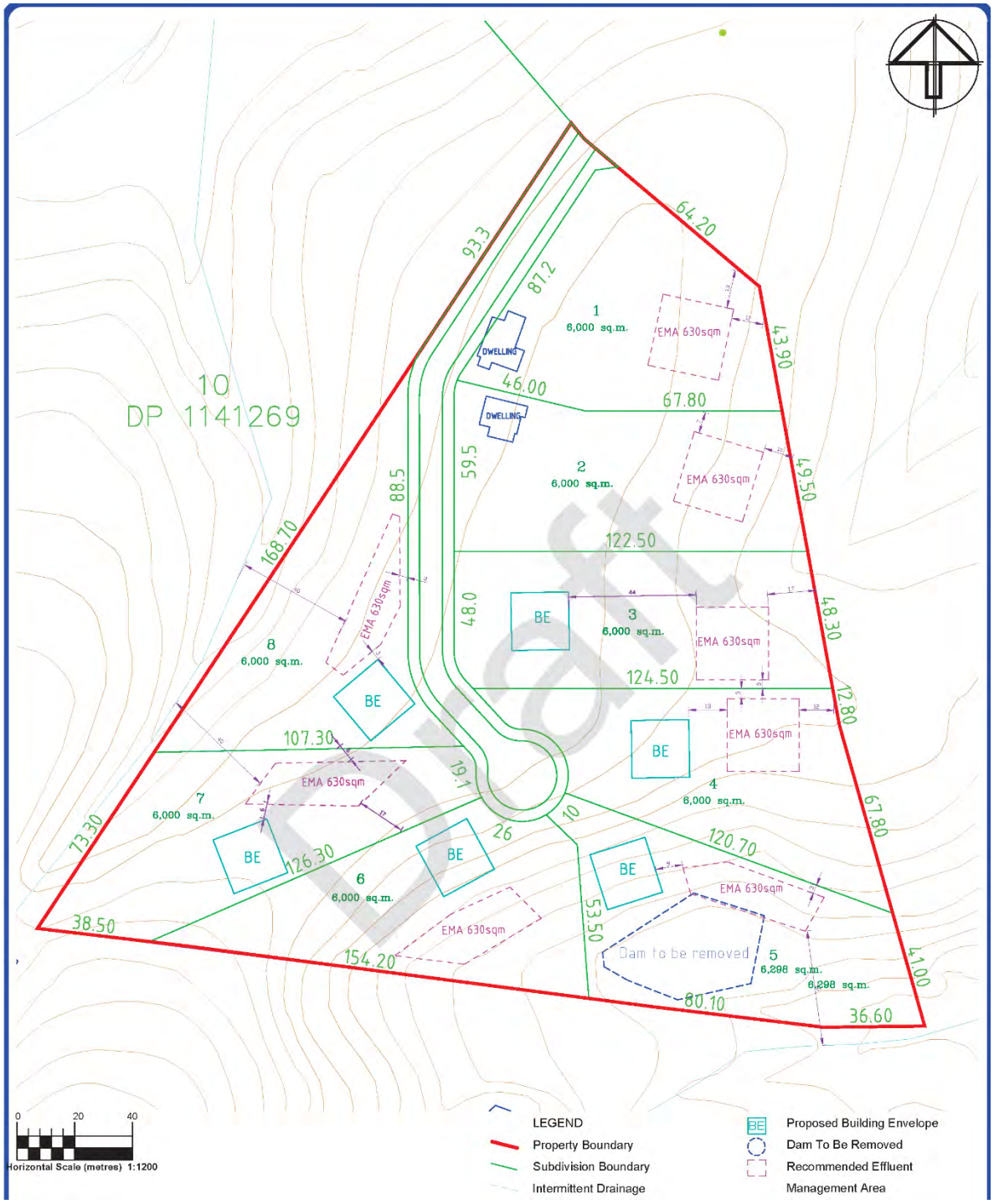


Figure 5. Proposed subdivision concept layout. Source: Earth Water Consulting (2020)

1.4 Site & Surrounding Vegetation, Topography and Slope

As noted in s. 1.2 and shown on Figs. 2 & 3, the Planning Proposal area is predominantly cleared with scattered trees and windbreaks on the southern portion (Plates 1-10). A row of Bangalow Palms is found along the southern boundary (Plate 8). A narrow stand of predominantly Wet Sclerophyll Forest (i.e. Forest vegetation formation) is found along the western boundary of the Site, as shown on Figs. 3 & 6. The southern eastern portion of the Site is dominated by Grassland with scattered trees, whilst the south western portion is under banana cultivation. The eastern and northeaster portion of the Site consists of Grassland and lawns.



Plate 11. Forest vegetation found along and beyond western boundary



Plate 12. Forest vegetation extending upslope to the south west

The surrounding vegetation includes the Wet Sclerophyll Forest to the west along a narrow gully further extending upslope to the south west (Plates 11 & 12). Otherwise, the predominant vegetation to the south is Grassland on upslope, as shown on Fig. 3 & Plate 8. To the north is the extensive newly constructed roundabout and overpass over the Pacific Motorway and predominantly Grassland beyond it. To the east is the Pacific Motorway with associated road reserve and Solitary Islands Way (see Figs. 2 & 3). The Site consists of a central ridge-oriented north to south with a maximum elevation of 32m AHD. The ridge downslopes to the east, west and south as shown on Fig. 3, reaching 10m AHD elevation to the south east.

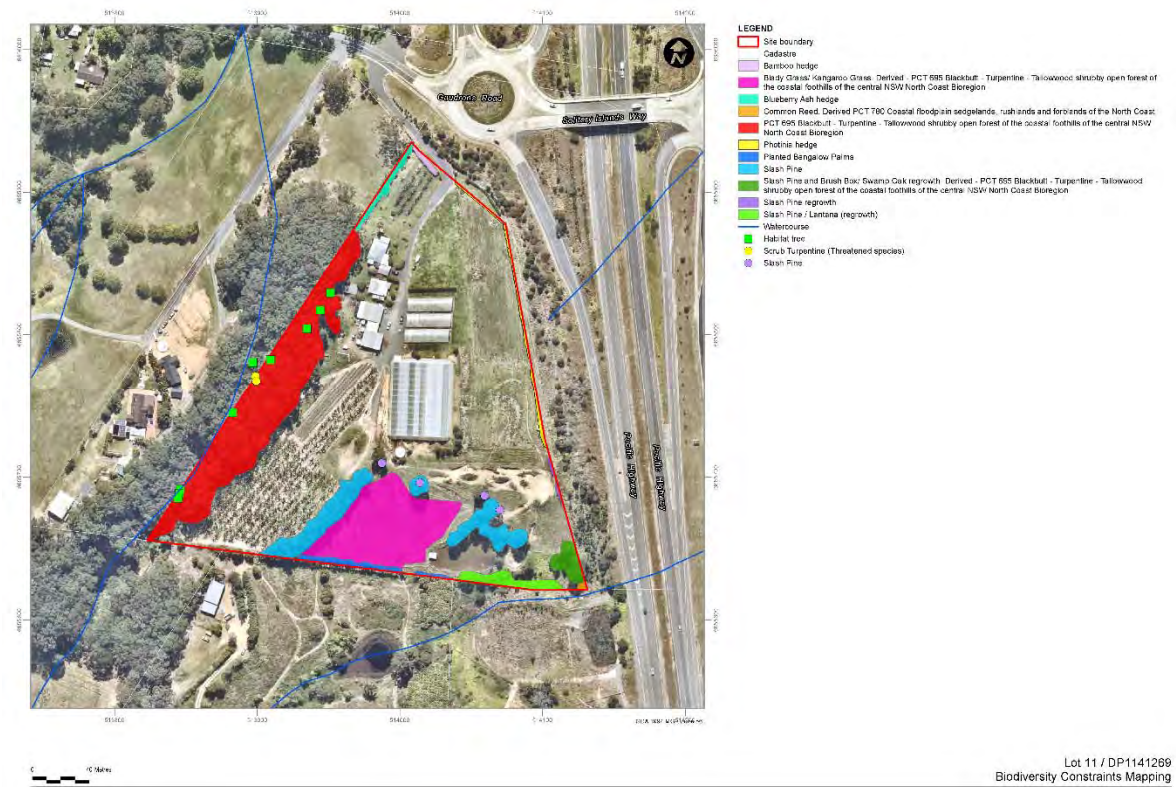


Figure 6. Vegetation mapping for the Site. Source: GeoLINK 2020 - Biodiversity Constraints Mapping

Accordingly, the potential bushfire hazard vegetation within the assessment area includes the Wet Sclerophyll Forest (i.e. Forest vegetation formation) along the western boundary and to the south west & Grassland to the south, south east. The classified Forest vegetation matches the findings of the preliminary ecological assessment undertaken by GeoLINK, as reproduced in Fig. 6.

Thus, the classified vegetation and the applicable slope, as shown on Fig. 3, are as detailed on Table 1.

Table 1. Classified vegetation and slope applicable to the vegetation surrounding the Site

Aspect	Vegetation	Slope	Comments
North & north east	Managed Land	N/A	Newly constructed roundabout and overpass over the Pacific Motorway and predominantly Grassland beyond it (more that 100m away)
East	Managed Land & Road Reserve	downslope 16^0	Pacific Motorway with associated road reserve and Solitary Islands Way. The Road Reserve is managed by Transport NSW and is at most 37m in width
West	Forest	Downslope 5-10^0 & 10-15^0	This vegetation is narrow and occurs along a gully. It is hemmed in by Grassland & lawns
South West	Forest	Upslope	The forest gully vegetation continues, still on a narrow band, upslope from the Site
South	Grassland	Upslope	Neighbouring rural land

In term of biodiversity, the Site is not mapped or is in proximity to Biodiversity Values land and it is not located near any sensitive ecosystems. The preliminary biodiversity mapping by GeoLINK indicate that only one threatened plant species, namely the Scrub Turpentine (*Rhodamnia rubescens*) was recorded along the western boundary, as shown on Fig. 6. A number of habitat trees, again along the western boundary, were also recorded. GeoLINK identify a number of Plant Community Types (PCT) as occurring at the site namely, PCT 695 Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central North Coast & derived PCTs as shown on Fig. 6. None of these PCT are identified as Threatened Ecological Communities (TECs). In any case, it is not proposed to impact on the Forest vegetation occurring along the western boundary.



An Aboriginal Cultural Heritage Assessment (ACHA) has been undertaken by Everick Heritage Pty Ltd (2020). The ACHA findings regarding the Site indicate that considerable soil disturbance has occurred historically due to banana farm operations, cut and fill earthworks, construction of amenities and landscaping. Nevertheless, one (1) Aboriginal stone tool was identified during survey of the site. It was found along the western boundary of the banana plantation as shown on Fig. 7. The object is a unifacial greywacke chopper, transversely broken with one (1) visible negative flake scar, identified as Gaudrons Road IF01. The ACHA concluded that there is a potential for further artefacts finds along the ridge crest, therefore further investigations are recommended. These will be undertaken at the subdivision DA stage.

Figure 7. Location of stone tool. Source: Everick Heritage (2020)

1.5. Risk Assessment and Consultant Qualifications

The proposed development Site is surrounded by predominantly rural & residential development and public roads. However, Forest vegetation is found on a narrow band to west and south west of the Site, whilst Grassland is found to the south. Therefore, the potential bushfire hazard is considered to be a low bushfire risk.

This report has been prepared by Paola Rickard.

The Fire Protection Association Australia (FPA) has in place the Bushfire Planning and Design Accreditation Scheme (BPAD), which is recognised by the NSW Rural Fires Services (RFS). Paola Rickard is a **BPAD - Level 3 Accredited Practitioner** (Accreditation no. BPAD 21855) and is listed on the FPA Australia web site register.

BPAD- Level 3 Accredited Practitioner can perform the following:

- *BPAD- Level 3 Accredited Practitioner meet specific requirements in relation to identifying bushfire prone land, assessing potential bushfire impact, and submitting designs and plans, both deemed to satisfy and alternate solution, to meet the performance requirements of the Building Code of Australia and the specific state or territory legislation, for subdivisions, new buildings or modification to existing buildings aiming to minimise the risk to future developments, their occupants and responding emergency services from a bushfire event.*

Paola holds a **Graduate Diploma in Design for Bush Fire Prone Areas with Distinction** from the University of Western Sydney and is a **bronze corporate member of the Fire Protection Association Australia (FPA Australia)**. She is a participating **member of the FPA Technical Advisory Committee (TAC) /20 Bushfire Safety**. The TAC provides a nationally focussed forum for discussion between practitioners, fire services and regulators on the design and construction of property in areas prone to bushfires.

From 2015 to 2019, Paola was appointed as a **BPAD member to the NSW Bushfire Working Group (NSWBWG)** set up by FPA Australia. The NSWBWG provide a forum to discuss the application, interpretation and periodic review of NSW Government-based bushfire related regulatory requirements governing land use planning and building construction in areas subject to bushfire impact.

Paola also holds a **Bachelor Degree in Applied Science, a Certificate in Bushland Regeneration**, and is a member of the **Australian Association Bush Regenerators**. She has over 18 years of experience in flora surveys and vegetation management issues, and **has been undertaking bushfire assessments since 2003.**

Paola has attended the “NSW Consulting Planners Bushfire Training Course” in Sydney in 2003 and has attended the “Planning for Bushfire Protection Short Course” held by the University of Technologies (UTS) Sydney in 2007. She has obtained certification for the short course. In November 2010, Paola attended the “One-day Planning for Bushfire Prone Areas Update Course” conducted by the Centre for Local Government UTS, Sydney. Additionally, Paola has a ‘Basic Bush Fire Awareness’ certificate and has experience in fire control and planning while living on a rural land sharing community.

2. Bushfire Protection Measures for Residential Subdivision

2.1 Introduction

Bushfire Protection Measures for Residential and Rural Subdivision are detailed in Chapter 5 of PBP 2019. The specific objectives for 'residential and rural residential subdivision development' are:

- *Minimise perimeters of the subdivision exposed to the bush fire hazard (hourglass shapes, which maximise perimeters and create bottlenecks, should be avoided);*
- *Minimise vegetated corridors that permit the passage of bush fire towards buildings;*
- *Provide for the siting of future dwellings away from ridge-tops and steep slopes, within saddles and narrow ridge crests;*
- *Ensure that APZs between a bush fire hazard and future dwellings are effectively designed to address the relevant bushfire attack mechanism;*
- *Ensure the ongoing maintenance of APZs;*
- *provide adequate access from all properties to the wider road network for residents and emergency services;*
- *provide access to hazard vegetation to facilitate bush fire mitigation works and fire suppression; and*
- *Ensure the provision of an adequate supply of water and other services to facilitate effective firefighting.*

Additionally, PBP identifies the performance criteria and acceptable solutions for the various proposed Bushfire Protection Measures (BPMs). The relevant BPMs criteria and acceptable solutions with regard to residential and rural residential subdivision development are outlined in Sections 2.2 to 2.4 of this report.

2.2 Asset Protection Zones/Bushfire Attack Level

Asset Protection Zones (APZs) are buffer areas between development and a fire hazard, which aim to protect human life and property. The APZ comprises an Inner Protection Area (IPA) and an Outer Protection Area (OPA). These areas are to be managed to reduce the bushfire hazard. Appendix A provides guidance concerning the general requirements for APZs and appropriate landscaping and property maintenance.

Intent of measures: to provide sufficient space and maintain reduced fuel loads to ensure radiant heat levels at the buildings are below critical limits and prevent direct flame contact.

At the subdivision level it is required to demonstrate that proposed dwellings can be accommodated so that potential building footprint is not exposed to radiant heat levels exceeding 29kW/m^2 for each proposed lot.

Accordingly, the Classified vegetation is Forest on upslope, and downslope 5-10^0 & 10-15^0 ranges; and Grassland on upslope as shown on Fig. 3. According to Table A1.12.3 of Planning for Bushfire Protection 2019 (PBP) for residential subdivisions the minimum APZ distances are calculated to achieve no more than 29kW/m^2 [i.e. Bushfire Attack Level (BAL)-29].

In this case the setbacks (APZs) requirements are:

- **Forest vegetation to the south west on upslope = 20m** (10m IPA + 10m OPA)
- **Forest vegetation to the west on 5-10^0 downslope = 31m** (16m IPA + 15m OPA)
- **Forest vegetation to the west on 10-15^0 downslope = 39m** (24m IPA + 15m OPA)
- **Grassland to the south** on upslope **= 10m** (10m IPA)

Fig. 7 shows the respective APZ setbacks (not to scale) applicable to Site from the retained vegetation boundary or the property boundary.

The land east of the Site, which is a road reserve, is jammed between the Site and the Pacific Motorway. It is landscaped and managed by Traffic NSW. No APZ is proposed on this side.

As shown on the proposed concept layout shown on Fig. 5, the dwelling envelopes on proposed lots 7, 8 & 9 are set back more than 40m from the south west and western boundary. Notably, the prescribed OPA allows for some vegetation retention along the western boundary. The remainder of the proposed dwelling envelopes lots are also concentrated on the central ridge and more than 10m from the southern boundary. Accordingly, it would be possible to accommodate the prescribed APZs depicted on Fig. 7.

Concerning the existing dwellings, s. 5.1.3 of PBP notes that existing dwellings located on the land would benefit from improved bushfire protection measures. The existing dwellings are sound and appropriately landscaped and can comply with the APZ setbacks for subdivisions. Access to both dwellings is sealed and with ample turning bays. Static water supply may need to be provided (discussed in s. 2.4). In any case, any upgrades where required would be conditionals on receiving approval for the subdivisions and would not be required to be implemented until the Construction Certificate stage.

In summary, the proposed development is capable of complying with the APZ requirements set out in Appendix 4 of PBP 2019. Guidance concerning the general requirements for APZs and appropriate landscaping and property maintenance is provided in Appendix A of this report.

Consideration of specific construction standards applicable to the proposal are not required at the planning proposal stage. As noted, the key requirement is to ensure that future dwellings can be accommodated so that a potential building footprint is not exposed to radiant heat levels exceeding 29kW/m^2. This proposal can easily achieve such requirement.



Figure 7. Vegetation retention area (yellow dashed line) and Asset Protection Zone (APZ – yellow to red dashed lines) - APZs (not to scale) range from 39m wide (Forest on 10-15 degrees downslope) to 10m wide (Grassland on upslope). The APZ is measured from the tree base of the retained vegetation edge or in case of the Grassland to the south from the boundary. Notably OPA 10m to 15m wide apply along western boundary.

2.3 Access

The provision of PBP 2019 specify the following criteria concerning access provisions, namely:

- Performance Criteria: to provide safe operational access to structures and water supply for emergency services, while residents are seeking to evacuate from an area

The proposed rezoning will need to demonstrate that the future residential subdivision layouts can comply with the PBP access requirements.

Investigation of traffic matters associated with the proposal has been undertaken by Weavers Consulting Group (2020). The full investigation report is reproduced in Appendix B.

According to Weavers Consulting Group (2020) the following was found:

- Gaudrons Road - *At the intersection the existing traffic lanes are 3.1 m wide as defined with a centreline and E1 edge lines. Shoulder width exceeds the 1.0 m requirement of Council's specification. As it can be assumed that 100% traffic assignment from the proposed intersection will be to and from the roundabout, then there is no requirement for upgrading of Gaudrons Road*.
- Internal Road – Council requirements is that the internal road reserve width needs to be 20 m and this can be provided.
- Conclusion - *This investigation has proven that the existing point of access to Gaudrons Road for Lot 11 will be suitable for a future road connection to be provided to the proposed road within Lot 11 for an 8 lot subdivision. The expected traffic generation from the subdivision will be very minor and further capacity analysis of the nearby roundabout on the western side of Pacific Highway should not be necessary. The above details are considered to be sufficient to prove "in principle" that satisfactory access can be provided to Gaudrons Road at the current access location subject to detailed design and provision for turning movements*.

As noted, the proposed rezoning will need to demonstrate that the future residential subdivision layouts can comply with the PBP access requirements. The road network will be designed to ensure service vehicles can undertake all necessary turning movements within the Site; thus, meeting PBP requirements. Notably, given the lay of the land it is not possible to provide a perimeter road and more than one access in and out of the development. However, it is noted that Site is already surrounded to the north and east by extensive public roads network. Nevertheless, as shown on the Fig. 5 conceptual layout, the proposed dead end public road will provide separation to the western hazard at least in part. Furthermore, the dead-end public road will be less than 200m in length and includes a compliant turning head (i.e. minimum 12 metres outer radius turning circle).

In summary, the Site is immediately adjacent to the M1 and in proximity of the newly constructed interchange, accordingly the rezoning of this Site would not increase the level of bush fire risk to the existing community. This is because firefighting access to this Site would be deemed to be designed to provide safe access for evacuation and firefighting operations.

2.4 Water, Gas and Electricity Supply

Intent of measures: to provide adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building.

The Site is not serviced by reticulated water. Accordingly, provision of water supply for a proposed future subdivision will need to comply with the acceptable solution detailed on Table 2 applicable to non-reticulated developments. In terms of electrical transmission lines, existing supply is overhead,

and if reticulated or bottled gas is provided it will comply with the relevant requirements stated in Table 2.

Table 2. Performance criteria and Acceptable Solutions for water, gas and electricity supply (as per Table 5.3c PBP 2019)

Performance Criteria	Acceptable Solutions
• Adequate water supply is provided for firefighting purposes • water supplies are located at regular intervals • the water supply is accessible and reliable for firefighting operations • flows and pressure are appropriate • the integrity of the water supply is maintained	• reticulated water is to be provided to the development where available. • A static water and hydrant supply is provided for non- reticulated development or where reticulated water supply cannot be guaranteed; and • Static water supply shall comply with table 5.3d. *Note: for this proposal it will entails provision of 10,000 L SWS per lot including the existing dwellings* • fire hydrant spacing, design and sizing comply with the relevant clauses of 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 roads. • fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005 • all above-ground water service pipes are metal, including and up to any taps.
Electricity Services Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings.	• Where practicable, electrical transmission lines are underground. • Where overhead electrical transmission lines are proposed: o lines are installed with short pole spacing (30 metres), unless crossing gullies, gorges or riparian areas; o no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 *Guideline for Managing Vegetation Near Power Lines*.
Gas Services Location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	• Reticulated or bottled is installed and maintained in accordance with AS/NZS 1596:2014 -*the storage and handling of LP Gas*, the requirements of relevant authorities, and metal piping is used; • All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side; • connections to and from gas cylinders are metal; • polymer-sheathed flexible gas supply lines are not used; and • above-ground gas service pipes are metal, including and up to any outlets.

3. Address of Direction 4.4 Planning for Bushfire Protection

The RFS practice note '2/12 - Planning Instruments and Policies' requires that the following be addressed to support a Planning Proposal.

Part 1 – Objectives or Intended Outcomes relating to bush fire prone land that is:
Protect life, property and the environment from bush fire hazards, by discouraging the establishment of incompatible land uses in bush fire prone areas, and encourage sound management of bush fire prone areas.

Response: The Site is in close proximity to the established residential area of Sapphire Beach. The Site is identified in the 'Korora' potential Large Lot Residential (Zone R5) Candidate Areas in the Coffs Harbour LGA. The proposed rezoning is a compatible landuse on this land as the Site occurs in proximity to residential development, and it is serviced by capable road infrastructure and electricity services. The proposed development Site is surrounded by predominantly rural & residential development and public roads. The retained Forest vegetation is limited in extent and the potential bushfire risk can effectively be mitigated by the provisions of suitable APZ and appropriate building construction standards.

Part 2 – Explanation of the Provisions - The identified objectives can be achieved by ensuring that new controls imposed on development will:

- *not increase the risk to life from bush fire,*
  Response: The proposal will not increase the risk to life from bushfire as adequate controls can be implemented in the future subdivision design to minimise such risk.

- *not introduce controls that place inappropriate developments in areas exposed to unacceptable bush fire hazard,*
  Response: As noted previously, the proposal is in close proximity to the established residential area of Sapphire Beach. It is surrounded by predominantly rural & residential development and public roads. The potential bushfire hazard is limited in extent and the Site is serviced by capable road infrastructure. Accordingly, the development will not be exposed to unacceptable bush fire hazard.

- *ensure that appropriate bush fire protection measures can be afforded to property at risk of bushfire,*
  Response: Appropriate bushfire protection measures can be accommodated at the proposal Site as demonstrated in s. 2.

- *minimise negative impacts on the surrounding environment,*
  Response: The preliminary biodiversity mapping by GeoLINK indicate that only one threatened plant species, namely the Scrub Turpentine and a number of habitat trees were recorded along the western boundary, as shown on Fig. 6. GeoLINK identified a number of Plant Community Types (PCT) as occurring at the Site. None of these PCT are identified as Threatened Ecological Communities (TECs). In any case, it is not proposed to impact on the Forest vegetation occurring along the western boundary. An Aboriginal Cultural Heritage Assessment (ACHA) has been undertaken by Everick Heritage Pty Ltd (2020). The ACHA findings indicate that considerable soil disturbance has occurred historically at the Site due to banana farm operations, cut and fill earthworks, construction of amenities and landscaping. Nevertheless, one Aboriginal stone tool was identified during survey of the site. The artefact occurs along the western boundary and further investigations are to be undertaken in accordance with the

Aboriginal cultural heritage consultation and assessment methodology by Everick Heritage in conjunction with the Registered Aboriginal Parties (RAPs). The methodology aims to:

1. To formulate a better understanding of the archaeology of the Project Area such that the areas of high and low archaeological significance are more clearly defined; and
2. To ensure that areas that will be impacted by development are further assessed for potential sub-surface Aboriginal objects with potential conservation values.

In summary, the conceptual layout ensures the Forest vegetation occurring to west of the Site as well as the artefact are retained.

- *ensure that provision is made for adequate evacuation/shelter options for the community,*
  Response: The Site occurs in proximity to residential development, and it is serviced by capable road infrastructure. The proposed development Site is surrounded by extensive roads (including the Pacific Motorway) and rural and residential development. The retained Forest vegetation is limited in extent and the potential bushfire risk can effectively be mitigated by the provisions of suitable APZ, appropriate roads and building construction standards. Accordingly, the rezoning does not increase the potential bushfire risk and existing measures are already in place at the locality level.

- *and ensure that development is capable of complying with Planning for Bush Fire Protection 2006 (PBP).*
  Response: The development is capable of complying with the relevant Residential and Rural Residential provisions detailed in Chapter 5 of PBP 2019 as demonstrated in s. 2. Notably, PBP 2019 is the currently legislated document, and it provides updated and more robust provisions than those detailed in PBP 2006.

Part 3 – Justification - The level of justification should be proportionate to the impact that the planning proposal will have.

Response: The proposed rezoning will not have an undue impact on the locality in terms of bushfire risk. This assessment has found that the proposal can comply with the Direction 4.4 Planning for Bushfire Protection and is capable of complying with PBP.

4. Conclusion & Recommendations

This Bushfire Assessment report has been prepared by LFA in accordance with the relevant provisions of PBP 2019 to support the Planning Proposal for Lot 11 DP1141269, 9 Gaudrons Road, Sapphire Beach, NSW. The Site is zoned RU2 Rural Landscape under the Coffs Harbour LEP 2013. The purpose of this Planning Proposal is to amend LEP 2013 to rezone the subject land from Zone RU2 Rural Landscape to Zone R5 Large Lot Residential. The proposal area is wholly affected by the Bush Fire Prone Land mapping.

Specifically, this assessment reviewed suitability of the Site for landuse intensification. Direction 4.4 Planning for Bushfire Protection identifies matters for consideration for landuse intensification proposals that will affect, or are in proximity to land mapped as bush fire prone.

A key principle should be to ensure that future development is capable of complying with PBP. To achieve this, it is necessary to undertake a constraint assessment of the Site in respect to bushfire to identify potential bush fire risks to the proposed forms of development (i.e. amend LEP 2013 to allow large lot residential development on Lot 11 DP1141269).

Thus, this bushfire assessment found that the proposal:

- will not increase the risk to life from bush fire;
- will not introduce controls that place inappropriate developments in areas exposed to unacceptable bush fire hazard;
- can provide for appropriate bush fire protection measures to properties at risk of bushfire;
- does not have adverse impacts on the surrounding environment;
- does not place additional burden to current evacuation/shelter options for the community; and
- the proposed development is capable of complying with Planning for Bush Fire Protection.

This bushfire assessment has been undertaken in accordance with the relevant provisions of PBP 2019 in its entirety and the future residential development can comply with all relevant Acceptable Solutions in this version of PBP.

The assessment found that the applicable bushfire protection measures and acceptable solutions as they would apply to future residential subdivision can be met and the following is noted:

- According to Table A1.12.3 of PBP 2019 for residential subdivisions the minimum APZ distances are calculated to achieve a radiant heat of no more than 29kW/m^2 (i.e. BAL- 29). In this case the setbacks (APZs) requirements to achieve BAL - 29 range from 39m to 10m. The proposed conceptual layout (see Fig. 5) demonstrate that it would be possible to accommodate the prescribed APZs depicted on Fig. 7 and that there is plenty of room available to achieve BAL – 29.
- Investigation of traffic matters associated with the proposal has been undertaken by Weavers Consulting Group (2020). The full investigation report is reproduced in Appendix B. This investigation has found that the existing point of access to Gaudrons Road for the Site will be suitable for a future road connection to be provided to the proposed road within Lot 11 for an 8-lot subdivision. According to Weavers Consulting Group, 'the expected traffic generation from the subdivision will be very minor and further capacity analysis of the nearby roundabout on the western side of Pacific Highway should not be necessary.' The road network within the Site will be designed to ensure service vehicles can undertake all necessary turning movements within the Site; thus, meeting PBP requirements. Notably, given the lay of the land it is not possible to provide a perimeter road and more than one access in and out of the development. However, it is noted that Site is already surrounded to the north and east by extensive public roads network. Still,

as shown on the Fig. 5 conceptual layout, the proposed dead end public road will provide separation to the western hazard at least in part. Furthermore, the dead-end public road will be less than 200m in length and includes compliant turning circle. In summary, the Site is immediately adjacent to the M1 and in proximity of the newly constructed interchange, accordingly the rezoning of this Site would not increase the level of bush fire risk to the existing community. This is because firefighting access to this Site would be deemed to be designed to provide safe access for evacuation and firefighting operations.

- The Site is not serviced by reticulated water. Accordingly, provision of water supply for a proposed future subdivision will need to comply with the acceptable solution detailed on Table 2 applicable to non-reticulated developments.
- In terms of electrical transmission lines, existing supply is overhead, and if reticulated or bottled gas is provided it will comply with the relevant requirements stated in Table 2.

In conclusion, this Assessment has duly considered the bushfire issues identified in s. 4.4.1 of PBP 2019. Accordingly, it has found that the proposed Planning Proposal to amend LEP 2013 to allow large lot residential development on Lot 11 DP1141269 can comply with s.9.1(2) Directions (specifically Direction 4.4 Planning for Bushfire Protection), and with the specific objectives for the development type and the performance criteria for the various proposed Bushfire Protection Measures in accordance with PBP 2019.

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Appendix A - APZs Requirements and Landscaping

A.1 General Requirement for Asset Protection Zones

Asset Protection Zones (APZs) are buffer areas between development and a fire hazard, which aim to protect human life and property. The APZ comprises an Inner Protection Area (IPA) and an Outer Protection Area (OPA). These areas are to be managed to reduce the bushfire hazard. The general requirements for APZs are described in Tables 1A and 2A.

Table 1A. Inner Protection Area (IPA) General Requirements

Specifications and Management	
Location	The IPA extends from the edge of the OPA to the development.
Purpose	Ensures that the presence of fuel, which could become involved in fire, is minimised.
Depth	Varies from 10 to 100 metres.
Fuel Loading	Minimum fine fuel at ground level, which could be set alight by bushfire.
Vegetation Requirements	Do not touch or overhang the building; Are well spread out and do not form a continuous canopy; Are not species that retain dead material or deposit excessive quantities of ground fuel in a short period; and Are located far enough away from the house so that they will not ignite the house by direct flame contact or radiated heat emissions.
Uses Within the Area	Tennis courts, swimming pools and gardens are permitted. Woodpiles, wooden sheds, combustive material storage areas, large quantities of garden mulch, stacked flammable building materials are not permitted.
Maintenance	This Area should be regularly mowed and all fuel removed e.g. fallen branches, leaf build-up.

Table 2A. Outer Protection Area (OPA) General Requirements

Specifications and Management	
Location	Located adjacent to the hazard. Originally the OPA would have formed part of the bushfire hazard but becomes an area where the fuel loadings are reduced.
Purpose	Reduction of fuel in this area substantially decreases the intensity of an approaching fire and restricts the pathway of crown fuels; reducing the level of direct flame, radiant heat and ember attack on the IPA.
Depth	Varies from 0 to 25 metres.
Fuel Loading	Fine fuel loads should be kept to a level where the fire intensity expected will not impact on adjacent developments. In the absence of any policy to the contrary, 8 tonnes per hectare of fuel is commonly used. In grasslands, fuel height should be maintained below 10 centimetres.
Vegetation Requirements	Any trees and shrubs should be maintained in such a manner that the vegetation is not continuous.
Maintenance	This Area should be regularly mowed and all excess fuels should be removed e.g. fallen branches, leaf build-up.

The RFS has also developed "Standards for Asset Protection Zones" which should be consulted for APZ specifications. Standards for Asset Protection Zones can be downloaded from <https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0010/13321/Standards-for-Asset-Protection-Zones.pdf>

A.2 Landscaping and Property Maintenance

A.2.1 Landscaping Features & Principles

Bushland vegetation provides the fuel which feeds wildfires; however, by providing adequate separation distance between the bush and buildings will effectively prevent the spread of bushfire. Still vegetation is not always the foe when it comes to bushfires and it is possible to use managed vegetation as a tool to reduce fire risk. According to many practitioners and researchers (Ramsay & Rudolph 2006; CFA 2004; RFS 2006; Queensland Government 2000; RFS undated), a well-designed garden can reduce bushfire hazard near buildings. In summary, homes and garden can blend with the natural environment and be landscaped to minimise the impact of fire at the same time.

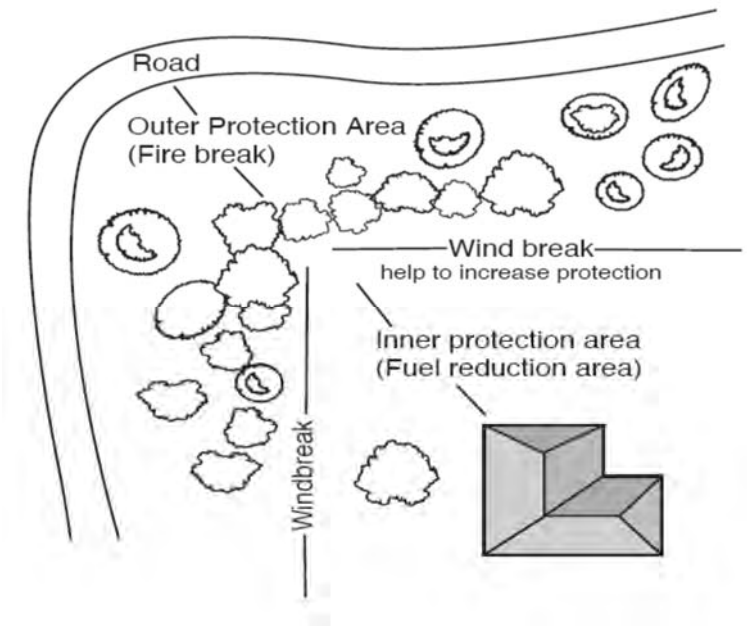


Figure 1A. Example of landscaped design aimed at minimising the impact of fire. Source RFS (undated)

According to the RFS (undated), this can be achieved by providing an effective Asset Protection Zone (APZ), which incorporates features such as fire-resistant plants, radiant heat barriers and windbreaks in the landscape layout as shown on Fig. 1A. The key features required when using landscaping as tool to reduce bushfire risk are summarised as follows (Ramsay & Rudolph 2006; RFS undated; RFS 2006):

- Plants with low flammability are selected (eg. broad leaves with high moisture and mineral content, smooth-trunk species with high branches, etc.)
- Vegetation does not provide a continuous path to the house
- Vegetation is located far enough away from the asset so that plants will not ignite the asset by direct flame contact or radiant heat emission
- Planted (or cleared) vegetation is into clumps rather than continuous rows
- Planted or retained species possesses attributes which makes them a good barrier against bushfire and wind attack
- Low branches are pruned two metres from the ground to prevent a ground fire from spreading into trees
- Lawn is planted and maintained around the future dwellings as this will slow the fire and reduce fire intensity. Alternatively, non-flammable pathways directly around the dwelling are provided
- Shrubs and other plants do not directly abut the dwelling. Where this does occur, gardens should contain low-flammability plants and non-flammable ground cover such as pebbles and crush tile
- Brush type fencing and planting “pencil pine” type trees next to buildings are avoided, as these are highly flammable.

Therefore, the features noted above and the principles listed in the following section should be applied to the landscaping and property maintenance for future dwellings.

A.2.2 Vegetation Management

Vegetation management is the responsibility of individual landowners and should, as per PBP, include:

- *Maintaining a low cut lawn;*
- *Keeping areas around the garden free of fuel;*
- *Utilising non-combustible fencing materials;*
- *Breaking up tree and shrub canopies by defining garden beds;*
- *Using non-flammable mulch;*
- *Ensuring tree branches do not overhang roofs;*
- *Ensuring tree canopies are not continuous; and*
- *Installing windbreaks in the direction from which fires are likely to approach.*

A.2.3 Property Maintenance

Property maintenance should, as per PBP, include:

- *Removal of material such as litter from the roof and gutters;*
- *Ensure painted surfaces are in good condition with decaying timbers being given particular attention to prevent the lodging of embers within gaps;*
- *Check pumps and water supplies are available and in working order;*
- *Driveways are in good condition with trees not being too close and forming an obstacle during smoky conditions;*
- *Check tiles and roof lines for broken tiles or dislodged roofing materials;*
- *Screens on windows and doors are in good condition without breaks or holes in flyscreen material and frames are well fitting into sills and window frames;*
- *Drenching or spray systems are regularly tested before the commencement of the fire season;*
- *Hoses and hose reels are not perished and fittings are tight and in good order;*
- *Doors are fitted with draught seals and well maintained;*
- *Mats are of non-combustible material or in areas of low potential exposure; Woodpiles, garden sheds and other combustible materials are located downslope and well away from the house; and*
- *Trees and other vegetation in the vicinity of power lines and tower lines should be managed and trimmed in accordance with the specifications in "Vegetation Safety Clearances" issued by Energy Australia (NS179 April 2002).*

Appendix B – Traffic Impact Investigation

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BUSHFIRE ASSESSMENT
FOR PLANNING PROPOSAL

Lot 7 DP 555490
148-158 Gaudrons Road, Sapphire Beach, NSW



Prepared By: Paola Rickard
BPAD – Level 3 Accredited Practitioner – BPAD-21855
Land & Fire Assessments Pty Ltd
For: Kerrie Hunter
Report No: LFA20041
Date: 1 April 2021

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

APPENDIX 6 - BUSHFIRE ASSESSMENT

Disclaimer

Land & Fire Assessments Pty Ltd (LFA) have conducted work concerning the environmental status of the site, which is the subject of this report, and has prepared this report on the basis of that assessment. The work was conducted, and the report has been prepared, in response to specific instructions from the client or a representative of the client and in reliance on certain data and information made available to LFA. The analysis, evaluations, opinions and conclusions presented in this report are based on that information, and they could change if the information is in fact inaccurate or incomplete.

Due consideration has been given to site conditions and to appropriate legislation and documentation available at the time of preparation of the report. As these elements are liable to change over time, the report should be considered current at the time of preparation only. Should further information become available regarding the conditions at the site, LFA reserves the right to review the report in the context of the additional information. LFA has made no allowance to update this report and has not taken into account events occurring after the time its assessment was conducted.

This report is intended for the sole use of the client and only for the purpose for which it was prepared. Any representation contained in the report is made only to the client unless otherwise noted in the report. Any third party who relies on this report or on any representation contained in it does so at his or her own risk

Revision List

Revision No.	Revision Date	Report Title	Report Author	Field Survey By	Status
00	19.01.21	Bushfire Assessment For Planning Proposal, Lot 7 DP555490, 148-158 Gaudrons Road, Sapphire Beach, NSW	Main Author: Paola Rickard (LFA - Senior Environmental Planner & BPAD – Level 3 Accredited Practitioner –no. BPAD 21855)	Paola Rickard undertaken on the 04.11.20	Draft
01	03.02.21				Final
02	01.04.21				Final

Paola Rickard contact detail: 0427 809 352

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Summary Compliance Table

Site Details	Lot 7 DP555490, 148-158 Gaudrons Road, Sapphire Beach, NSW 2450; Coffs Harbour City Council LGA
Proposal	Rezone the subject land from Zone RU2 Rural Landscape to Zone R5 Large Lot Residential. Change for the new R5 zoned land from the current 40 Ha Minimum Lot Size to 1 Ha
Bushfire Prone Land Map	Vegetation Category 1 & Category 3 - see Fig. 1
Planning context	s. 4.46 of the *Environmental Planning and Assessment Act 1979* and s. 100B of the *Rural Fires Act 1997;* section 9.1(2) of the *Environmental Planning and Assessment Act 1979 - Directions* (specifically Direction 4.4 Planning for Bushfire Protection)
Bushfire planning guideline and relevant chapter	Planning for Bushfire Protection 2019 (PBP) Chapter 5 - Residential and Rural Subdivision; s. 4.4.1 Consideration of bush fire issues; Appendix 1
Application complies with 'Deemed - to Satisfy' (DtS) provisions	Yes, all DtS provisions can generally be met by a future residential subdivision
Consultation with RFS Commissioner	Required under s.9.1(2) Directions of the *Environmental Planning and Assessment Act 1979*; specifically, Direction 4.4 Planning for Bushfire Protection
Compliance statement	This Assessment has duly considered the bushfire issues identified in s 4.4.1 of PBP 2019. Accordingly, it has found that the proposed Planning Proposal to amend LEP 2013 to allow large lot residential development on Lot 7 DP555490 can generally comply with s.9.1(2) Directions (specifically Direction 4.4 Planning for Bushfire Protection), with the specific objectives for the development type, and the performance criteria for the various proposed Bushfire Protection Measures in accordance with PBP 2019, but only because the existing dwellings are already approved and no further intensification of landuse is proposed.
Full Name of Accredited Practitioner	Paola Rickard - Land & Fire Assessments Pty Ltd
Qualification	BPAD – Level 3 Accredited Practitioner - Accreditation no. BPAD-21855, valid to 2/08/2021
Date	01 April 2021
Signature	

1. Introduction

1.1 Background & Planning Context

This Bushfire Assessment report has been prepared by Land & Fire Assessments Pty Ltd (LFA) in accordance with the relevant provisions of Planning for Bushfire Protection (PBP) 2019 in its entirety and future residential development can comply with all relevant Acceptable Solutions in this version of PBP. This assessment has been prepared to support the **Planning Proposal for Lot 7 DP555490, 148-158 Gaudrons Road, Sapphire Beach, NSW**. The Site is shown on Figs. 1, 2 & 3. Sapphire Beach is located in the Coffs Harbour City Council (CHCC) Local Government Area (LGA) approximately 10 km north of Coffs Harbour.

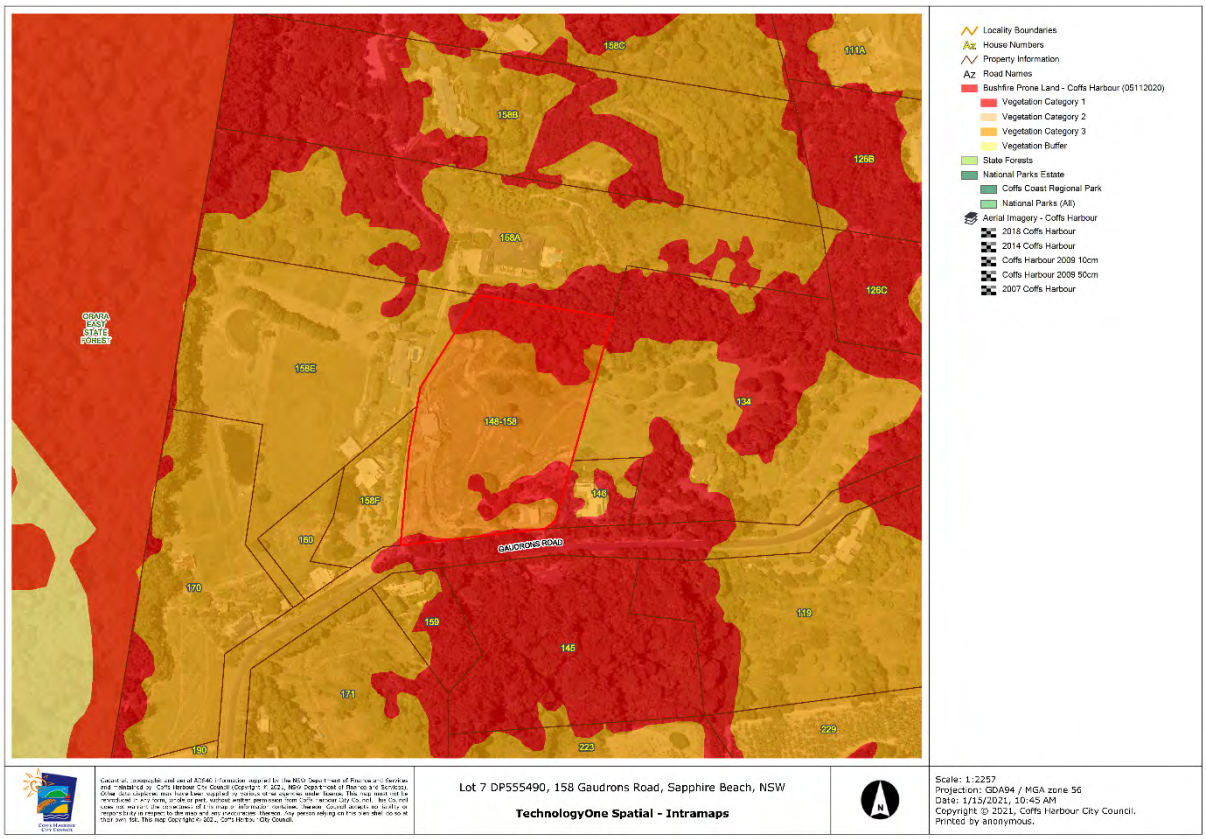


Figure 1. The Site (red boundary) & Bush Fire Prone Land as applicable to Site (i.e. 148-158 Gaudrons Rd; Lot 7 DP555490). Source: CHCC Intramaps

This Planning Proposal applies to Lot 7 DP555490 (the Site), which is zoned RU2 Rural Landscape under the Coffs Harbour Local Environmental Plan (LEP) 2013 (refer to Fig. 4). The purpose of this Planning Proposal is to amend LEP 2013 to allow large lot residential development. The proposal area is wholly affected by the Bush Fire Prone Land mapping, as shown on Fig. 1. Accordingly, the proposal triggers the need to address the bushfire planning provisions.

Section 4.4.1 of PBP 2019 requires consideration of bushfire issues when preparing a draft LEP or planning proposal. The emphasis is on early consultation and inclusion of a bushfire assessment that demonstrate compliance with the s.9.1(2) Directions (specifically Direction 4.4 Planning for Bushfire Protection) and PBP.

The Minister for Planning, under section 9.1(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) issues directions that relevant planning authorities (such as local councils) must follow when preparing planning proposals for new Local Environmental Plans (LEP) and amending LEPs.

Direction 4.4 Planning for Bushfire Protection identifies matters for consideration for rezoning that will affect, or are in proximity to land mapped as bush fire prone.

The key principle is to ensure that future development is capable of complying with PBP. To achieve this, it is necessary to undertake a constraint assessment of the Site to identify potential bush fire risks to the individual site and proposed forms of development. The assessment requirements are detailed in s. 4.4.1 of PBP 2019. These measures, summarised below, will be evaluated for compliance in this assessment:

1. Assessment of the suitability of the land for the proposed development given the bush fire risk and existing land uses
2. The proposal must demonstrate that the required APZs can be met on the development site and that the road network can support evacuation demands numbers in the event of an emergency.
3. It is important that new development does not increase the level of bush fire risk to the existing community. A traffic report prepared by a suitably qualified traffic consultant may be required in circumstances where issues relating to access/egress are identified.
4. In addition to the review of any layout designs, consideration must also be given to the LEP provisions relating to minimum lot sizes to ensure appropriate APZs can be accommodated within future subdivisions.

Under s. 4.46 of the *Environmental Planning and Assessment Act 1979* and s. 100B of the *Rural Fires Act 1997* a Bushfire Safety Authority (BFSA) will be required from the Commissioner of the NSW Rural Fire Service (RFS) for the future subdivision of the land. Clause 44 of the *Rural Fires Regulation 2013* specifies the points to be considered in preparing an application for a Bush Fire Safety Authority (BFSA). In addition, PBP 2019 states that it must be demonstrated that the proposal satisfies the broad aim and objective of PBP, the specific objectives for the development type, and the performance criteria for the various proposed Bushfire Protection Measures (BPMs).

Chapter 5 of PBP sets out the specific objectives, and the specifications and requirements for Bushfire Protection Measures for Residential and Rural Subdivision Development. These measures, summarised below, will be assessed for compliance in this assessment:

- Asset Protection Zones/Bushfire Attack Level;
- Access;
- Services; and
- Landscaping and Maintenance

Furthermore, address of Direction 4.4 Planning for Bushfire Protection is undertaken in s.3 of this report.

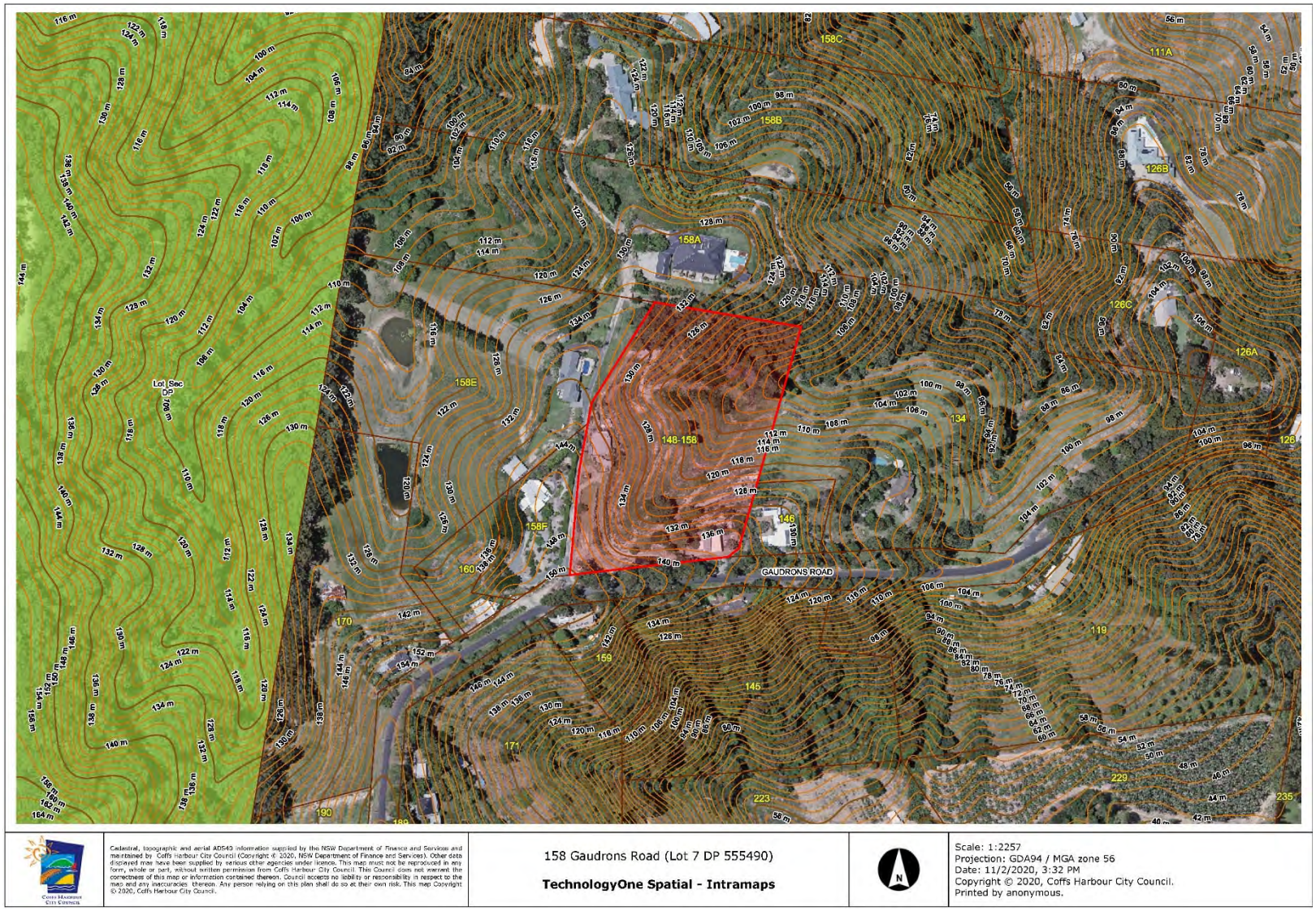


Figure 2. The Site (red boundary) within the locality context. Source: CHCC Intramaps

APPENDIX 6 - BUSHFIRE ASSESSMENT

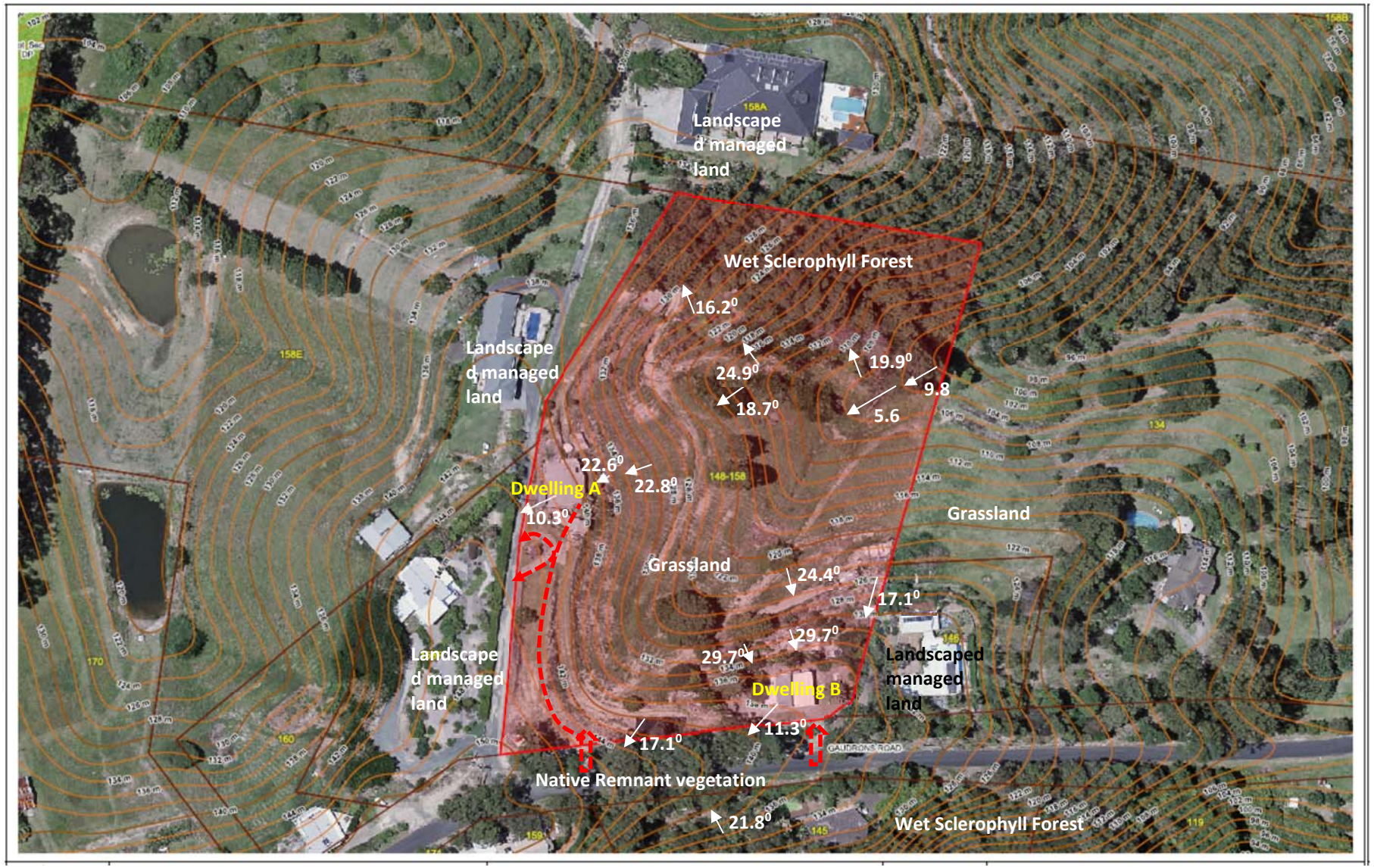


Figure 3. 148-158 Gaudrons Road (Lot 7 DP 555490) - Site assessment area, Vegetation, Slope analysis (arrows point up the slope) using 1-2m contours intervals (slopes also verified using Nikon Laser Rangefinder) - site assessment 04/11/20. Also showing current access (red dashed line) to each dwelling (A & B). Source: CHCC Intramaps

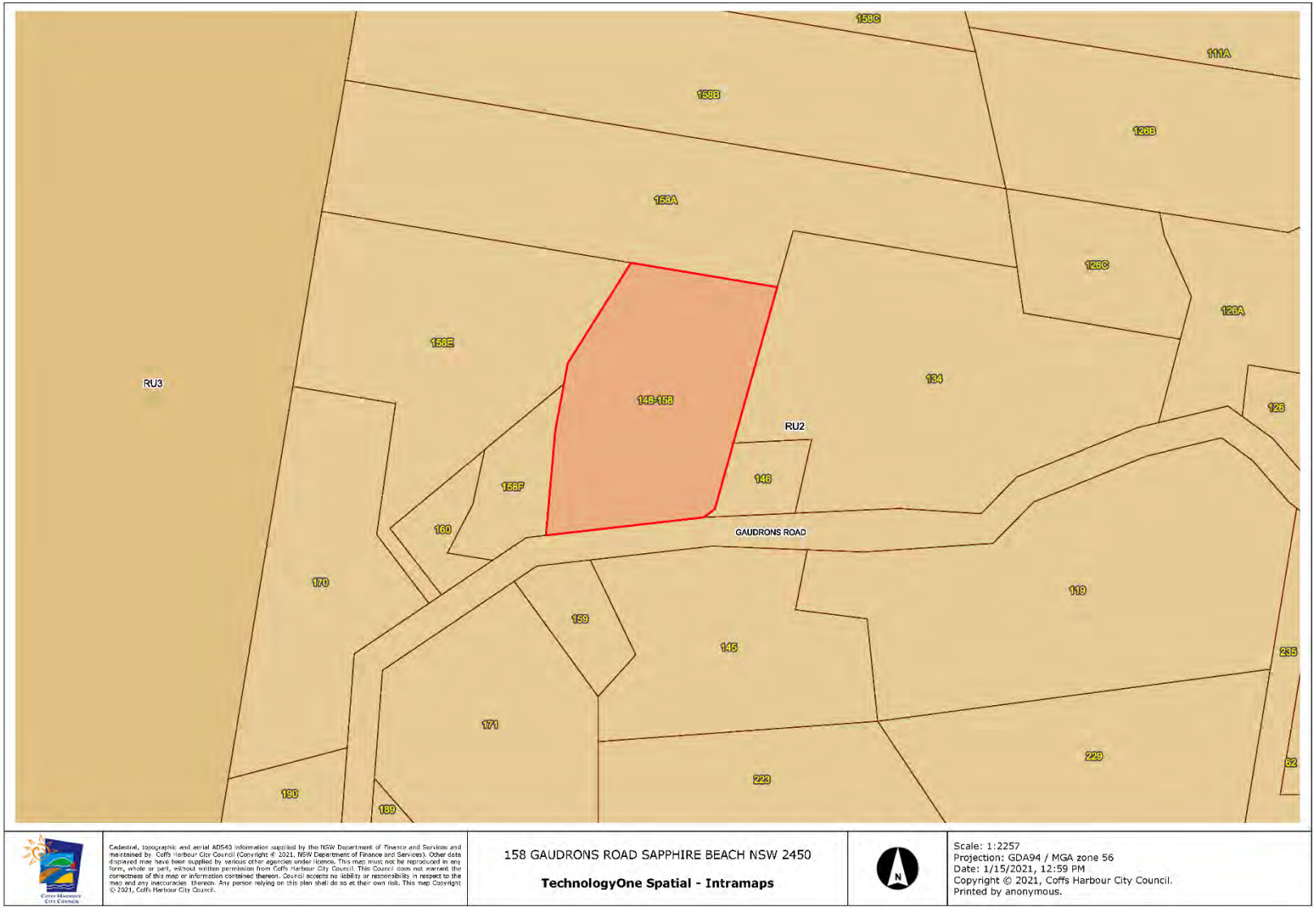


Figure 4. Land zoning applicable to the Site (red boundary). Source CHCC (2019)

1.2 The Subject Site

The Subject Site (i.e. Lot 7 DP555490), which is 2.05 Ha in size, is directly accessed from Gaudrons Road, as shown on Figs. 1-4. The land in context with the locality is shown on Fig. 2. It entails a developed property utilised for rural residential landuse and low-level grazing by goats, as shown on Plates 1-13. Two approved dwellings, one to the west (Dwelling A at 158 Gaudrons Rd) and one to the south (Dwelling B at 148 Gaudrons Rd), and associated sheds and water tanks are present on the Site (Fig. 3 & Plates 1, 2, 6, 7 & 9). Each dwelling has separate access to Gaudrons Road (see Fig. 3 & Plates 4, 5, 10 to 13). In addition, a right of carriageway along the western boundary provides alternative access to Dwelling A (Plate 13). Terracing and retaining walls are found on the sloping side of each dwelling (Plates 12, 6, 6 to 8). The Site is bounded by Gaudrons Road to the south and surrounded by lifestyle residential lots.

The Site is located ~1.6km west of the established residential areas of Sapphire Beach. Whilst the property and its immediate surrounds are zoned RU2 Rural landscape (see Fig. 4), the Site is identified in the 'Korora' potential Large Lot Residential (Zone R5) Candidate Areas in the Coffs Harbour LGA. The Site does not contain Biodiversity Values land and it is not located near High Values Habitats.

The Site, which consists of steep north east to east facing slope draining to the north east, is predominantly cleared with scattered trees and landscaping. Upslope to the north of the Site is a forested area consisting of Wet Sclerophyll Forest (i.e. Forest vegetation formation), as shown on Fig. 3. This vegetation is mapped as Tertiary Koala Habitat in CHCC GIS mapping. Along Gaudrons Road to the south is also predominantly Wet Sclerophyll Forest and Remnant vegetation.



Plate 1. Looking north towards the existing residential Dwelling A found along the western boundary. Note existing farm access tracks



Plate 2. Looking north west from the western Dwelling A towards the Forest vegetation on an upslope. Note terracing and retaining wall



Plate 3 (left). Looking south across the access point onto Gaudrons Rd for Dwelling A. Note existing concrete water tank



Plate 4 (right). Looking south along the access for Dwelling A



Plate 5 (left). Looking north further along across access to Dwelling A. Note second concrete water tank and turning area around tank (see Fig. 3)





Plate 6 (top). Looking east, south east towards Dwelling B to the right of photo. Note extensive terracing and ~4-5m high retaining wall

Plate 7. Dwelling B, retaining wall & terracing



Plate 8. Looking westward from Dwelling B terrace towards Dwelling A left and Forest on upslope (right)



Plate 9 (top - photo collage). Dwelling B and surrounding grounds



Plate 10 (left). Looking westward along Gaudrons Rd, access point to Dwelling A to the right. Note concrete tank shown on Plate 3

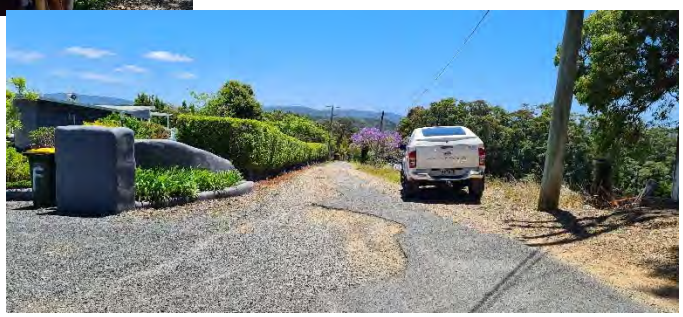
Plate 11 (right). Looking eastward along Gaudrons Rd towards access point to Dwelling B





Plate 12 (left). Access to Dwelling B (148 Gaudrons Rd)

Plate 13 (right). Right of carriageway along western boundary to Site providing access to neighbouring land as well as alternative access to Dwelling A



1.3 Proposed Development

The purpose of this Planning Proposal is to amend LEP 2013 to allow large lot residential development on Lot 7 DP555490. The Planning Proposal will:

- Rezone the subject land from Zone RU2 Rural Landscape to Zone R5 Large Lot Residential; and
- Change to the Minimum Lot Size (MLS) for the new R5 zoned land from the current 40 hectares. A new MLS of 1 Ha is sought for this precinct.

The proposed concept layout is shown as Fig. 5.

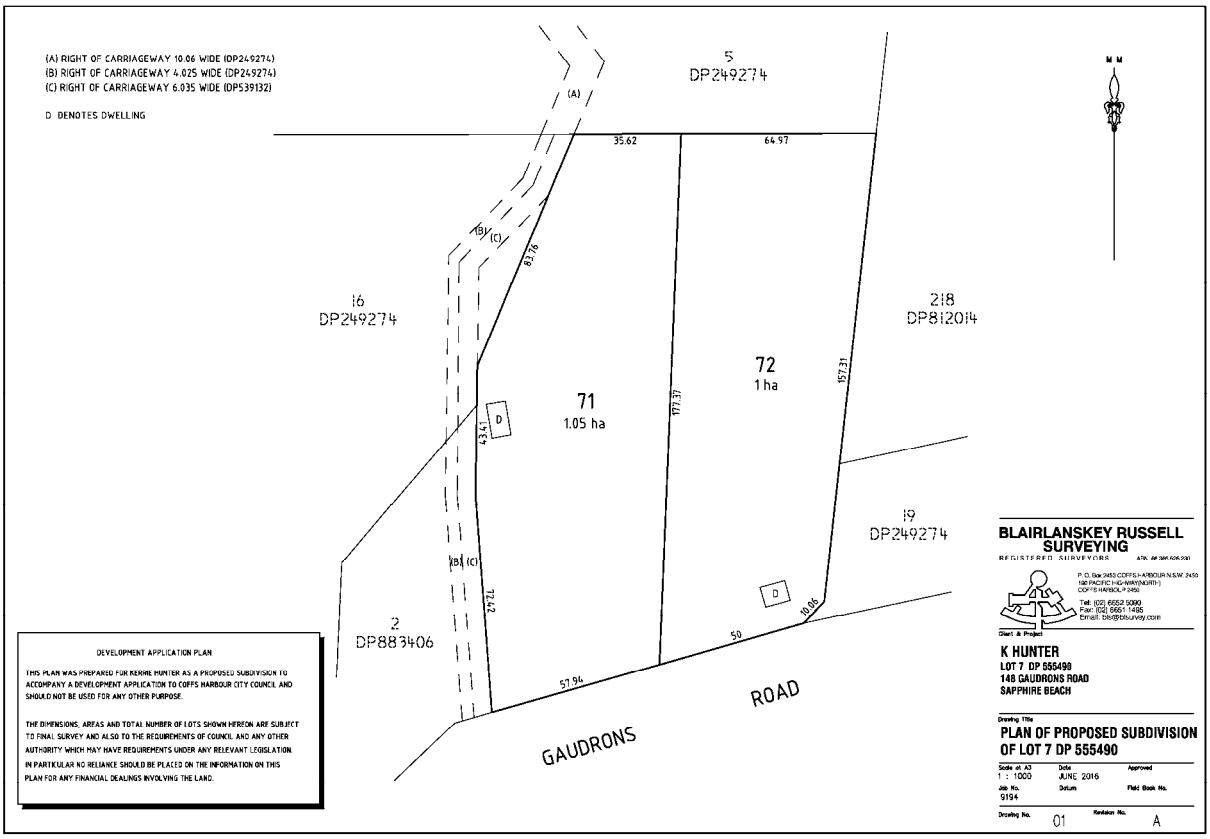


Figure 5. Proposed concept layout

1.4 Site & Surrounding Vegetation, Topography and Slope

As noted in s. 1.2 and shown on Figs. 2 & 3, the Planning Proposal area is predominantly cleared with scattered trees and landscaping. The Site is located on a steep north-east to east facing slope and is currently utilised as a farm property/goat paddock. Elevation ranges from 150m AHD to the south west corner to 103m AHD to the north east of the Site. The upper slopes have been previously terraced to assist with agricultural practices and numerous access tracks associated with a former banana plantation crisscross the property. Upslope to the north of the Site is a forested area consisting of Wet Sclerophyll Forest (i.e. Forest vegetation formation), as shown on Fig. 3. This vegetation is mapped as Tertiary Koala Habitat in CHCC GIS mapping. Along Gaudrons Road to the south is predominantly Wet Sclerophyll Forest (i.e. Forest vegetation formation) and Remnant vegetation. The majority of the Site is dominated by Grassland with scattered trees.

The surrounding vegetation includes the Wet Sclerophyll Forest to the north, north east and Wet Sclerophyll Forest to the south. Otherwise, the predominant vegetation surrounding the Site is Grassland and landscaped/managed land as shown on Fig. 3.

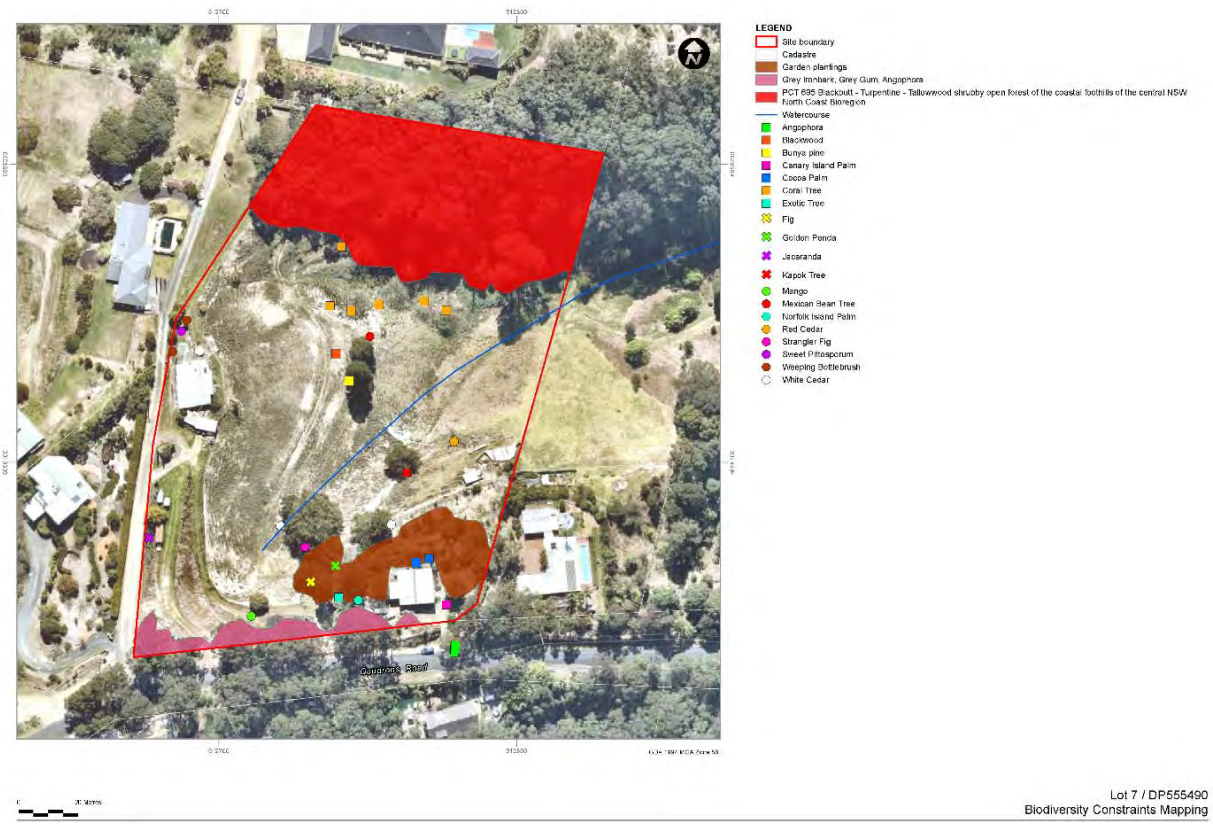


Figure 6. Vegetation mapping for the Site. Source: GeoLINK 2020 - Biodiversity Constraints Mapping

The classified Forest vegetation matches the findings of the preliminary ecological assessment undertaken by GeoLINK, as reproduced in Fig. 6. Thus, the potential bushfire hazard vegetation within the assessment area includes the Forest vegetation formation and Grassland (see Fig. 3).

Accordingly, the Classified vegetation is Forest predominantly to the north on an upslope and Grassland surrounding the existing approved dwellings on downslope ranges exceeding 20^0 (see Fig. 3). Forest vegetation is found beyond Gaudrons Rd to the south.

Normally, the Forest vegetation would be considered the Classified vegetation and the slope under the classified vegetation would be used to determined required Asset protection Zones (APZs) or setbacks. However, in this case the Forest vegetation to the north of the Site entails a small portion of the assessment area (approximately 66m and 110m away from each respective dwelling) and on an upslope. However, the vegetation, which will most significantly influence the bushfire behaviour, is the Grassland vegetation. Similarly, the effective slope is that under the vegetation, which will most significantly influence the bushfire behaviour. In this case, the steep land under the Grassland vegetation.

Thus, the classified vegetation and the applicable slope, as shown on Fig. 3, are as detailed on Table 1.

Table 1. Classified vegetation and slope applicable to the vegetation surrounding each of the exiting dwellings

Dwelling	Aspect	Vegetation	Slope	Comments
Dwelling A - 158 Gaudrons Rd	North, north east & south	Grassland	Downslope 22.8^0	Steep land, currently managed in a fuel reduced condition by virtue of retaining wall, terracing, maintained farm access tracks, goat grazing and slashing
	West	Right of Carriageway & Landscaped Managed Land	Upslope 10.3^0	Right of Carriageway is found along western boundary and beyond it are lifestyle residential dwellings surrounded by landscaped garden

Dwelling	Aspect	Vegetation	Slope	Comments
Dwelling B - 148 Gaudrons Rd	North & West	Grassland	Downslope 29.7^0	Steep land, currently managed in a fuel reduced condition by virtue of ~4-5m high retaining wall, terracing, maintained farm access tracks, goat grazing and slashing
	East	Landscaped Managed Land	Downslope greater than 20^0	Garden and hard landscaping and beyond it, lifestyle residential dwelling surrounded by landscaped garden
	South	Public Road, Landscaped Managed Land & Forest	Upslope then, beyond Gaudrons Rd downslope greater than 20^0	Gaudrons Road is found upslope of the dwelling, then further south is neighbouring residential dwelling surrounded by landscaped gardens and then Forest is found on steep downslope

In term of biodiversity, the Site is not mapped or is in proximity to Biodiversity Values land and it is not located near any sensitive ecosystems. The preliminary biodiversity mapping by GeoLINK indicate that no threatened plant species were recorded for the Site, as shown on Fig. 6. GeoLINK identify one Plant Community Types (PCT) as occurring at the Site namely, PCT 695 Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central North Coast, as shown on Fig. 6. This PCT is not identified as a Threatened Ecological Community (TEC). In any case, it is not proposed to impact on the Forest vegetation occurring along the northern portion of the Site.

An Aboriginal Cultural Heritage Assessment (ACHA) has been undertaken by Everick Heritage Pty Ltd (2020). The ACHA findings regarding the Site indicate that considerable soil disturbance has occurred historically due cut and fill earthworks associated with the terracing and driveway entrance to the adjoining property. The ACHA concluded that that subdivision works within 148 Gaudrons Road are unlikely to impact on Aboriginal objects and will not impact on any known places or sites of cultural significance to the Aboriginal community. As such additional consultation and archaeological investigation is not required for this Site.

1.5. Risk Assessment and Consultant Qualifications

The proposed development Site is surrounded by predominantly rural residential development and public roads. However, Forest vegetation is found to the north on an upslope and further south beyond Gaudrons Rod on a steep downslope. Regardless, the two exiting and approved residential dwellings are surrounded by Grassland on a steep downslope, which will most significantly influence the bushfire behaviour. Therefore, the potential bushfire hazard is considered to be a medium bushfire risk.

This report has been prepared by Paola Rickard.

The Fire Protection Association Australia (FPA) has in place the Bushfire Planning and Design Accreditation Scheme (BPAD), which is recognised by the NSW Rural Fires Services (RFS). Paola Rickard is a **BPAD - Level 3 Accredited Practitioner** (Accreditation no. BPAD 21855) and is listed on the FPA Australia web site register.

BPAD- Level 3 Accredited Practitioner can perform the following:

- *BPAD- Level 3 Accredited Practitioner meet specific requirements in relation to identifying bushfire prone land, assessing potential bushfire impact, and submitting designs and plans, both deemed to satisfy and alternate solution, to meet the performance requirements of the Building Code of Australia and the specific state or territory legislation, for subdivisions, new*

buildings or modification to existing buildings aiming to minimise the risk to future developments, their occupants and responding emergency services from a bushfire event.

Paola holds a **Graduate Diploma in Design for Bush Fire Prone Areas with Distinction** from the University of Western Sydney and is a **bronze corporate member of the Fire Protection Association Australia (FPA Australia)**. She is a participating **member of the FPA Technical Advisory Committee (TAC) /20 Bushfire Safety**. The TAC provides a nationally focussed forum for discussion between practitioners, fire services and regulators on the design and construction of property in areas prone to bushfires.

From 2015 to 2019, Paola was appointed as a **BPAD member to the NSW Bushfire Working Group (NSWBWG)** set up by FPA Australia. The NSWBWG provide a forum to discuss the application, interpretation and periodic review of NSW Government-based bushfire related regulatory requirements governing land use planning and building construction in areas subject to bushfire impact.

Paola also holds a **Bachelor Degree in Applied Science, a Certificate in Bushland Regeneration**, and is a member of the **Australian Association Bush Regenerators**. She has over 18 years of experience in flora surveys and vegetation management issues, and **has been undertaking bushfire assessments since 2003.**

Paola has attended the "NSW Consulting Planners Bushfire Training Course" in Sydney in 2003 and has attended the "Planning for Bushfire Protection Short Course" held by the University of Technologies (UTS) Sydney in 2007. She has obtained certification for the short course. In November 2010, Paola attended the "One-day Planning for Bushfire Prone Areas Update Course" conducted by the Centre for Local Government UTS, Sydney. Additionally, Paola has a 'Basic Bush Fire Awareness' certificate and has experience in fire control and planning while living on a rural land sharing community.

2. Bushfire Protection Measures for Residential Subdivision

2.1 Introduction

Bushfire Protection Measures for Residential and Rural Subdivision are detailed in Chapter 5 of PBP 2019. The specific objectives for 'residential and rural residential subdivision development' are:

- *Minimise perimeters of the subdivision exposed to the bush fire hazard (hourglass shapes, which maximise perimeters and create bottlenecks, should be avoided);*
- *Minimise vegetated corridors that permit the passage of bush fire towards buildings;*
- *Provide for the siting of future dwellings away from ridge-tops and steep slopes, within saddles and narrow ridge crests;*
- *Ensure that APZs between a bush fire hazard and future dwellings are effectively designed to address the relevant bushfire attack mechanism;*
- *Ensure the ongoing maintenance of APZs;*
- *provide adequate access from all properties to the wider road network for residents and emergency services;*
- *provide access to hazard vegetation to facilitate bush fire mitigation works and fire suppression; and*
- *Ensure the provision of an adequate supply of water and other services to facilitate effective firefighting.*

Additionally, PBP identifies the performance criteria and acceptable solutions for the various proposed Bushfire Protection Measures (BPMs). The relevant BPMs criteria and acceptable solutions with regard to residential and rural residential subdivision development are outlined in Sections 2.2 to 2.4 of this report.

2.2 Asset Protection Zones/Bushfire Attack Level

Asset Protection Zones (APZs) are buffer areas between development and a fire hazard, which aim to protect human life and property. The APZ comprises an Inner Protection Area (IPA) and an Outer Protection Area (OPA). These areas are to be managed to reduce the bushfire hazard. Appendix A provides guidance concerning the general requirements for APZs and appropriate landscaping and property maintenance.

Intent of measures: to provide sufficient space and maintain reduced fuel loads to ensure radiant heat levels at the buildings are below critical limits and prevent direct flame contact.

At the subdivision level it is required to demonstrate that proposed dwellings can be accommodated so that potential building footprint is not exposed to radiant heat levels exceeding 29kW/m^2 for each proposed lot.

Table A1.12.3 of Planning for Bushfire Protection 2019 (PBP) prescribes the minimum APZ distances for residential subdivisions. The setback is calculated using the slope of the classified vegetation to achieve no more than 29kW/m^2. Slope grades over 20 degrees (as in this case) are outside of slope ranges specified in Table A1.12.3. This means that BAL 29 cannot be achieved as an acceptable solution.

The APZ area is the managed land setback distance required to be implemented from the classified vegetation to the proposed dwelling walls. Importantly, at the subdivision stage, the APZ needs to be located on lands with a slope less than 18 degrees. No dwellings can be built within the APZ area, but roads, effluent disposal areas, pools etc can be located within the APZ.

As discussed in s.1.4, the Forest vegetation would normally be considered the Classified vegetation and the slope under the classified vegetation would be used to determined required APZ or setbacks. However, in this case the Forest vegetation to the north of the Site entails a small portion of the assessment area (approximately 66m and 110m away from each respective dwelling) and on an upslope. However, the vegetation, which will most significantly influence the bushfire behaviour, is the Grassland vegetation. Similarly, the effective slope is that under the vegetation, which will most significantly influence the bushfire behaviour. In this case, the steep land under the Grassland vegetation.

The Grassland classified vegetation (or potential bushfire hazard) surrounding the dwellings occurs on slopes over 20 degrees. Furthermore, the slope of the land in the immediate proximity of the dwellings is also over 18 degrees and the APZ needs to be located on lands with a slope less than 18 degrees. If the dwellings had not been already approved, this would have been considered an impediment to the rezoning potential.

However, the dwellings are approved (this occurred before the current construction standards applied) and the land is being effectively managed as an APZ by a number of means. Specifically, by using goats, retaining walls, terracing, regular four-wheel drive slashing, etc. In fact, it is possible to have an APZ over 18 degrees provided it can be demonstrated that effective management can occur. Accordingly, an APZ plan of management would need to be submitted with the DA at the subdivision stage to further ratify the current measures being implemented in perpetuity.

Importantly, the proposed rezoning and future subdivision is only contemplating the creation of two lots, each containing one of the existing approved dwelling. So, in this case, it can be argued that no further intensification of landuse is proposed and that basically the status quo will remain and, if subdivided, further improvements can be implemented to increase the resilience for each of the two lots created.

Concerning the existing dwellings, s. 5.1.3 of PBP notes that existing dwellings located on the land would benefit from improved bushfire protection measures. The existing approved dwellings where not constructed to a specific BAL construction requirement. Thus, at the subdivision DA stage they would not be required to be upgraded to BAL 29 for instance. However, each dwelling may require some upgrades to improve protection, such as including non-combustible screens to all openable windows, enclosing the underfloor where less than 400m above finished ground level with non-combustible material or the like. Static water supply will also need to be provided. In any case, any upgrades would be conditionals to receiving approval for the subdivision and would not be required to be implement until that stage.

In summary, the land surrounding each dwelling is being effectively managed as an APZ by a number of means. Thus, the proposed development (i.e. future two lots subdivisions) is capable of complying with the APZ requirements set out in Appendix 4 of PBP 2019. Guidance concerning the general requirements for APZs and appropriate landscaping and property maintenance is provided in Appendix A of this report.

Consideration of specific construction standards applicable to the proposal are not required at the planning proposal stage. As noted, the existing approved dwellings where not constructed to a specific BAL construction requirement. However, each dwelling may require some upgrades to improve protection. In any case, any upgrades would be conditionals on receiving approval for the subdivision.

2.3 Access

The provision of PBP 2019 specify the following criteria concerning access provisions, namely:

- Performance Criteria: to provide safe operational access to structures and water supply for emergency services, while residents are seeking to evacuate from an area

The proposed rezoning will need to demonstrate that the future residential subdivision layouts can comply with the PBP access requirements.

Perimeter roads are not mandated for rural subdivisions; however, all subdivisions of more than 3 allotments need to have more than one access in and out of the development. In addition, a development comprising more than three dwellings needs to provide dedication of road access to council and not by right of way. These provisions will not apply to this proposed rezoning as only two lots are proposed and each has already lawful access to Gaudrons Rd. Nevertheless, there are other access provisions to be complied with at the subdivision stage, which means the current property accesses are likely to require some upgrades. Namely:

- 4m carriageway minimum for property access driveways and suitable turning area is provided for each dwelling
- Two-wheeled drive and all-weather roads
- Suitable access for category 1 fire appliance within 4m of static water supply (more on this below)
- Minimum vertical clearance of 4 m to any overhanging obstructions

Concerning the existing public road system, the PBP requirements are that all roads are through roads. It is noted that Gaudrons Road is not a through road, is more than 200m in length and does not have complying turning circle. Accordingly, PBP requires '*that new development does not increase the level of bush fire risk to the existing community. A traffic report prepared by a suitably qualified traffic consultant may be required in circumstances where issues relating to access/egress are identified.*'

Investigation of traffic matters associated with the proposal has been undertaken by Weavers Consulting Group (2020). The full investigation report is reproduced in Appendix B.

According to Weavers Consulting Group (2020) the following was found:

- Both lots will have more than 50 m of frontage to Gaudrons Road.
- The existing lot contains two dwellings. There will be a nil increase in daily vehicle trips created by the subdivision as there are already two dwellings on the lot.
- Proposed Lot 1 on the western side currently has vehicular access via the existing ROC along the western side boundary. The terms of the instrument for access via the ROC have not been disclosed to the writer. An alternative access direct to Gaudrons Road is located 30 m east of the ROC. An existing access to proposed lot 2 is located at the eastern corner of the lot.
- Sight distance requirements of AS2890 were found to be satisfied for all the current accesses to the two dwellings present on Site.
- Gaudrons Road - At the Site the existing central seal range from 5.6 to 6.5 m wide. As there is no increase in dwellings resulting from the subdivision there is definitely no nexus on which to It is require upgrading of Gaudrons Road.
- Conclusion – '*This investigation has proven that the existing points of access to Gaudrons Road for proposed Lots 1 and 2 are suitable for access from each lot to Gaudrons Road. As there are already two dwellings, one on each proposed lot, there will be no increase in traffic generation from the subdivision and no decrease in the amenity of the existing access along Gaudrons Road. As there is no current EPA Act Section 7.11 Infrastructure Contributions plan for Gaudrons Road Council can not require the applicant to contribute toward upgrading of Gaudrons Road. Consideration of the mountainous nature of the existing road environment indicates that general upgrading of Gaudrons Road in accordance with Specification 0041 may not produce desirable outcomes and a more targeted approach to safety improvements, funded through Council's normal channels, may be more suited to the locality'.*

In summary, the fact that the future potential two lots at this Site are already legally accessed separately and directly from Gaudrons Rd, and that no increase in residential density is proposed, indicate that rezoning of this Site would not increase the level of bush fire risk to the existing community. This is because firefighting access to this Site, as it is currently with a few improvements, would be deemed to be designed to provide safe access for evacuation and firefighting operations.

2.4 Water, Gas and Electricity Supply

Intent of measures: to provide adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building.

The Site is not serviced by reticulated water. Accordingly, provision of water supply for a proposed future subdivision will need to comply with the acceptable solution detailed on Table 2 applicable to non-reticulated developments. It is noted however that several non-combustible water tanks are already present on Site and are accessible from the respective internal accesses. In terms of electrical transmission lines, existing supply is overhead, and if reticulated or bottled gas is provided it will comply with the relevant requirements stated in Table 2.

Table 2. Performance criteria and Acceptable Solutions for water, gas and electricity supply (as per Table 5.3c PBP 2019)

Performance Criteria	Acceptable Solutions
• Adequate water supply is provided for firefighting purposes • water supplies are located at regular intervals • the water supply is accessible and reliable for firefighting operations • flows and pressure are appropriate • the integrity of the water supply is maintained	• reticulated water is to be provided to the development where available. • A static water and hydrant supply is provided for non- reticulated development or where reticulated water supply cannot be guaranteed; and • Static water supply shall comply with table 5.3d. *Note: for this proposal it will entails provision of 10,000 L SWS per lot including the existing dwellings* • fire hydrant spacing, design and sizing comply with the relevant clauses of 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 roads. • fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005 • all above-ground water service pipes are metal, including and up to any taps.
Electricity Services Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings.	• Where practicable, electrical transmission lines are underground. • Where overhead electrical transmission lines are proposed: o lines are installed with short pole spacing (30 metres), unless crossing gullies, gorges or riparian areas; o no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 *Guideline for Managing Vegetation Near Power Lines*.
Gas Services Location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	• Reticulated or bottled is installed and maintained in accordance with AS/NZS 1596:2014 *-the storage and handling of LP Gas*, the requirements of relevant authorities, and metal piping is used; • All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side; • connections to and from gas cylinders are metal; • polymer-sheathed flexible gas supply lines are not used; and • above-ground gas service pipes are metal, including and up to any outlets.

3. Address of Direction 4.4 Planning for Bushfire Protection

The RFS practice note '2/12 - Planning Instruments and Policies' requires that the following be addressed to support a Planning Proposal.

Part 1 – Objectives or Intended Outcomes relating to bush fire prone land that is:
Protect life, property and the environment from bush fire hazards, by discouraging the establishment of incompatible land uses in bush fire prone areas, and encourage sound management of bush fire prone areas.

Response: The Site is identified in the 'Korora' potential Large Lot Residential (Zone R5) Candidate Areas in the Coffs Harbour LGA. The proposed rezoning is a compatible landuse on this land as the Site occurs in proximity to similar rural lifestyle residential development, and it is serviced by capable road infrastructure and electricity services. The proposed development Site is surrounded by predominantly rural residential development and a public road. Importantly, the proposed rezoning and future subdivision is only contemplating the creation of two lots, each containing an existing approved dwelling serviced by separate access driveways. So, in this case, it can be argued that no further intensification of landuse is proposed and that basically the status quo will remain. However, if subdivided, further improvements can be implemented to increase the resilience for each of the two lots created; therefore, the potential bushfire risk could actually be reduced.

Part 2 – Explanation of the Provisions - The identified objectives can be achieved by ensuring that new controls imposed on development will:

- *not increase the risk to life from bush fire,*
  Response: The proposal will not increase the risk to life from bushfire as adequate controls can be implemented in the future subdivision design to minimise such risk. For instance, an APZ plan of management would need to be submitted with the DA at the subdivision stage to further ratify the current measures being implemented to manage the land surrounding the dwellings in perpetuity.

- *not introduce controls that place inappropriate developments in areas exposed to unacceptable bush fire hazard,*
  Response: As noted previously, the proposed rezoning and future subdivision is only contemplating the creation of two lots, each containing one of the existing approved dwellings serviced by separate access driveways. Therefore, no further intensification of landuse is proposed; however, if subdivided, further improvements can be implemented to increase the resilience for each of the two lots created. Therefore, the potential bushfire risk would actually be reduced. Accordingly, the development will not be exposed to unacceptable bush fire hazard.

- *ensure that appropriate bush fire protection measures can be afforded to property at risk of bushfire,*
  Response: Appropriate improved bushfire protection measures can be accommodated at the proposal Site as demonstrated in s. 2.

- *minimise negative impacts on the surrounding environment,*
  Response: The preliminary biodiversity mapping by GeoLINK indicate that no threatened plant species were found at the Site, as shown on Fig. 6. GeoLINK identified one Plant Community Type (PCT) as occurring at the Site. The PCT is not identified as a Threatened Ecological

Community (TEC). In any case, it is not proposed to impact on the Forest vegetation occurring along the northern portion of the Site.

An Aboriginal Cultural Heritage Assessment (ACHA) has been undertaken by Everick Heritage Pty Ltd (2020). The ACHA concluded that that subdivision works within 148 Gaudrons Road are unlikely to impact on Aboriginal objects and will not impact on any known places or sites of cultural significance to the Aboriginal community. As such additional consultation and archaeological investigation is not required for this Site.

- *ensure that provision is made for adequate evacuation/shelter options for the community,*
  Response: The proposed rezoning and future subdivision is only contemplating the creation of two lots, each containing one of the existing approved dwellings serviced by separate access driveways. Accordingly, the rezoning does not increase the potential bushfire risk and existing measures are already in place at the locality level.

- *and ensure that development is capable of complying with Planning for Bush Fire Protection 2006 (PBP).*
  Response: The development is capable of complying with the relevant Residential and Rural Residential provisions detailed in Chapter 5 of PBP 2019 as demonstrated in s. 2. Notably, PBP 2019 is the currently legislated document, and it provides updated and more robust provisions than those detailed in PBP 2006.

Part 3 – Justification - The level of justification should be proportionate to the impact that the planning proposal will have.

Response: The proposed rezoning will not have an undue impact on the locality in terms of bushfire risk. This assessment has found that the proposal can comply with the Direction 4.4 Planning for Bushfire Protection and is capable of complying with PBP.

4. Conclusion & Recommendations

This Bushfire Assessment report has been prepared by LFA in accordance with the relevant provisions of PBP 2019 to support the Planning Proposal for Lot 7 DP555490, 148-158 Gaudrons Road, Sapphire Beach, NSW. The Site is zoned RU2 Rural Landscape under the Coffs Harbour LEP 2013. The purpose of this Planning Proposal is to amend LEP 2013 to rezone the subject land from Zone RU2 Rural Landscape to Zone R5 Large Lot Residential. The proposal area is wholly affected by the Bush Fire Prone Land mapping.

Specifically, this assessment reviewed suitability of the Site for landuse intensification. Direction 4.4 Planning for Bushfire Protection identifies matters for consideration for landuse intensification proposals that will affect, or are in proximity to land mapped as bush fire prone.

A key principle should be to ensure that future development is capable of complying with PBP. To achieve this, it is necessary to undertake a constraint assessment of the Site in respect to bushfire to identify potential bush fire risks to the proposed forms of development (i.e. amend LEP 2013 to allow change to Minimum Lot Size from 40 ha to 1 Ha or less on Lot 7 DP555490).

Thus, this bushfire assessment found that the proposal:

- will not increase the risk to life from bush fire;
- will not introduce controls that place inappropriate developments in areas exposed to unacceptable bush fire hazard;
- can provide for appropriate bush fire protection measures to properties at risk of bushfire;
- does not have adverse impacts on the surrounding environment;
- does not place additional burden to current evacuation/shelter options for the community; and
- the proposed development is capable of complying with Planning for Bush Fire Protection.

This bushfire assessment has been undertaken in accordance with the relevant provisions of PBP 2019 in its entirety and the future residential development can comply with all relevant Acceptable Solutions in this version of PBP.

The assessment found that the applicable bushfire protection measures and acceptable solutions as they would apply to future residential subdivision can be met and the following is noted:

- According to Table A1.12.3 of PBP 2019 for residential subdivisions the minimum APZ distances are calculated to achieve a radiant heat of no more than 29kW/m^2 (i.e. BAL- 29).
- The Grassland classified vegetation (or potential bushfire hazard) surrounding the approved dwellings occurs on slopes over 20 degrees. Slope grades over 20 degrees are outside of slope ranges specified in Table A1.12.3 of PBP. Nevertheless, the existing approved dwellings where not constructed to specific BAL construction requirements. Thus, at the subdivision DA stage they would not be required to be upgraded to BAL 29 for instance. However, each dwelling may require some upgrades.
- The slope of the land in the immediate proximity of the dwellings is also over 18 degrees and the APZ needs to be located on lands with a slope less than 18 degrees. If the dwellings had not been already approved, this would have been considered an impediment to the rezoning potential.
- However, the dwellings are approved and the land is being effectively managed as an APZ by a number of means. Thus, it is possible to have an APZ over 18 degrees provided it can be demonstrated that effective management can occur. Accordingly, an APZ plan of management would need to be submitted with the DA at the subdivision stage to further ratify in perpetuity the current measures being implemented.
- Importantly, the proposed rezoning and future subdivision is only contemplating two lots, each with one of the existing approved dwelling. Therefore, no further intensification of

landuse is proposed and the status quo will remain and, if subdivided, further improvements can be implemented to increase the resilience for each of the two lots created.

- Investigation of traffic matters associated with the proposal has been undertaken by Weavers Consulting Group (2020). The full investigation report is reproduced in Appendix B. This investigation has found that the existing points of access to Gaudrons Road are suitable for access. As there are already two dwellings, one on each proposed future lot, there will be no increase in traffic generation from the subdivision and no decrease in the amenity of the existing access along Gaudrons Road. In summary, the rezoning of this Site would not increase the level of bush fire risk to the existing community. This is because firefighting access to this Site, as it is currently with a few improvements, would be deemed to be designed to provide safe access for evacuation and firefighting operations.
- The Site is not serviced by reticulated water. Accordingly, provision of water supply for a proposed future two-lots subdivision will need to comply with the acceptable solution detailed on Table 2 applicable to non-reticulated developments.
- In terms of electrical transmission lines, existing supply is overhead, and if reticulated or bottled gas is provided it will comply with the relevant requirements stated in Table 2.

In conclusion, this Assessment has duly considered the bushfire issues identified in s. 4.4.1 of PBP 2019. Accordingly, it has found that the proposed Planning Proposal to amend LEP 2013 to allow large lot residential development on Lot 7 DP555490 generally comply with s.9.1(2) Directions (specifically Direction 4.4 Planning for Bushfire Protection), and with the specific objectives for the development type and the performance criteria for the various proposed Bushfire Protection Measures in accordance with PBP 2019, but only because the existing dwellings are already approved and no further intensification of landuse is proposed.

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Appendices

APPENDICES 23

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Appendix A - APZs Requirements and Landscaping

A.1 General Requirement for Asset Protection Zones

Asset Protection Zones (APZs) are buffer areas between development and a fire hazard, which aim to protect human life and property. The APZ comprises an Inner Protection Area (IPA) and an Outer Protection Area (OPA). These areas are to be managed to reduce the bushfire hazard. The general requirements for APZs are described in Tables 1A and 2A.

Table 1A. Inner Protection Area (IPA) General Requirements

Specifications and Management	
Location	The IPA extends from the edge of the OPA to the development.
Purpose	Ensures that the presence of fuel, which could become involved in fire, is minimised.
Depth	Varies from 10 to 100 metres.
Fuel Loading	Minimum fine fuel at ground level, which could be set alight by bushfire.
Vegetation Requirements	Do not touch or overhang the building; Are well spread out and do not form a continuous canopy; Are not species that retain dead material or deposit excessive quantities of ground fuel in a short period; and Are located far enough away from the house so that they will not ignite the house by direct flame contact or radiated heat emissions.
Uses Within the Area	Tennis courts, swimming pools and gardens are permitted. Woodpiles, wooden sheds, combustive material storage areas, large quantities of garden mulch, stacked flammable building materials are not permitted.
Maintenance	This Area should be regularly mowed and all fuel removed e.g. fallen branches, leaf build-up.

Table 2A. Outer Protection Area (OPA) General Requirements

Specifications and Management	
Location	Located adjacent to the hazard. Originally the OPA would have formed part of the bushfire hazard but becomes an area where the fuel loadings are reduced.
Purpose	Reduction of fuel in this area substantially decreases the intensity of an approaching fire and restricts the pathway of crown fuels; reducing the level of direct flame, radiant heat and ember attack on the IPA.
Depth	Varies from 0 to 25 metres.
Fuel Loading	Fine fuel loads should be kept to a level where the fire intensity expected will not impact on adjacent developments. In the absence of any policy to the contrary, 8 tonnes per hectare of fuel is commonly used. In grasslands, fuel height should be maintained below 10 centimetres.
Vegetation Requirements	Any trees and shrubs should be maintained in such a manner that the vegetation is not continuous.
Maintenance	This Area should be regularly mowed and all excess fuels should be removed e.g. fallen branches, leaf build-up.

The RFS has also developed "Standards for Asset Protection Zones" which should be consulted for APZ specifications. Standards for Asset Protection Zones can be downloaded from <https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0010/13321/Standards-for-Asset-Protection-Zones.pdf>

A.2 Landscaping and Property Maintenance

A.2.1 Landscaping Features & Principles

Bushland vegetation provides the fuel which feeds wildfires; however, by providing adequate separation distance between the bush and buildings will effectively prevent the spread of bushfire. Still vegetation is not always the foe when it comes to bushfires and it is possible to use managed vegetation as a tool to reduce fire risk. According to many practitioners and researchers (Ramsay & Rudolph 2006; CFA 2004; RFS 2006; Queensland Government 2000; RFS undated), a well-designed garden can reduce bushfire hazard near buildings. In summary, homes and garden can blend with the natural environment and be landscaped to minimise the impact of fire at the same time.

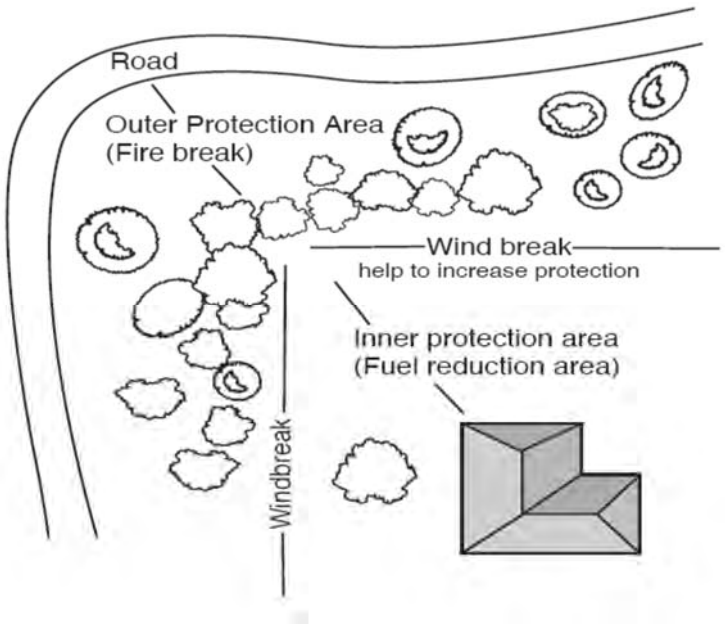


Figure 1A. Example of landscaped design aimed at minimising the impact of fire. Source RFS (undated)

According to the RFS (undated), this can be achieved by providing an effective Asset Protection Zone (APZ), which incorporates features such as fire-resistant plants, radiant heat barriers and windbreaks in the landscape layout as shown on Fig. 1A. The key features required when using landscaping as tool to reduce bushfire risk are summarised as follows (Ramsay & Rudolph 2006; RFS undated; RFS 2006):

- Plants with low flammability are selected (eg. broad leaves with high moisture and mineral content, smooth-trunk species with high branches, etc.)
- Vegetation does not provide a continuous path to the house
- Vegetation is located far enough away from the asset so that plants will not ignite the asset by direct flame contact or radiant heat emission
- Planted (or cleared) vegetation is into clumps rather than continuous rows
- Planted or retained species possesses attributes which makes them a good barrier against bushfire and wind attack
- Low branches are pruned two metres from the ground to prevent a ground fire from spreading into trees
- Lawn is planted and maintained around the future dwellings as this will slow the fire and reduce fire intensity. Alternatively, non-flammable pathways directly around the dwelling are provided
- Shrubs and other plants do not directly abut the dwelling. Where this does occur, gardens should contain low-flammability plants and non-flammable ground cover such as pebbles and crush tile
- Brush type fencing and planting “pencil pine” type trees next to buildings are avoided, as these are highly flammable.

Therefore, the features noted above and the principles listed in the following section should be applied to the landscaping and property maintenance for future dwellings.

A.2.2 Vegetation Management

Vegetation management is the responsibility of individual landowners and should, as per PBP, include:

- *Maintaining a low cut lawn;*
- *Keeping areas around the garden free of fuel;*
- *Utilising non-combustible fencing materials;*
- *Breaking up tree and shrub canopies by defining garden beds;*
- *Using non-flammable mulch;*
- *Ensuring tree branches do not overhang roofs;*
- *Ensuring tree canopies are not continuous; and*
- *Installing windbreaks in the direction from which fires are likely to approach.*

A.2.3 Property Maintenance

Property maintenance should, as per PBP, include:

- *Removal of material such as litter from the roof and gutters;*
- *Ensure painted surfaces are in good condition with decaying timbers being given particular attention to prevent the lodging of embers within gaps;*
- *Check pumps and water supplies are available and in working order;*
- *Driveways are in good condition with trees not being too close and forming an obstacle during smoky conditions;*
- *Check tiles and roof lines for broken tiles or dislodged roofing materials;*
- *Screens on windows and doors are in good condition without breaks or holes in flyscreen material and frames are well fitting into sills and window frames;*
- *Drenching or spray systems are regularly tested before the commencement of the fire season;*
- *Hoses and hose reels are not perished and fittings are tight and in good order;*
- *Doors are fitted with draught seals and well maintained;*
- *Mats are of non-combustible material or in areas of low potential exposure; Woodpiles, garden sheds and other combustible materials are located downslope and well away from the house; and*
- *Trees and other vegetation in the vicinity of power lines and tower lines should be managed and trimmed in accordance with the specifications in "Vegetation Safety Clearances" issued by Energy Australia (NS179 April 2002).*

Appendix B – Traffic Impact Investigation

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30 November 2020

Mr Stephen Sawtell
Stephen Sawtell Consultants
78 Fairview Road
SAPPHIRE BEACH, NSW, 2450

Our ref: 20-205
Your ref:

Dear Stephen,

Investigation of Traffic Related Matters Associated with Proposed Subdivision of 148 Gaudrons Road

1 Background

A proposed plan of subdivision has been submitted to Coffs Harbour City Council to subdivide Lot 7 DP 555490 into 2 lots to separate the two existing dwellings on the property.

Coffs Harbour City Council has provided a list of road and access related issues to be addressed resulting from the TLC meeting notes of 17 June 2020. The matters include:

1. Upgrading of Gaudrons Road in accordance with the Coffs Harbour City Council Development Design Specification, particularly Section 3.6
2. Sight distances to be verified for access onto Gaudrons Road



Figure 1 - The site.

2 This Review

This review will address relevant matters relating to vehicular access to Lot 7 and the need to upgrade Gaudrons Road.

3 Site Inspection

An inspection of the site was carried out on 24 November 2020. The weather was fine.

4 Subdivision

It is proposed to subdivide the existing lot with an area of 2.05 ha into lots of 1.0 and 1.05 ha area. Both lots will have more than 50 m of frontage to Gaudrons Road.

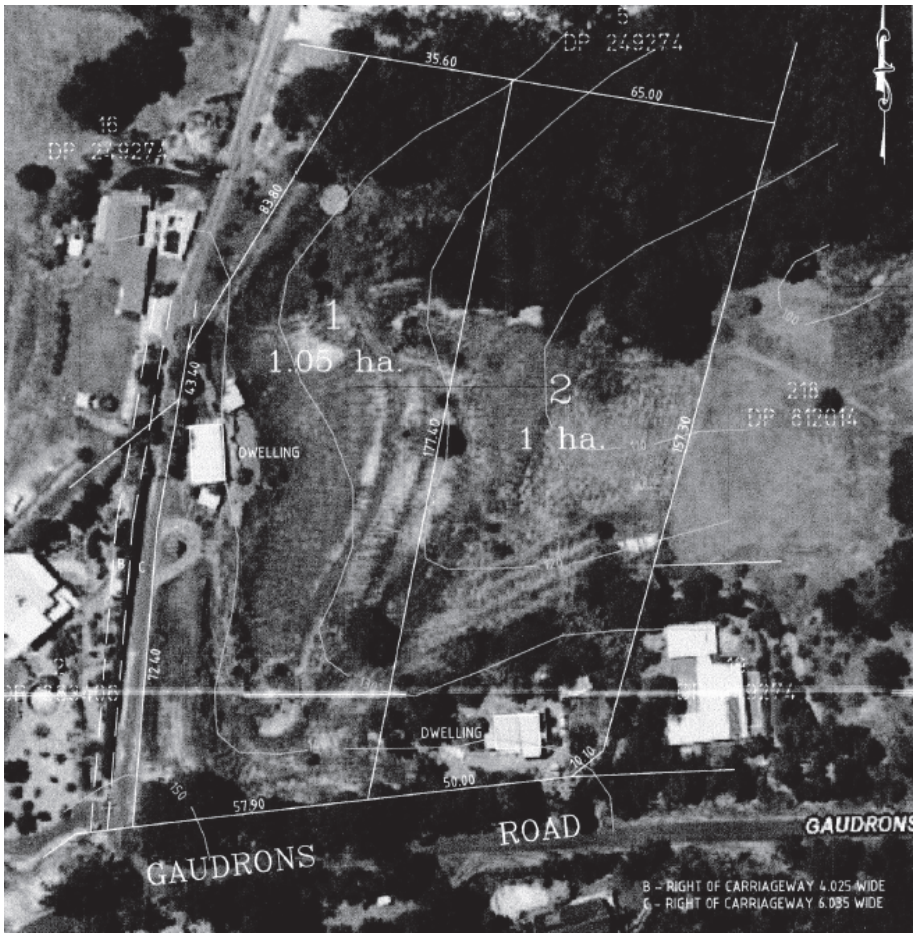


Figure 2 – Proposed subdivision layout.

5 Traffic Generation

From the RMS Technical Direction TDT 2013/04a, Guide to Traffic Generating Developments – Updated Traffic Surveys the traffic generation from Low Density Residential Dwellings in regional areas is:

- 7.4 trips per day per dwelling
- Weekday average evening peak hour vehicle trips 0.78

- Weekday average morning peak hour vehicle trips 0.71

The existing lot contains two dwellings. There will be a nil increase in daily vehicle trips created by the subdivision as there are already two dwellings on the lot.

The current contribution to traffic on Gaudrons Road is:

- 14.8 trips per day
- Weekday average evening peak hour vehicle trips 1.56
- Weekday average morning peak hour vehicle trips 1.42

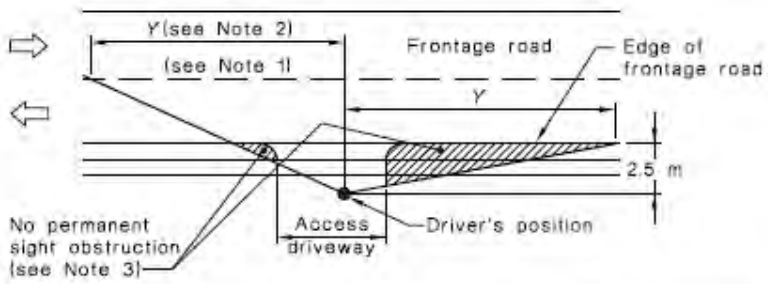
6 Sight Distance Assessment

Proposed Lot 1 on the western side currently has vehicular access via the existing ROC along the western side boundary. The terms of the instrument for access via the ROC have not been disclosed to the writer. An alternative access direct to Gaudrons Road is located 30 m east of the ROC. An existing access to proposed lot 2 is located at the eastern corner of the lot.

6.1 Sight Distance Requirements

Sight distance requirements are documented in AS/NZS 2890.1 Parking Facilities Part 1: Off-street car parking.

AS/NZS 2890.1:2004 32



Frontage road speed (Note 4) km/h	Distance (Y) along frontage road m		
	Access driveways other than domestic (Note 5)		Domestic property access (Note 6)
	Desirable 5 s gap	Minimum SSD	
40	55	35	30
50	69	45	40
60	83	65	55
70	97	85	70
80	111	105	95
90	125	130	Use values from 2nd and 3rd columns
100	139	160	
110	153	190	

Figure 3 – AS 2890.1 Figure 3.2 Sight Distance Requirements at Access Driveways

The Minimum SSD in the figure above is Stopping Sight Distance as contained in Austroads Guide to Road Design – Part 3 Geometric Design, 2017. Stopping Sight Distance (SSD) is the

distance to enable a normally alert driver, travelling at the design speed on wet pavement, to perceive, react and brake to a stop before reaching a hazard on the road ahead. The reaction time is taken as 2.0 seconds and the values above have been rounded to the nearest 5 m.

The driver's sight line is taken to be from eye height at 1.1 m to an approaching vehicle also at 1.1 m. It is noted that more recent Austroads sightline criterial adopt a vehicle height of 1.25 m which will result in greater sight line lengths when sighting over a crest.

$$SSD = \frac{R_T V}{3.6} + \frac{V^2}{254(d + 0.01a)}$$

where

R_T = reaction time (sec)

V = operating speed (km/h)

d = coefficient of deceleration (longitudinal friction factor)

a = longitudinal grade (%, + for upgrades and – for downgrades)

6.2 Access to Lot 1 Via ROC

The existing ROC appears to provide access to at least 7 lots.

Available sight distances at the access are as follows:

- The available sight distance to eastbound traffic is 152 m
- The available sight distance to westbound traffic is 130 m
- The grade of Gaudrons Road at the ROC is 9% and 3% down 30 m west of the ROC.



Figure 4 - Intersection of ROC with Gaudrons Road



Figure 5 – Sight line from ROC to westbound traffic.



Figure 6 – Sight line from ROC to eastbound traffic.

For traffic travelling west uphill to the point of impact at the ROC a sight distance of 130 m equates to an approach speed of more than 100 km/h. It is expected that the approach speed would be less than 60 km/h due to the mountainous terrain and uphill grade.

For traffic travelling east downhill to the point of impact at the ROC a sight distance of 152 m equates to an approach speed of 96 km/h. It is expected that the approach speed would be less than 60 km/h due to the mountainous terrain and undulating grade for which a sight distance of 70 m would be required.

6.3 Access to Lot 1 Via Existing Access 30 m from ROC

Available sight distances at the access are as follows:

- The available sight distance to eastbound traffic is 75 m
- The available sight distance to westbound traffic is 126 m
- The grade of Gaudrons Road at the access is 13%.



Figure 7



Figure 8 – Sight line from Lot 1 access to westbound traffic.



Figure 9 – Sight line from Lot 1 to eastbound traffic.

For traffic travelling west uphill to the point of impact at the existing access a sight distance of 126 m equates to an approach speed of more than 100 km/h. It is expected that the approach speed would be less than 60 km/h due to the mountainous terrain and uphill grade.

For traffic travelling east downhill to the point of impact at the existing access a sight distance of 75 m equates to an approach speed of 60 km/h. It is expected that the approach speed would be less than 60 km/h due to the mountainous terrain and undulating grade. A horizontal curve located approximately 135 m west of the ROC was assessed to have a radius of approximately 65 m which equates to a travel speed of 47 km/h.

Therefore, the sight distance requirements of AS 2890.1 are considered to be satisfied for proposed Lot 1.

6.4 Access to Lot 2 Via Existing Access at the Eastern End of the Site

Available sight distances at the access are as follows:

- The available sight distance to eastbound traffic is 125 m
- The available sight distance to westbound traffic is 180 m
- The grade of Gaudrons Road at the access is 15%.



Figure 10 - Existing Access to Lot 2



Figure 11 – Sight line from Lot 2 access to westbound traffic.



Figure 12 – Sight line from Lot 2 to eastbound traffic,

For traffic travelling west uphill to the point of impact at the existing access a sight distance of 180 m equates to an approach speed of more than 100 km/h. It is expected that the approach speed would be less than 60 km/h due to the mountainous terrain and uphill grade.

For traffic travelling east downhill to the point of impact at the existing access a sight distance of 125 m equates to an approach speed of 80 km/h. It is expected that the approach speed would be less than 60 km/h due to the mountainous terrain and undulating grade.

Therefore, the sight distance requirements of AS 2890.1 are considered to be satisfied for proposed Lot 2.

7 Upgrading of Gaudrons Road

Previous advice of Coffs Harbour City Council has been that upgrading of Gaudrons Road in accordance with the Coffs Harbour City Council Development Design Specification 0041 Geometric Road Layout Section 3.6 would be required. Section 3.6 contains the following table.

3.6 CARRIAGEWAYS

Carriageway widths for rural roads should comply with Table 3.2.

Table 3.2 Carriageway widths

Road type	Max traffic volume (vpd)	Max speed (1) (km/h)	Carriageway width (m)(2)	Shoulder (3) (4)	Reserve width
Local Minor	<200	60	6.0 (sealed)	1.0	20
Local Major	>200	80	6.0 (sealed)	1.0	20
Collector	>2000	80(8)	7.0 (sealed)	1.0 (sealed)	20
Arterial Road	NA	100(11)	7.0 (sealed)	1.0 (sealed)	30
Rural Residential	400	60	6 (sealed)	(kerb)	20

The table indicates that the requirements for rural local roads include a sealed pavement 6.0 m wide and 1.0 m shoulders. The provision of a table drain would be outside the 8 m wide formation. Normally a 1.5 m slope at 1 in 4 into the invert of the drain is the standard requirement.

The width of Gaudrons Road was measured at uniform intervals from the end of the concrete pavement at the Solitary Islands Way roundabout as shown in the table below.

It is apparent that the road is not constructed with a uniform minimum sealed width of 6.0 m, nor does it have clearly defined separate shoulders and table drains at many locations. It is obvious that the road has been shaped into the steep mountainous terrain and given the apparent age of the road, standard 1.5 m wide table drains with a 1 in 4 lead in grade can not be achieved due to the constraints on the overall width of the road formation due to the terrain.

Due to the mountainous terrain, it is apparent that a “run off road” type crash would have a high probability of resulting in fatalities. The road has a posted speed limit of 60 km/h and many curves with a safe travel speed less than the speed limit. There are no curve warning signs, delineation is sporadic, there are many trees in the clear zone and no safety barriers in high risk areas.

Widening of the shoulders in various locations would no doubt result in massive earthworks and potential environmental impacts. As there is no apparent damage to roadsides resulting from insufficient table drain capacity it must be assumed that stormwater drainage is currently adequately catered for.

Table 1 – Gaudrons Road widths.

Distance from Concrete pavement (km)	Left shoulder width (m)	Central seal width (m)	Right shoulder width (m)	Comment
0.2	1.5	6.0	3.0	In cutting
0.4	3.0	5.9	1.5	Cutting LHS
0.5	1.5	6.8	1.5	Cutting LHS
0.6	2.5	6.2	3.5	
0.81	1.3	5.6	1.2	Cutting RHS
1.0	1.5	6.0	1.1	Cutting RHS
1.1	2.0	5.5	2.5	Fill embankment
1.2	2.0	5.6	1.1	Cutting RHS
1.4	Driveway	6.5	Driveway	
1.6	1.0	6.1	3.0	
1.7	1.2	5.2	1.0	

From the table above it can be seen that the seal width varies from 5.5 to 6.8 m. The wider seal would include some widening of curves. The arithmetic mean of the seal width is 5.95 m.

Previous indications from Council have been that development along the length of Gaudrons Road would result in the need to widen the seal and shoulders in accordance with Council's Development Specification for greenfield sites. An obvious benefit of the road in its current form is that drivers generally travel at lower speeds and with attention to the road alignment which would probably result in lower reaction times, probably 1.5 seconds would be the norm.

Widening of the road may result in higher operational traffic speeds which without upgrading horizontal curves and reducing grades could result in more traffic accidents on the road. Instead, it may be more appropriate to take a road safety approach in accordance with the "safe system" to carry out safety works which would reduce potential crash severity, serious injuries and possible deaths.

No 148 Gaudrons Road is located between cross sections at 1.2 and 1.4 km in the table above.

It is apparent that a blanket application of Council's rural road standard to the road would not be an efficient expenditure as any incremental improvement would be at enormous cost. Also, it is understood that there are currently 67 dwellings which gain access via Gaudrons Road. If the subdivision resulted in one additional dwelling the impact of the traffic increase would be only 1.5% and it would be difficult to attribute the need for any upgrading works to the resulting increase in traffic from the subdivision. As there is no increase in dwellings resulting

from the subdivision there is definitely no nexus on which to require upgrading of Gaudrons Road.

It is noted that Council does not have a Section 7.11 Infrastructure Contributions plan for Gaudrons Road. Therefore, Council is not legally entitled to require the developer to contribute to works at other locations along the length of the road.

8 Conclusion

This investigation has proven that the existing points of access to Gaudrons Road for proposed Lots 1 and 2 are suitable for access from each lot to Gaudrons Road.

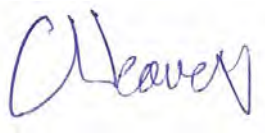
As there are already two dwellings, one on each proposed lot, there will be no increase in traffic generation from the subdivision and no decrease in the amenity of the existing access along Gaudrons Road.

As there is no current EPA Act Section 7.11 Infrastructure Contributions plan for Gaudrons Road Council can not require the applicant to contribute toward upgrading of Gaudrons Road.

Consideration of the mountainous nature of the existing road environment indicates that general upgrading of Gaudrons Road in accordance with Specification 0041 may not produce desirable outcomes and a more targeted approach to safety improvements, funded through Council's normal channels, may be more suited to the locality.

If any of these issues need clarification please contact me on 0432 016 490.

Yours sincerely



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27th August 2021

The Owners

9 Gaudrons Road

Sapphire Beach, NSW 2450

Stormwater Assessment to Support Planning Proposal

9 Gaudrons Road Sapphire Beach, Lot 11 DP1141269

Background

Lot 11 DP1141269 is proposed to be rezoned to facilitate future subdivision to three lots. There are currently two existing dwellings on the site which are proposed to remain on separate future lots, with a proposed future lot located on the southern portion of the site. A pre-lodgement meeting was held with Coffs Harbour City Council (CHCC) on 17 June 2020 and comments were raised in regard to how stormwater will be managed. The objective of this assessment is to undertake a preliminary Hydrological analysis to determine peak flows under existing and future land uses and identify suitable measures to address stormwater runoff for future development of the site.



Figure 1 – Site locality (Source CHCC Tech one)

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Site Description

The site is located on the Southern border of Gaudrons Road. The approximate site area is 5.29 hectares, and occupies a low ridgeline with gentle slopes on the northern extent of the site with moderate to steep slopes at the southern extent of the site. The Pacific Highway road corridor is immediately to the east of the site. There is a natural drainage gully to the Southern end of the site discharging East under the Pacific Highway. To the West there is an additional natural drainage line that runs North along the property boundary, before heading North-West through the adjoining lot 10 DP 1141269 (19 and 19A Gaudrons Road). The site and surrounding areas are shown in figure 1.

Methodology

A site analysis has been prepared identifying existing flow patterns and discharge locations, and is included in **Appendix A**. A conceptual hydrological model has been developed for the existing and proposed future landuse to quantify potential impacts. The site analysis, and assumptions used to develop the hydrological model are discussed below.

Site Analysis

The site is currently used as an agricultural operation and contains two dwellings, sheds, four covered growing areas (greenhouses) and associated hardstand areas. The existing impervious site areas are summarised in Table 1 below.

Description	Area (m2)
Dwelling 1	285
Dwelling 2	170
Roof/Shed 1	80
Roof/Shed 2	420
Hardstand Access Area	1580
Greenhouse 1, 2, 3	900
Greenhouse 4	2535
TOTAL	5970

Table 1 – Existing Impervious Site Areas

Existing catchments were defined from aerial imagery and topographic mapping (2018 LIDAR) and reviewed through a site walkover. There are three defined catchments. The North-Eastern part of the site flows to an existing concrete catch drain located on Lot 18 DP 1141269. The Western part of the site flows on to adjoining Lot 10 DP 1141269. The Southern part of the site drains to an existing farm dam and natural drainage gully to the South.

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North-Eastern catchment – Greenhouses 1, 2, 3 and half of 4 are contained in this catchment, along with a small portion of the existing hardstand area. The outlet is located along the concrete catchdrain on the adjoining lot. The outlet consists of a multi-pipe headwall, with a small amount of storage at the inlet. Additional information on the Pacific Highway drainage network is required to confirm the discharge location, however it is likely that an outlet is located on the Eastern side of the highway, discharging to the trunk drainage system that runs east between Gumtree Glen and Crystal Drive.

Western catchment – The existing dwellings, sheds, and a majority of the existing hardstand area are contained within this catchment. No defined outlets were identified from a site walkover. Existing stormwater discharges as non-concentrated flows to the adjoining lot. Downstream of the adjoining lot the existing natural watercourse flows North, under Gaudrons Road, traversing several rural properties prior to discharging under the Pacific Highway adjacent Sugarmill Road.

Southern catchment – The largest of the greenhouses is located on the boundary between the Southern and North-Eastern catchments. The greenhouse has a roof water collection system connected to a storage tank, with an overflow outlet located in the Southern catchment. It has been assumed that in a major event the roof water system would overflow and part of the flows would discharge to the North-Eastern catchment. The catchment includes a farm dam, and small pump shed. The outlet adjacent the South-Eastern corner of the site consists of a box culvert. It is likely that this system discharges to the trunk drainage system on the eastern side of the Pacific Highway, between Gumtree Glen and Crystal Drive.

Future Development

The proposed future development of the site includes 3 rural residential lots. The proposed concept lot layout is included in **Appendix B**. For assessment of potential stormwater impacts it was assumed that existing development on the site will remain with the addition of new access to Lots 2 and 3, and a 400m2 building envelope on Lot 3.

Future access to lots is based on RFS requirements from Planning for Bushfire protection, requiring a 4m sealed carriageway. The additional developed impervious site areas are summarised in Table 2 below.

	Area (m2)
Access Road (212m long),	848
Lot 2 Driveway (68m long)	272
Lot 3 Building Envelope	400
Lot 3 Driveway (175m long)	700
TOTAL	2220

Table 2 – Future Additional Developed Impervious Site Areas

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Hydrological Analysis

Hydrological analysis has been undertaken in accordance with the Australian Rainfall Runoff (ARR) 2019 procedure for peak flow estimation. The 100yr ARI (1% AEP) event has been adopted for analysis. ARR2019 specifies that an ensemble of 10 patterns be run for every duration, with the design peak flow taken as the average of the 10 patterns.

To determine peak flows under existing and future land uses DRAINS software was used to prepare a conceptual hydrological simulation for each catchment with an Initial Loss (IL) Continuing Loss (CL) Model. ARR2019 data was accessed from the associated Datahub website including ARR2019 Storms, Rainfall Ensembles, and Preburst Rainfall. A summary of the adopted modelling parameters is provided in **Appendix C**.

Subject to the final configuration of the future development the drainage patterns and associated impacts may differ from the conceptual hydrological model developed. The analysis provides an indication of the magnitude of impacts, based on the proposed concept layout. Results are presented in the table below.

Catchment	Existing Peak Flows (m3/s)	Future Peak Flows (m3/s)	% Increase
North-Eastern	0.649	0.688	6.0
Western	1.121	1.121	0
Southern	1.254	1.353	7.9

Table 3 – DRAINS results 1% AEP Existing vs Future Peak Flows

Mitigation Options

Mitigation strategies to address increases in stormwater runoff due to development are addressed in CHCC current policy framework. CHCC Water Sensitive Urban Design Guideline 2018 (WSUD 2018) outlines acceptable approaches to mitigating impacts on stormwater for Rural and large lot residential development. It notes that pollution reduction targets do not apply, however design and implementation of the following measures is generally considered acceptable,

"Road reserves may comprise turfed or planted swale drainage subject to Council approval…On-lot measures may comprise rainwater tanks and dispersal of runoff (sheet flow) from impervious areas over grassed/planted areas."

In addition to the above requirements WSUD 2018 notes that discharges should generally be maintained at pre-development levels and refers to Clause 12 (retardation / detention basins) in the Northern Rivers Local Government Handbook of Stormwater Drainage Design. Cl 12.2.10 notes that, *"Design and installation of stormwater detention / retention is required on*

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development sites in all areas where under-capacity drainage systems exist downstream of the site or where the proposed development will result in the existing infrastructure surcharging."

There are two alternative approaches to addressing detention if required, being at the lot-scale, or through construction of centralised basins. The proposed future development provides adequate space for each lot to address detention requirements at the lot-scale. This would allow mitigation measures to be tailored to the future development of each lot and remove the burden on council of maintenance of centralised basins in dedicated drainage reserves.

The proposed approach is to impose a Permissible Site Discharge (PSD) on each lot to match the existing site discharge. A future land-owner might wish to address the PSD requirements through adopting water sensitive design by limiting impervious areas and providing detention or retention through small landscaped storages, or alternatively address the requirement through a more traditional approach by providing a lot-scale on site detention system. This could be controlled through a Stormwater Management Plan for the site, outlining objectives, acceptable solutions, and assumptions to be used for demonstrating compliance of alternative designs.

The proposed concept lot layout sites the shared property access in the North-Eastern catchment. Future grades over the site will be suitable for incorporating a vegetated swale/buffer along the road corridor. Swale systems operate best in the range of 1-4% grade, however can incorporate check dams on steeper grades. This is consistent with the approach proposed in the WSUD 2018 guideline.

The North-Eastern and Southern catchments discharge directly to existing drainage systems that are part of the Pacific Highway Corridor under the control of Transport for New South Wales (TfNSW). The outlet systems passing under the Pacific Highway would be cost prohibitive to upgrade to cater for any increased flows. It is proposed that consultation be undertaken with TfNSW to determine objectives for each catchment, and a preferred solution be developed in consultation with CHCC and TfNSW.

Conclusion

The preliminary hydrological analysis indicates that future development of the site at the proposed density will result in minor increases to peak flows from the site. To counteract the effects of increased runoff a combination of strategies could be used adopting water sensitive design approaches and/or more traditional detention basins. It is proposed to address requirements at the lot-scale where acceptable to CHCC and TfNSW. The proposed measures would be developed in consultation with CHCC and incorporated in a site-specific Stormwater Management Plan to accompany a future Development Application for Subdvision.

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For any further information please do not hesitate to contact AS Engineering directly.

Yours faithfully

AS Engineering



Ross Nimmo CPEng MIEAust NER

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Attachments

Appendix A – SK001 Site Analysis Sheet 1 of 2, SK002 Site Analysis Sheet 2 of 2

Appendix B – SK003 Concept Lot Layout

Appendix C – Hydrological Modelling Parameters Summary

APPENDIX 7 - STORMWATER ASSESSMENT

A1



LEGEND

- Site boundary
- Catchment boundary
- LIDAR Contours 2018 (0.5m)
- Structures
- Hardstand access area
- Concrete catch drain
- Stormwater flow arrow
- Inlet to piped system
- Natural water course

PRELIMINARY

Rev.	Date	Revision Details	By	Ver	App.

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CIVIL ENGINEERING & PROJECT MANAGEMENT
COFFS HARBOUR

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Client: CHRIS & CHRIS BOWEN

Project: LOT 11 DP1141269
9 GAUDRONS ROAD
SAPPHIRE BEACH

Drawn	Signed	Date
RWN	RWN	14/04/23
Designed	Signed	Date
Verified	Signed	Date
Approved	Signed	Date

Drawing Title: PLANNING PROPOSAL
SITE ANALYSIS PLAN
SHEET 1 OF 2

Project No.: 205102
Scale: 1 in 500 (A1)
Drawing No.: SK001 Rev.

APPENDIX 7 - STORMWATER ASSESSMENT



PRELIMINARY

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COFFS HARBOUR

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Client: CHRIS & CHRIS BOWEN

Project: LOT 11 DP1141269
9 GAUDRONS ROAD
SAPPHIRE BEACH

Drawn	Signed	Date
RWN	RWN	14/04/23
Designed	Signed	Date
Verified	Signed	Date
Approved	Signed	Date

Drawing Title: PLANNING PROPOSAL
SITE ANALYSIS PLAN
SHEET 2 OF 2

Project No: 205102
Scale: 1 in 500 (A1)
Drawing No: SK002 Rev:

Redistributed 0 5 10 15 20 25 30m

APPENDIX 7 - STORMWATER ASSESSMENT

A1



PRELIMINARY

Rev	Date	Revision Details	By	Ver	App

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CIVIL ENGINEERING & PROJECT MANAGEMENT
COFFS HARBOUR

Client: CHRIS & CHRIS BOWEN

Project: LOT 11 DP1141269
9 GAUDRONS ROAD
SAPPHIRE BEACH

Drawn: BRS	Signed: BRS	Date: 21/08/21
Designed:	Signed:	Date:
Verified:	Signed:	Date:
Approved:	Signed:	Date:

Drawing Title: PLANNING PROPOSAL
CONCEPT LOT LAYOUT

Project No: 205102
Scale: 1 in 800 (A1)
Drawing No: SK003 Rev:

APPENDIX 7 - STORMWATER ASSESSMENT

9 Gaudrons Road Stormwater Assessment

DRAINS MODEL INPUTS

	Area (m2)	%	Flow Path (m)	Roughness (n)	Slope (%)	t (minutes)
Western Catchment - Existing						
Total Area (m2)	19745					
Indirectly Connected Impervious Areas (RIA)	2377	12.0				2
(Dwelling 1 and 2 Shed 1 and 2, 90% Hardstand Access Area)						
Pervious Areas (PA)	17368	88.0	100	0.06	11.5	18.3
Western Catchment - Developed						
Indirectly Connected Impervious Areas	2577	13.1				2.0
Existing areas plus 50% Building Envelope Lot 3						
Pervious Areas (PA)	17168	86.9	100	0.06	11.5	18.3

	Area (m2)	%	Flow Path (m)	Roughness (n)	Slope (%)	t (minutes)
North Eastern Catchment - Existing						
Total Area (m2)	11585					
Indirectly Connected Impervious Areas	2246.5	19.4				2
(Greenhouse 1,2,3 and 50% of 4, 5% Hardstand)						
Pervious Areas	9338.5	80.6	74	0.06	5.5	19.1
North Eastern Catchment - Developed						
Indirectly Connected Impervious Areas	3366.5	29.1				2
Existing plus Shared Access and Driveway Lot 2						
Pervious Areas	8218.5	70.9	40	0.06	5.5	15.6

	Area (m2)	%	Flow Path (m)	Roughness (n)	Slope (%)	t (minutes)
Southern Catchment - Existing						
Total Area	21647					
Indirectly Connected Impervious Areas	1346.5	6.2				2
(Greenhouse 50% of 4, 5% Hardstand)						
Pervious Areas	20300.5	93.8	98	0.06	18.5	16.5
Southern Catchment - Developed						
Indirectly Connected Impervious Areas	2246.5	10.4				2
Existing plus 50% Building Envelope Lot 3 and Driveway Lot 3						
Pervious Areas	19400.5	89.6	68	0.06	18.5	14.6

TOTALS

Exist IMP Area TOTAL	5970
Dev IMP Area TOTAL	8190
TOTAL AREA	52977

ASSUMPTIONS

Flow times for pervious areas estimated using modified Friends Equation as outlined in NRLG Handbook
Roughness n=0.06 densely grassed - as per NRLG Handbook
Impervious Areas IL 0.4mm, CL 0mm (ARR2019 Table 9.6.8)
Pervious Areas IL 50mm, CL 3.3mm (Review of ARR Design Inputs for NSW Final Report (OEH), Site 20507

ARR DATAHUB INPUTS

Results - ARR Data Hub
[STARTTXT]

Input Data Information
[INPUTDATA]
Latitude,-30.229022
Longitude,153.145794
[END_INPUTDATA]

River Region
[RIVREG]
Division,South East Coast (NSW)
River Number,5
River Name,Bellinger River
[RIVREG_META]

Time Accessed,13 April 2021 01:25PM
Version,2016_v1
[END_RIVREG]

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9th April 2021

The Owners

148 Gaudrons Road

Sapphire Beach NSW 2450

C/O Mr Stephen Sawtell

Factor X Solutions Pty Ltd

Stormwater Assessment to Support Planning Proposal

148 Gaudrons Road Sapphire Beach, Lot 7 DP555490

Background

Lot 7 DP555490 is proposed to be rezoned to facilitate future subdivision to minimum 1 hectare lots. A pre-lodgement meeting was held with Coffs Harbour City Council on 17 June 2020 and comments were raised in regards to Flooding and Overland Flow. The objective of this assessment is to undertake a preliminary Hydrological and Hydraulic analysis to assess the potential restriction imposed on the future lots by the natural drainage gully that traverses the site.

Site Description

The site is located on the Northern side of Gaudrons road. The approximate site area is 2.05 hectares and is traversed by a natural drainage gully running in a North-East direction. The natural drainage gully continues through the adjoining property (Lot 218 DP812014) for approximately 180m before joining another natural watercourse. The drainage line is steeply graded and falls approximately 60m in level over 310m of length. Side slopes are in the order of 30% to 35%. The subject site and downstream lot are shown in figure 1.

Methodology

To determine the potential restriction imposed on future subdivision of lot 7 DP 555490 a preliminary desktop Hydrological and Hydraulic analysis has been undertaken. Catchment definition has been based on aerial imagery, and topographic mapping. Hydrological analysis has been undertaken in accordance with the Australian Rainfall Runoff (ARR) 2019 procedure for peak flow estimation. The 100yr ARI (1% AEP) event has been adopted for analysis. Hydraulic analysis has been undertaken using Mannings equation to estimate the natural drainage line capacity at a depth of flow of 0.3m.

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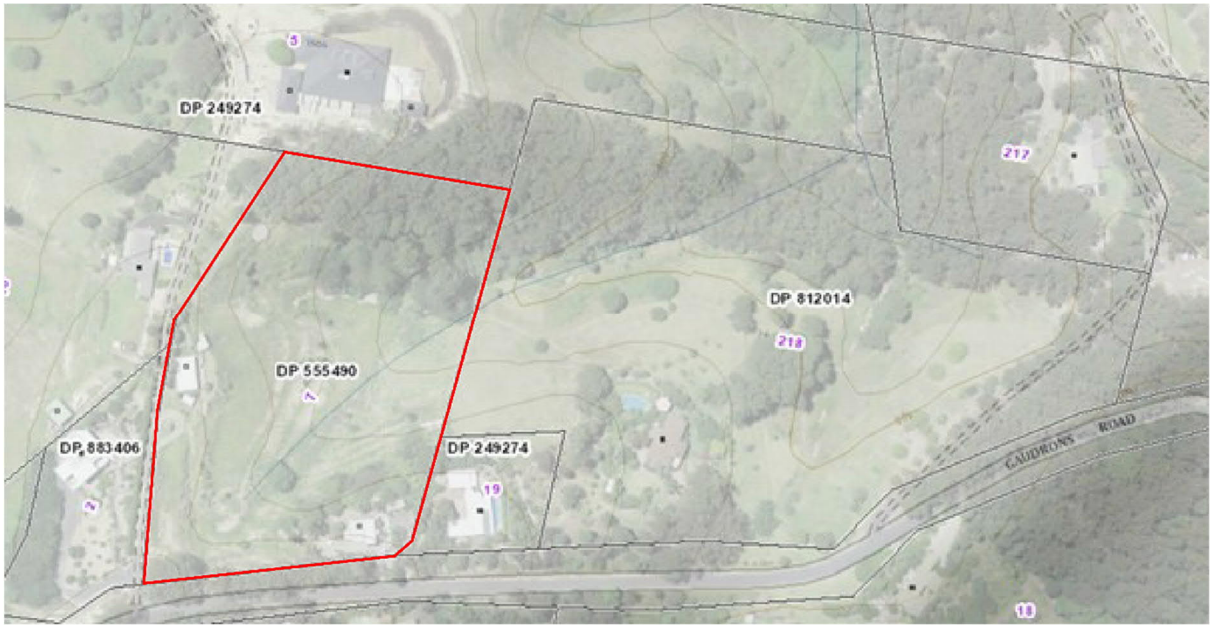


Figure 1 – Subject site and adjoining lots (source Six Maps)

Catchment Definition

The catchment is primarily small lot Rural Residential landuse, and extends to Gaudrons Road to the South, and is confined by a ridge to the west on adjoining Lots. The catchment area was estimated using topographic maps, resulting in a measured approximate catchment area of 2 hectares. The catchment is shown below in figure 2.



Figure 2 – Estimated Catchment Area (source Six Maps)

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Hydrological Analysis

ARR2019 specifies that an ensemble of 10 patterns are to be calculated for every duration, with the design peak flow taken as the average of the 10 patterns. ARR2019 data was accessed from the associated Datahub website including ARR2019 Storms, Rainfall Ensembles, and Preburst Rainfall. DRAINS software was used to simulate the catchment with an Initial Loss (IL) Continuing Loss (CL) Model. A summary of the adopted modelling parameters is provided below:

- ARR Data Hub Latitude,-30.226231 Longitude,153.132447
- Impervious Areas IL 0.4mm, CL 0mm (ARR2019 Table 9.6.8)
- Pervious Areas IL 50mm, CL 3.3mm (Review of ARR Design Inputs for NSW Final Report (OEH), Site 205007 Woolgoolga)
- Catchment Area 2 hectares
- Indirectly connected impervious area 0.12 hectares (6%), 2min flow time
- Pervious Area 94%, 11 min flow time (Friends equation - 110m flow length, n = 0.035, Slope 35%)

The peak mean flow of 1.369m3/s for the 1% AEP event at the catchment outlet occurs during the 15 minute storm burst. Results for the full ensemble of storms modelled is included in Figure 3.

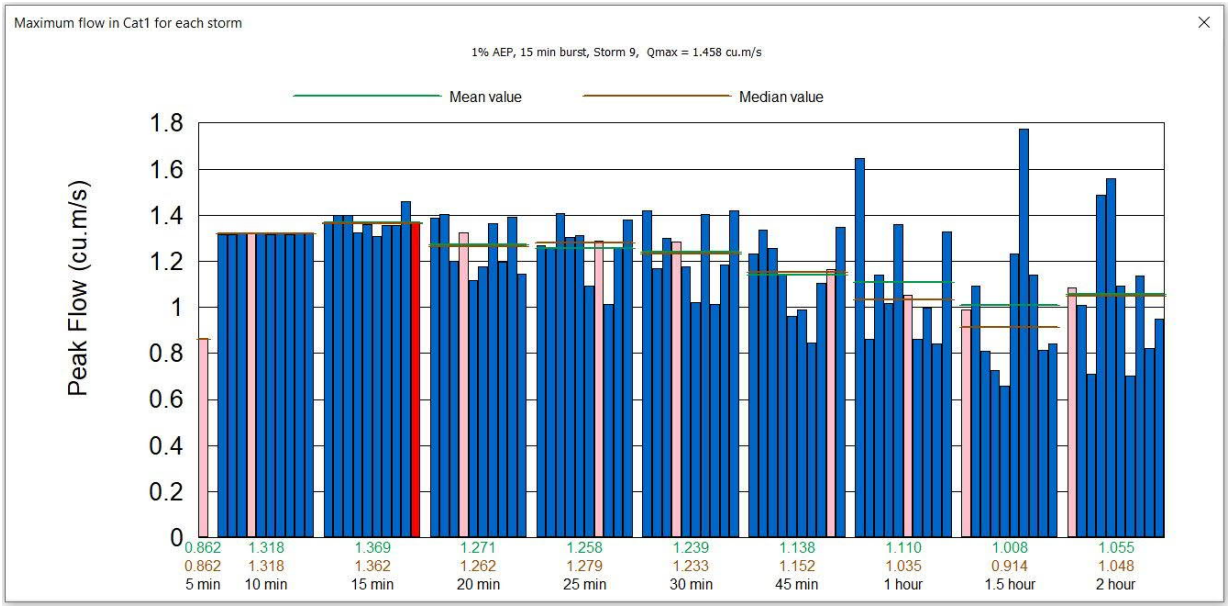


Figure 3 – DRAINS results

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Preliminary Hydraulic Analysis

A check of the potential depth of flow in the gully was approximated using Mannings equation with the following assumptions;

- Grade 15%
- Mannings n Roughness Coefficient 0.043
- Base Width 2m
- Side Slope 1 in 3 metres
- Normal Depth 0.3m

The capacity of the estimated drainage gully cross section at 0.3m is 1.548m3/s. Due to the steepness of the site and the drainage channel any floodplain storage or tailwater effects are likely to be minimal.

Potential Site Restrictions

The site was inspected on 9th April 2021. A photo looking up the existing gully from the eastern side of the property is included in figure 3 below. The channel is well defined and widens as the gully flattens out towards the eastern boundary of the site. Any restrictions on future development due to flooding potential would be limited to the defined channel and banks.



Figure 3 – Existing Gully (looking South-West from Eastern boundary)

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Conclusion

The natural drainage line that traverses the site does not significantly constrain the site for the proposed density of minimum 1 hectare lots.

The steep nature of the site and its location at the top of the catchment will generally result in any overland flows generated on the site being quickly conveyed to the existing natural drainage line, to discharge from the site.

Future development on the site should:

- take into consideration the location of the existing drainage gully
- site any structures clear of the defined channel and banks
- be designed to limit the consequences for downstream properties.

To address overland sheet flows, adoption of general building controls requiring a minimum difference between finished floor levels and finished ground levels, and adequate site drainage would provide sufficient protection to cope with shallow water depths.

For any further information please do not hesitate to contact AS Engineering directly.

Yours faithfully

AS Engineering



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12 November 2020

Mr Stephen Sawtell
Stephen Sawtell Consultants
78 Fairview Road
SAPPHIRE BEACH, NSW, 2450

Our ref: 20-201
Your ref:

Dear Stephen,

Investigation of Traffic Related Matters Associated with Proposed Subdivision of 9 Gaudrons Road

1 Background

A proposed plan of subdivision has been submitted to Coffs Harbour City Council to subdivide Lot 11 DP 1141269 into 8 lots with an internal access road.

Coffs Harbour City Council has provided a list of road and access related issues to be addressed resulting from the TLC meeting notes of 17 June 2020. The matters include:

1. Upgrading of Gaudrons Road in accordance with the Coffs Harbour City Council Development Design Specification
2. Internal road requires a 20 m road reserve
3. Intersection sight distances to be verified
4. Concept stormwater management plan dealing with discharge to the motorway
5. Design of the access road intersection with Gaudrons Road and connection to the development lot to comply with Austroads Road Design specifications and Council specifications.

2 This Review

In order to provide some certainty for the landowners, Mr and Mrs C & C Bowen this review proposes to address items 1, 2, 3 and 5 above plus other relevant matters to prove the acceptability of the proposal before proceeding to detailed design and other ancillary matters for a Development Application.

3 Site Inspection

An inspection of the site was carried out on 30 October 2020. The weather was fine.



Figure 1 - The site.

4 Traffic Generation

From the RMS Technical Direction TDT 2013/04a, Guide to Traffic Generating Developments – Updated Traffic Surveys the traffic generation from Low Density Residential Dwellings in regional areas is:

- 7.4 trips per day per dwelling
- Weekday average evening peak hour vehicle trips 0.78
- Weekday average morning peak hour vehicle trips 0.71

The existing lot contains one dwelling and a commercial agricultural activities which would generate additional vehicle trips above that generated by a single dwelling. The increase in daily vehicle trips created by the subdivision will be due to the additional 7 lots less the existing trips generated by the commercial activities on the site.

Disregarding the existing commercial activities the increase in vehicle trips due to an additional 7 lots is:

- 52 trips per day
- Weekday average evening peak hour vehicle trips 5.5
- Weekday average morning peak hour vehicle trips 5.0

As the increase in peak hour traffic is only 5 trips it is obvious that a traffic count of the nearby roundabout would not be warranted to assess the capacity of the roundabout to accept the additional peak hour traffic loading.

5 Sight Distance Assessment

The existing access intersection with Gaudrons Road is proposed to be upgraded for design vehicle turning to and from Gaudrons Road.



Figure 2 - Existing Access to Gaudrons Rd and Turning Movements

Available sight distances at the access are as follows:

- The available sight distance to traffic exiting the roundabout is 105 m
- The available sight distance to traffic approaching from the west is 136 m
- The minimum Safe Intersection Sight Distance (SISD) for traffic approaching from the roundabout is 46 m with an approach speed of 30 km/h and reaction time of 1.5 seconds
- The roundabout exit speed is constrained by the radius of the traffic lanes and determined to be 30 km/h
- The approach speed from the west is the posted speed limit of 60 km/h. This gives a required SISD of 106 m which is 30 m less than the available sight distance

As Stopping Sight Distance is less than SISD this requirement is also satisfied.

A second measure of suitability is the time gap that a driver turning right out of the access into Gaudrons Road has to see an oncoming vehicle and consider that there is sufficient time to enter the traffic stream. This is the minimum gap sight distance and for this situation is 5 seconds to both approach directions.

The Critical Acceptance Gap has been determined from a statistical analysis of the random traffic stream passing a vehicle stopped at the intersection.

- For the eastbound approach the 15th percentile time was found to be 6.47 seconds and
- For the westbound approach the 15th percentile time was found to be 6.71 seconds.

The 15 percentile time is the number of seconds that 85% of the traffic stream will exceed

Therefore, the minimum Critical Acceptance Gap is exceeded and the proposed change of the existing property access to a road intersection satisfies sight distance requirements of Austroads and Council's specifications.

6 Upgrading of Gaudrons Road

Upgrading of Gaudrons Road in accordance with the Coffs Harbour City Council Development Design Specification is the first point of the TLC notes.

At the intersection the existing traffic lanes are 3.1 m wide as defined with a centreline and E1 edge lines. Shoulder width exceeds the 1.0 m requirement of Council's specification.

As it can be assumed that 100% traffic assignment from the proposed intersection will be to and from the roundabout, then there is no requirement for upgrading of Gaudrons Road.

7 Internal Road Width

The TLC notes noted that the internal road reserve width needed to be 20 m. This can be provided.

8 Other Matters

It is noted that the existing access constructed from Gaudrons Road to Lot 11 currently has a minimum width of 4 m. It is acknowledged that the access will need to be upgraded to meet Council's Design Specification for geometry, pavement and services etc to be continuous with the internal road. The required alignment for the connection is currently being investigated in more detail.

This subdivision proposal should not need to be referred to TfNSW as it does not meet the threshold requirements of Schedule 3 of the Infrastructure SEPP.

9 Conclusion

This investigation has proven that the existing point of access to Gaudrons Road for Lot 11 will be suitable for a future road connection to be provided to the proposed road within Lot 11 for an 8 lot subdivision.

The expected traffic generation from the subdivision will be very minor and further capacity analysis of the nearby roundabout on the western side of Pacific Highway should not be necessary.

The above details are considered to be sufficient to prove "in principle" that satisfactory access can be provided to Gaudrons Road at the current access location subject to detailed design and provision for turning movements.

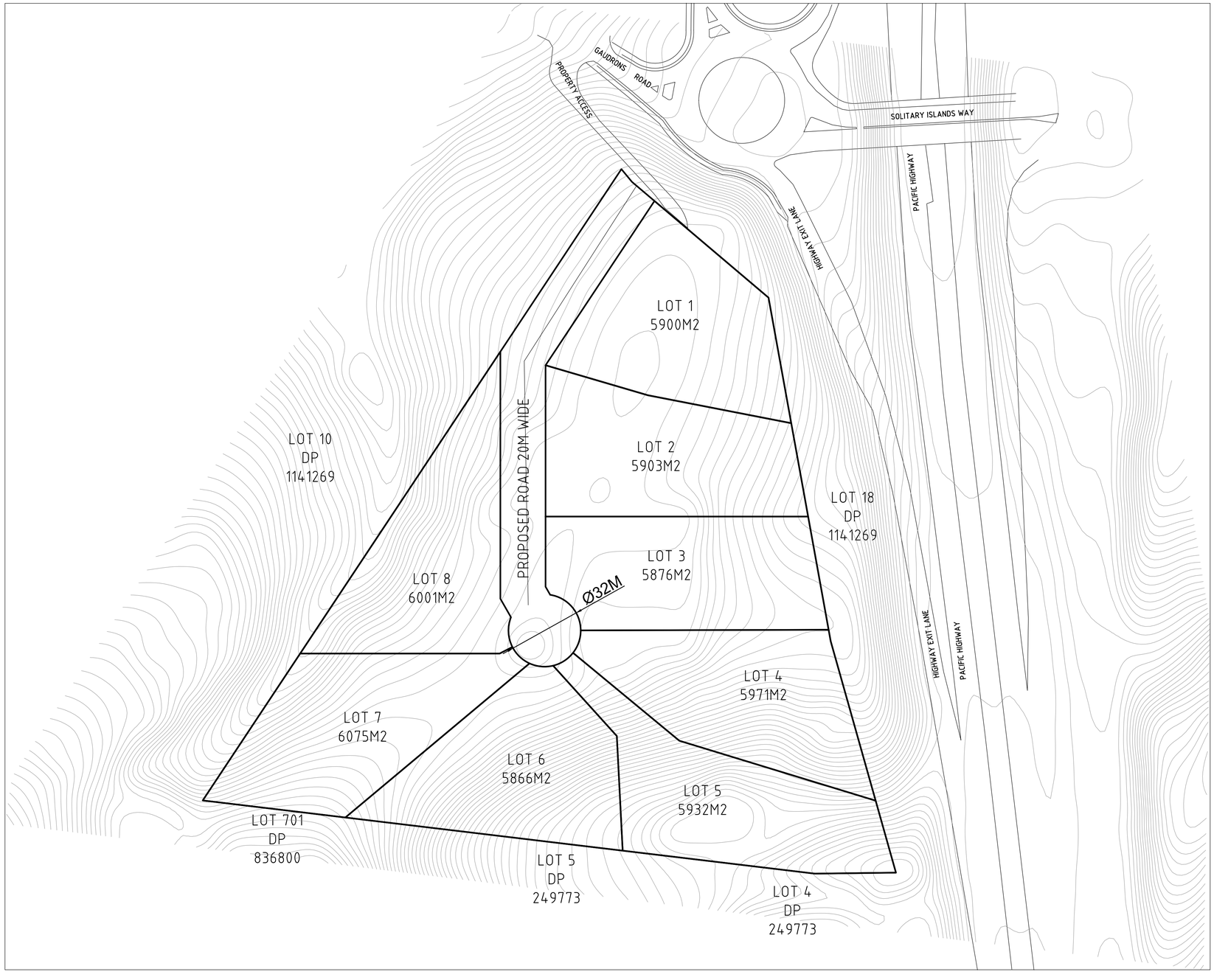
If any of these issues need clarification please contact me on 0432 016 490.

Yours sincerely



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MIE Aust CPEng NER
Lead Road Safety Auditor
Director
Weavers Consulting Group Pty Ltd
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A1



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COFFS HARBOUR

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Client:
CHRIS & CHRIS BOWEN

Project:
LOT 11 DP1141269
9 GAUDRONS ROAD
SAPPHIRE BEACH

Drawn	RWN	Signed RWN	Date 14/04/21
Designed		Signed	Date
Verified		Signed	Date
Approved		Signed	Date

Drawing Title:
PLANNING PROPOSAL
CONCEPT LOT LAYOUT

Project No. 205102
Scale 1 in 1000 (A1)
Drawing No. SK003 Rev.

20 10 0 10 20 30 40 50 100mm

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CONSULTING TRAFFIC, CIVIL & STRUCTURAL ENGINEERING & PROJECT MANAGEMENT
☎ 0432 016 490 chris.weavers@iinet.net.au

30 November 2020

Mr Stephen Sawtell
Stephen Sawtell Consultants
78 Fairview Road
SAPPHIRE BEACH, NSW, 2450

Our ref: 20-205
Your ref:

Dear Stephen,

Investigation of Traffic Related Matters Associated with Proposed Subdivision of 148 Gaudrons Road

1 Background

A proposed plan of subdivision has been submitted to Coffs Harbour City Council to subdivide Lot 7 DP 555490 into 2 lots to separate the two existing dwellings on the property.

Coffs Harbour City Council has provided a list of road and access related issues to be addressed resulting from the TLC meeting notes of 17 June 2020. The matters include:

1. Upgrading of Gaudrons Road in accordance with the Coffs Harbour City Council Development Design Specification, particularly Section 3.6
2. Sight distances to be verified for access onto Gaudrons Road



Figure 1 - The site.

2 This Review

This review will address relevant matters relating to vehicular access to Lot 7 and the need to upgrade Gaudrons Road.

3 Site Inspection

An inspection of the site was carried out on 24 November 2020. The weather was fine.

4 Subdivision

It is proposed to subdivide the existing lot with an area of 2.05 ha into lots of 1.0 and 1.05 ha area. Both lots will have more than 50 m of frontage to Gaudrons Road.

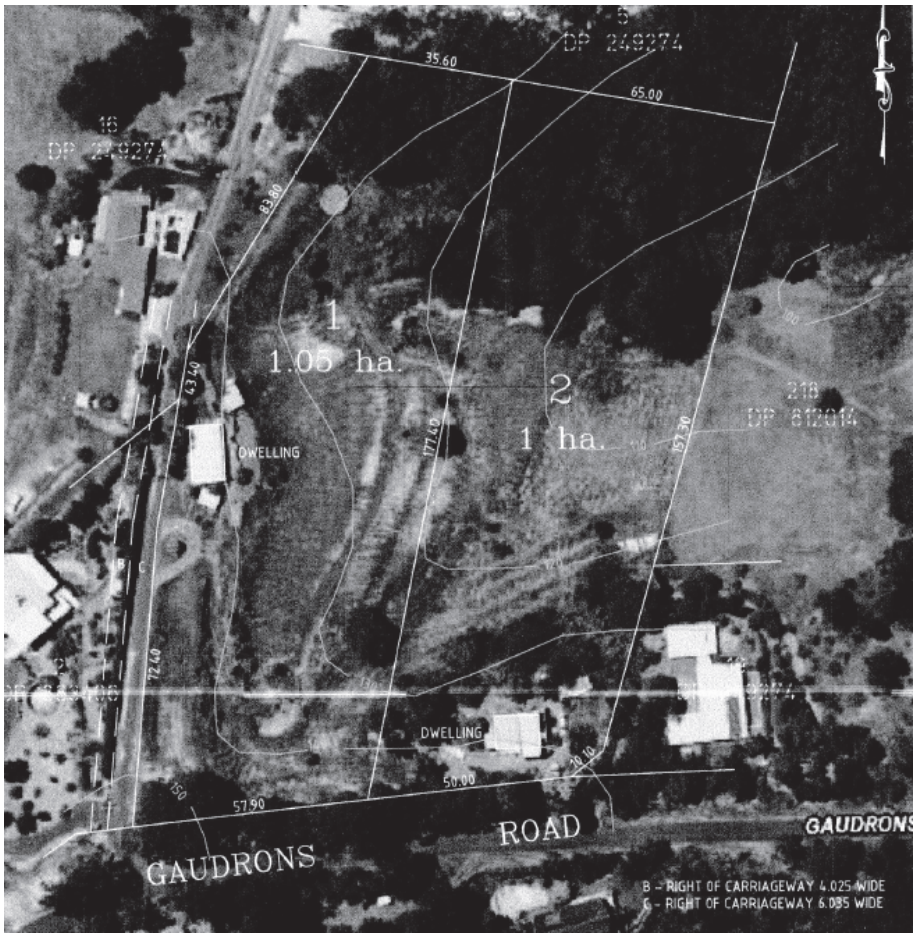


Figure 2 – Proposed subdivision layout.

5 Traffic Generation

From the RMS Technical Direction TDT 2013/04a, Guide to Traffic Generating Developments – Updated Traffic Surveys the traffic generation from Low Density Residential Dwellings in regional areas is:

- 7.4 trips per day per dwelling
- Weekday average evening peak hour vehicle trips 0.78

- Weekday average morning peak hour vehicle trips 0.71

The existing lot contains two dwellings. There will be a nil increase in daily vehicle trips created by the subdivision as there are already two dwellings on the lot.

The current contribution to traffic on Gaudrons Road is:

- 14.8 trips per day
- Weekday average evening peak hour vehicle trips 1.56
- Weekday average morning peak hour vehicle trips 1.42

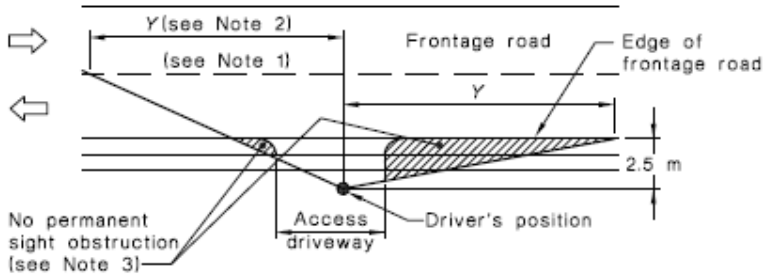
6 Sight Distance Assessment

Proposed Lot 1 on the western side currently has vehicular access via the existing ROC along the western side boundary. The terms of the instrument for access via the ROC have not been disclosed to the writer. An alternative access direct to Gaudrons Road is located 30 m east of the ROC. An existing access to proposed lot 2 is located at the eastern corner of the lot.

6.1 Sight Distance Requirements

Sight distance requirements are documented in AS/NZS 2890.1 Parking Facilities Part 1: Off-street car parking.

AS/NZS 2890.1:2004 32



Frontage road speed (Note 4) km/h	Distance (Y) along frontage road m		
	Access driveways other than domestic (Note 5)		Domestic property access (Note 6)
	Desirable 5 s gap	Minimum SSD	
40	55	35	30
50	69	45	40
60	83	65	55
70	97	85	70
80	111	105	95
90	125	130	Use values from 2nd and 3rd columns
100	139	160	
110	153	190	

Figure 3 – AS 2890.1 Figure 3.2 Sight Distance Requirements at Access Driveways

The Minimum SSD in the figure above is Stopping Sight Distance as contained in Austroads Guide to Road Design – Part 3 Geometric Design, 2017. Stopping Sight Distance (SSD) is the

distance to enable a normally alert driver, travelling at the design speed on wet pavement, to perceive, react and brake to a stop before reaching a hazard on the road ahead. The reaction time is taken as 2.0 seconds and the values above have been rounded to the nearest 5 m.

The driver's sight line is taken to be from eye height at 1.1 m to an approaching vehicle also at 1.1 m. It is noted that more recent Austroads sightline criterial adopt a vehicle height of 1.25 m which will result in greater sight line lengths when sighting over a crest.

$$SSD = \frac{R_T V}{3.6} + \frac{V^2}{254(d + 0.01a)}$$

where

R_T = reaction time (sec)

V = operating speed (km/h)

d = coefficient of deceleration (longitudinal friction factor)

a = longitudinal grade (%, + for upgrades and – for downgrades)

6.2 Access to Lot 1 Via ROC

The existing ROC appears to provide access to at least 7 lots.

Available sight distances at the access are as follows:

- The available sight distance to eastbound traffic is 152 m
- The available sight distance to westbound traffic is 130 m
- The grade of Gaudrons Road at the ROC is 9% and 3% down 30 m west of the ROC.



Figure 4 - Intersection of ROC with Gaudrons Road



Figure 5 – Sight line from ROC to westbound traffic.



Figure 6 – Sight line from ROC to eastbound traffic.

For traffic travelling west uphill to the point of impact at the ROC a sight distance of 130 m equates to an approach speed of more than 100 km/h. It is expected that the approach speed would be less than 60 km/h due to the mountainous terrain and uphill grade.

For traffic travelling east downhill to the point of impact at the ROC a sight distance of 152 m equates to an approach speed of 96 km/h. It is expected that the approach speed would be less than 60 km/h due to the mountainous terrain and undulating grade for which a sight distance of 70 m would be required.

6.3 Access to Lot 1 Via Existing Access 30 m from ROC

Available sight distances at the access are as follows:

- The available sight distance to eastbound traffic is 75 m
- The available sight distance to westbound traffic is 126 m
- The grade of Gaudrons Road at the access is 13%.



Figure 7



Figure 8 – Sight line from Lot 1 access to westbound traffic.



Figure 9 – Sight line from Lot 1 to eastbound traffic.

For traffic travelling west uphill to the point of impact at the existing access a sight distance of 126 m equates to an approach speed of more than 100 km/h. It is expected that the approach speed would be less than 60 km/h due to the mountainous terrain and uphill grade.

For traffic travelling east downhill to the point of impact at the existing access a sight distance of 75 m equates to an approach speed of 60 km/h. It is expected that the approach speed would be less than 60 km/h due to the mountainous terrain and undulating grade. A horizontal curve located approximately 135 m west of the ROC was assessed to have a radius of approximately 65 m which equates to a travel speed of 47 km/h.

Therefore, the sight distance requirements of AS 2890.1 are considered to be satisfied for proposed Lot 1.

6.4 Access to Lot 2 Via Existing Access at the Eastern End of the Site

Available sight distances at the access are as follows:

- The available sight distance to eastbound traffic is 125 m
- The available sight distance to westbound traffic is 180 m
- The grade of Gaudrons Road at the access is 15%.



Figure 10 - Existing Access to Lot 2



Figure 11 – Sight line from Lot 2 access to westbound traffic.



Figure 12 – Sight line from Lot 2 to eastbound traffic,

For traffic travelling west uphill to the point of impact at the existing access a sight distance of 180 m equates to an approach speed of more than 100 km/h. It is expected that the approach speed would be less than 60 km/h due to the mountainous terrain and uphill grade.

For traffic travelling east downhill to the point of impact at the existing access a sight distance of 125 m equates to an approach speed of 80 km/h. It is expected that the approach speed would be less than 60 km/h due to the mountainous terrain and undulating grade.

Therefore, the sight distance requirements of AS 2890.1 are considered to be satisfied for proposed Lot 2.

7 Upgrading of Gaudrons Road

Previous advice of Coffs Harbour City Council has been that upgrading of Gaudrons Road in accordance with the Coffs Harbour City Council Development Design Specification 0041 Geometric Road Layout Section 3.6 would be required. Section 3.6 contains the following table.

3.6 CARRIAGEWAYS

Carriageway widths for rural roads should comply with Table 3.2.

Table 3.2 Carriageway widths

Road type	Max traffic volume (vpd)	Max speed (1) (km/h)	Carriageway width (m)(2)	Shoulder (3) (4)	Reserve width
Local Minor	<200	60	6.0 (sealed)	1.0	20
Local Major	>200	80	6.0 (sealed)	1.0	20
Collector	>2000	80(8)	7.0 (sealed)	1.0 (sealed)	20
Arterial Road	NA	100(11)	7.0 (sealed)	1.0 (sealed)	30
Rural Residential	400	60	6 (sealed)	(kerb)	20

The table indicates that the requirements for rural local roads include a sealed pavement 6.0 m wide and 1.0 m shoulders. The provision of a table drain would be outside the 8 m wide formation. Normally a 1.5 m slope at 1 in 4 into the invert of the drain is the standard requirement.

The width of Gaudrons Road was measured at uniform intervals from the end of the concrete pavement at the Solitary Islands Way roundabout as shown in the table below.

It is apparent that the road is not constructed with a uniform minimum sealed width of 6.0 m, nor does it have clearly defined separate shoulders and table drains at many locations. It is obvious that the road has been shaped into the steep mountainous terrain and given the apparent age of the road, standard 1.5 m wide table drains with a 1 in 4 lead in grade can not be achieved due to the constraints on the overall width of the road formation due to the terrain.

Due to the mountainous terrain, it is apparent that a "run off road" type crash would have a high probability of resulting in fatalities. The road has a posted speed limit of 60 km/h and many curves with a safe travel speed less than the speed limit. There are no curve warning signs, delineation is sporadic, there are many trees in the clear zone and no safety barriers in high risk areas.

Widening of the shoulders in various locations would no doubt result in massive earthworks and potential environmental impacts. As there is no apparent damage to roadsides resulting from insufficient table drain capacity it must be assumed that stormwater drainage is currently adequately catered for.

Table 1 – Gaudrons Road widths.

Distance from Concrete pavement (km)	Left shoulder width (m)	Central seal width (m)	Right shoulder width (m)	Comment
0.2	1.5	6.0	3.0	In cutting
0.4	3.0	5.9	1.5	Cutting LHS
0.5	1.5	6.8	1.5	Cutting LHS
0.6	2.5	6.2	3.5	
0.81	1.3	5.6	1.2	Cutting RHS
1.0	1.5	6.0	1.1	Cutting RHS
1.1	2.0	5.5	2.5	Fill embankment
1.2	2.0	5.6	1.1	Cutting RHS
1.4	Driveway	6.5	Driveway	
1.6	1.0	6.1	3.0	
1.7	1.2	5.2	1.0	

From the table above it can be seen that the seal width varies from 5.5 to 6.8 m. The wider seal would include some widening of curves. The arithmetic mean of the seal width is 5.95 m.

Previous indications from Council have been that development along the length of Gaudrons Road would result in the need to widen the seal and shoulders in accordance with Council's Development Specification for greenfield sites. An obvious benefit of the road in its current form is that drivers generally travel at lower speeds and with attention to the road alignment which would probably result in lower reaction times, probably 1.5 seconds would be the norm.

Widening of the road may result in higher operational traffic speeds which without upgrading horizontal curves and reducing grades could result in more traffic accidents on the road. Instead, it may be more appropriate to take a road safety approach in accordance with the "safe system" to carry out safety works which would reduce potential crash severity, serious injuries and possible deaths.

No 148 Gaudrons Road is located between cross sections at 1.2 and 1.4 km in the table above.

It is apparent that a blanket application of Council's rural road standard to the road would not be an efficient expenditure as any incremental improvement would be at enormous cost. Also, it is understood that there are currently 67 dwellings which gain access via Gaudrons Road. If the subdivision resulted in one additional dwelling the impact of the traffic increase would be only 1.5% and it would be difficult to attribute the need for any upgrading works to the resulting increase in traffic from the subdivision. As there is no increase in dwellings resulting

from the subdivision there is definitely no nexus on which to require upgrading of Gaudrons Road.

It is noted that Council does not have a Section 7.11 Infrastructure Contributions plan for Gaudrons Road. Therefore, Council is not legally entitled to require the developer to contribute to works at other locations along the length of the road.

8 Conclusion

This investigation has proven that the existing points of access to Gaudrons Road for proposed Lots 1 and 2 are suitable for access from each lot to Gaudrons Road.

As there are already two dwellings, one on each proposed lot, there will be no increase in traffic generation from the subdivision and no decrease in the amenity of the existing access along Gaudrons Road.

As there is no current EPA Act Section 7.11 Infrastructure Contributions plan for Gaudrons Road Council can not require the applicant to contribute toward upgrading of Gaudrons Road.

Consideration of the mountainous nature of the existing road environment indicates that general upgrading of Gaudrons Road in accordance with Specification 0041 may not produce desirable outcomes and a more targeted approach to safety improvements, funded through Council's normal channels, may be more suited to the locality.

If any of these issues need clarification please contact me on 0432 016 490.

Yours sincerely



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LAND USE CONFLICT RISK ASSESSMENT
FOR PLANNING PROPOSAL
Lot 11 DP1141269
9 Gaudrons Road, Sapphire Beach, NSW



Prepared By: Paola Rickard
Land & Fire Assessments Pty Ltd
For: Chris & Chris Bowen
Project No.: LFA20041
Date: 25 January 2021

Disclaimer

Land & Fire Assessments Pty Ltd (LFA) have conducted work concerning the environmental status of the site, which is the subject of this report, and has prepared this report on the basis of that assessment. The work was conducted, and the report has been prepared, in response to specific instructions from the client or a representative of the client and in reliance on certain data and information made available to LFA. The analysis, evaluations, opinions and conclusions presented in this report are based on that information, and they could change if the information is in fact inaccurate or incomplete.

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Revision List

Revision No.	Revision Date	Report Title	Report Author	Field Survey By	Status
00	25.01.2021	Land Use Conflict Risk Assessment for Planning Proposal, Lot 11 DP1141269, 9 Gaudrons Road, Sapphire Beach, NSW	Main Author: Paola Rickard (LFA - Senior Environmental Planner)	Paola Rickard undertaken on the 04.11.20	Final

LFA contact details: Paola Rickard - 0427 809 352

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1. Introduction and Background

1.1 Introduction

Land & Fire Assessments Pty Ltd (LFA) has been commissioned by Chris & Chris Bowen to prepare a Land Use Conflict Risk Assessment (LUCRA) to support the **Planning Proposal for Lot 11 DP1141269, 9 Gaudrons Road, Sapphire Beach, NSW**. The site is shown on Figs. 1 & 2. Sapphire Beach is located in the Coffs Harbour City Council (CHCC) Local Government Area (LGA) approximately 10 km north of Coffs Harbour.

This Planning Proposal applies to Lot 11 DP1141269 (the Site), which is zoned RU2 Rural Landscape under the Coffs Harbour Local Environmental Plan (LEP) 2013 (refer to Fig. 4). The purpose of this Planning Proposal is to amend LEP 2013 to allow large lot residential development.

Pre-lodgement meeting notes from CHCC dated 17/06/20 indicated that a LUCRA is required to support this planning proposal due to existing RU2 Zoning and its past use for the cultivation of bananas and surrounding land uses.

Council planning provisions concerning the preparation of LUCRAs do not specify requirements to support a Planning Proposal. Therefore, this LUCRA has been undertaken following the CHCC Development Control Plan 2015 (DCP) provisions specified to support Development Applications for subdivisions, specifically:

- C1.5 SUBDIVISION-DESIGN REQUIREMENTS FOR RURAL AND LARGE LOT RESIDENTIAL ZONES

C1.5 also details the provisions regarding the preparation of a LUCRA. The relevant clause states:

> (2) Subdivisions are to incorporate **adequate buffers between dwelling envelopes and adjoining agricultural land to ensure that the agricultural potential of those lands will not be diminished** (refer to the Land Use Conflict Risk Assessment Guide prepared by the NSW Department of Primary Industries).

The LUCRA will address land use interface issues and risks between rural land uses and a future rural residential development. The LUCRA will be prepared in accordance with the Land Use Conflict Risk Assessment Guide, which has been promoted by the NSW Department of Primary Industries (DPI 2011) and is based on Learmonth *et al* (2007).

The purpose of the LUCRA is to identify landuse compatibility and potential conflict between neighbouring landuses, and therefore, assists in the identification of the potential for future landuse conflict. The LUCRA aims to:

- *Objectively assess the effect and level of proposed landuse on neighbouring land uses;*
- *Accurately identify the risk of conflict between neighbouring land uses;*
- *Complement development control and buffer requirements with an understanding of likely landuse conflict;*
- *Proactively address landuse issues and risks before a new landuse proceeds or before a dispute arises; and*
- *Highlight or recommend strategies to help minimise conflict and contribute to the negotiation, proposal, implementation and evaluation of separation strategies.*

In summary, the LUCRA is a tool aimed at:

- Identifying the effects of the landuse on neighbouring landuse; and
- Evaluate the level of impact of these effects.

In order to achieve those aims, a four-step assessment process is undertaken as follows:

1. **Information Gathering** – The site geophysical characteristics, the nature of the development proposed and the surrounding landuses are described.
2. **Risk Level Evaluation** - Each proposed activity is recorded and an assessment of potential landuse conflict level is assigned. The higher the risk level, the more attention it will require.
3. **Identification of Risk Mitigation Management Strategies** – Management strategies are identified which can assist in lowering the risk of potential conflict.
4. **Record Results –** Key issues, risk level and recommended management strategies are recorded and summarised.

Accordingly, this landuse conflict risk assessment will utilise the aforementioned four-step assessment process**.**

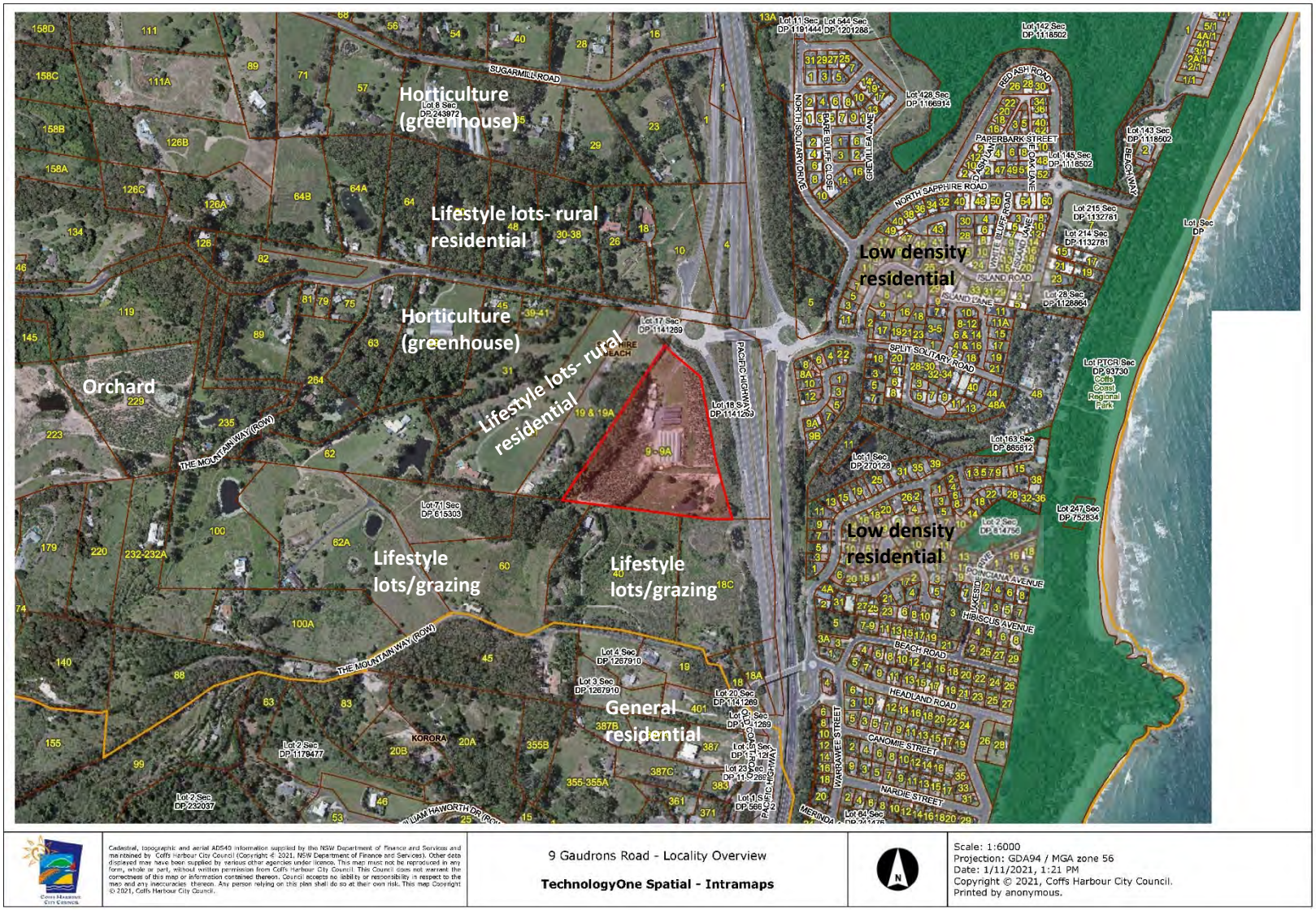


Figure 1. The Site (red boundary) within the locality context & predominant landuse. Source: CHCC Intramaps

2. Information Gathering (Step 1)

2.1 The Subject Site

The Subject Site (i.e. Lot 11 DP1141269), which is 5.268 Ha in size, is directly accessed from Gaudrons Road. The land in context with the locality is shown on Fig. 1. It entails a developed property utilised for horticulture (banana plantation and hydroponics figs). The Site is bounded by Gaudrons Road to the north, the Pacific Motorway to the east, rural lifestyle lots to the west and south. Two residential dwellings are found on Site as well as large greenhouses, sheds, water tanks and sealed driveway access. A dam is found on the south eastern corner of the Site.

The Site is in close proximity (just east of the Motorway) to the established residential areas of Sapphire Beach, as shown on Fig. 1. Whilst rural land is found to the north, south and west, the Site is identified in the 'Korora' potential Large Lot Residential (Zone R5) Candidate Areas in the Coffs Harbour LGA. The Site does not contain Biodiversity Values land and it is not located near any sensitive ecosystems.

The Site, which consists of a central ridge with downslopes to the east, west and south, is predominantly cleared with scattered trees and windbreaks on the southern portion (Plates 1-10). A row of Bangalow Palms is found along the southern boundary. A narrow stand of predominantly Wet Sclerophyll Forest is found along the western boundary of the Site, as shown on Fig. 2. The southern eastern portion of the Site is dominated by Grassland with scattered trees, whilst the south western portion is under banana cultivation. The eastern and northeaster portion of the Site consists of Grassland and lawns.





Plates 1 & 2. Looking south west towards the two existing residential dwellings. Note the Forest vegetation in the background, which is found along the western boundary



Plate 3. Looking north along the existing sealed access area and the greenhouses in the background



Plate 4. Looking south east at the extensive lawn



Plate 5. Looking north east across Site towards the Pacific Motorway and beyond is the Sapphire Beach residential area



Plate 6. Looking south west at the horticultural farm infrastructure, which will be decommissioned



Plate 7. Looking south east across the Site- one of the greenhouses to the right



Plate 8. Looking south- south west from the top of the ridge towards southern boundary (marked by row of Bangalow Palms) and neighbouring land.

Plate 9. The banana orchard found to the SW of the Site bounded by windbreak





Plate 10. Looking north along western portion of Site with greenhouse to the right and banana orchard to the left. Note the Forest vegetation found along western boundary.

The surrounding vegetation includes the Wet Sclerophyll Forest to the west along a narrow gully further extending upslope to the south west. This vegetation is mapped as Tertiary Koala habitat in the Coffs Harbour Comprehensive Koala Plan of Management (CHCKPoM). Otherwise, the predominant vegetation to the south of the Site is Grassland on upslope, as shown on Fig. 1 & Plate 8. Landuse to the east consist of lifestyle lot rural residential, whilst immediately to the south are rural properties, which can support low level grazing. The Forest vegetation found along and beyond the western boundary provides a thick vegetation buffer between the Site and the neighbouring lot to the east, as shown on Plates 11 & 12. As noted previously, a row of Bangalow Palms is found along the southern boundary providing buffering between the Site and the southern neighbours (Plates 8 & 13).



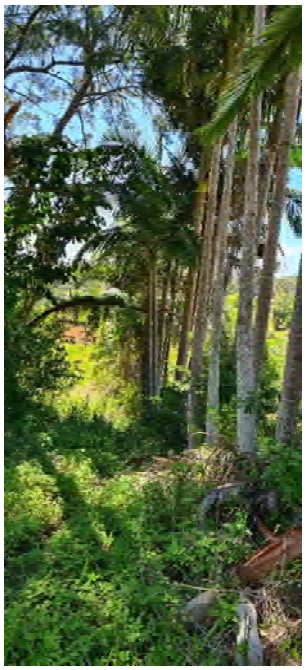
Plate 11. Forest vegetation found along and beyond western boundary providing a thick vegetation buffer between the site and the neighbouring lot to the east



Plate 12. Forest vegetation extending upslope to the south west

To the north is the extensive newly constructed roundabout and overpass over the Pacific Motorway and predominantly lifestyle lots beyond it. To the east is the Pacific Motorway with associated road reserve and Solitary Islands Way (see Figs. 1 & 2), and the residential area of Sapphire Beach (Plates 5 & 14).

The Site consists of a central ridge-oriented north to south with a maximum elevation of 32m AHD. The ridge downslopes to the east, west and south, reaching 10m AHD elevation to the south east. A creek runs along the western boundary. The main soil landscape is 'Megan' with the south east corner featuring the 'Monee' soil Landscape (Everick Heritage Pty Ltd 2020).



The Site is mapped as having Class 5 Acid Sulfate Soils (ASS). The proposal Site is outside of the 100-year ARI Flood Extent.

Plate 13 (left). Row of Bangalow Palms along the southern boundary providing buffering between the Site and the southern neighbours



Plate 14. Pacific Motorway with associated road reserve, Solitary Islands Way and the residential area of Sapphire Beach to the east of the Site

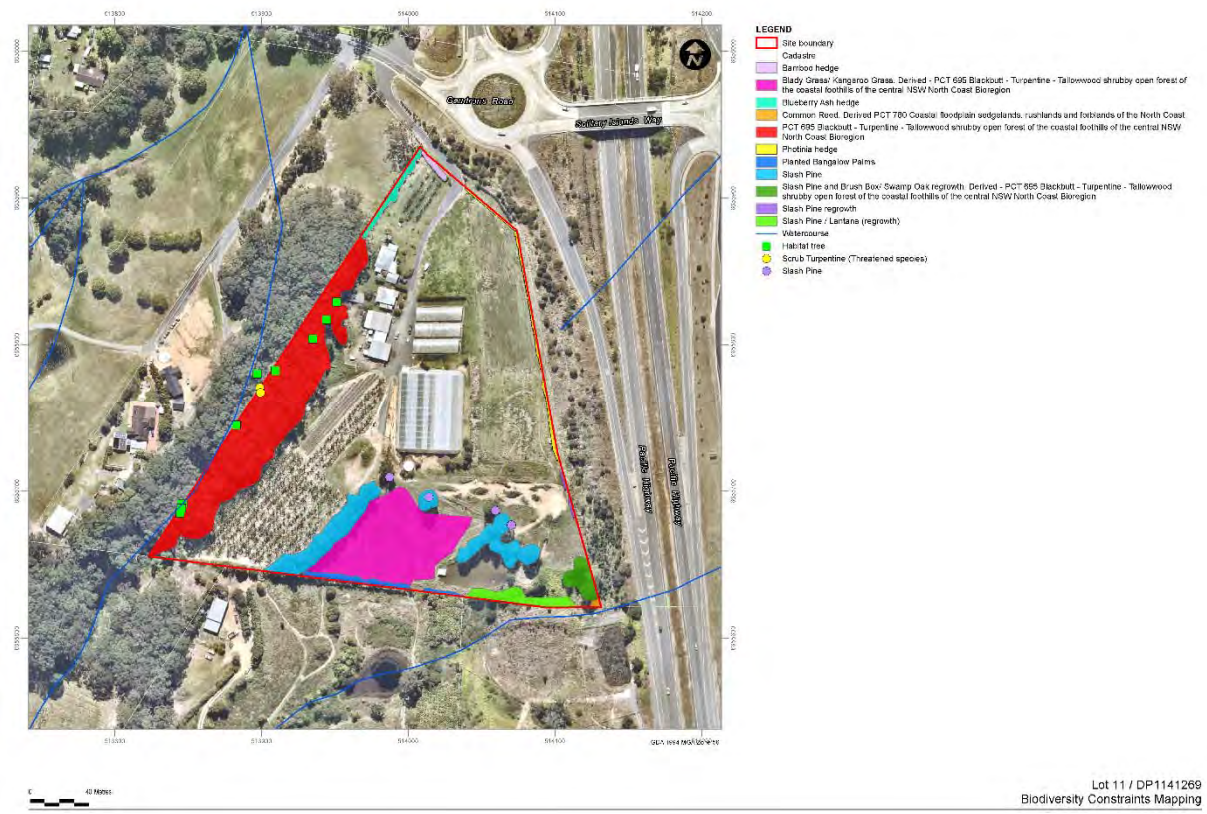


Figure 2. Vegetation mapping for the Site. Source: GeoLINK 2020 - Biodiversity Constraints Mapping

Preliminary biodiversity mapping by GeoLINK indicate that only one threatened plant species, namely the Scrub Turpentine (*Rhodamnia rubescens*) was recorded along the western boundary, as shown on Fig. 2. A number of habitat trees, again along the western boundary, were also recorded. GeoLINK identified a number of Plant Community Types (PCT) as occurring at the Site namely, PCT 695 Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central North Coast & derived PCTs as shown on Fig. 2. None of these PCTs are identified as Threatened Ecological Communities (TECs). In any case, it is not proposed to impact on the Forest vegetation occurring along the western boundary.



An Aboriginal Cultural Heritage Assessment (ACHA) has been undertaken by Everick Heritage Pty Ltd (2020). The ACHA findings regarding the Site indicate that considerable soil disturbance has occurred historically due to banana farm operations, cut and fill earthworks, construction of amenities and landscaping. Nevertheless, one Aboriginal stone tool was identified during survey of the Site. It was found along the western boundary of the banana plantation as shown on Fig. 3. The object is a unifacial greywacke chopper, transversely broken with one visible negative flake scar, identified as Gaudrons Road IF01. The ACHA concluded that there is a potential for further artefacts finds along the ridge crest; therefore, further investigations are recommended. These will be undertaken at the subdivision DA stage.

Figure 3. Location of stone tool. Source: Everick Heritage (2020)

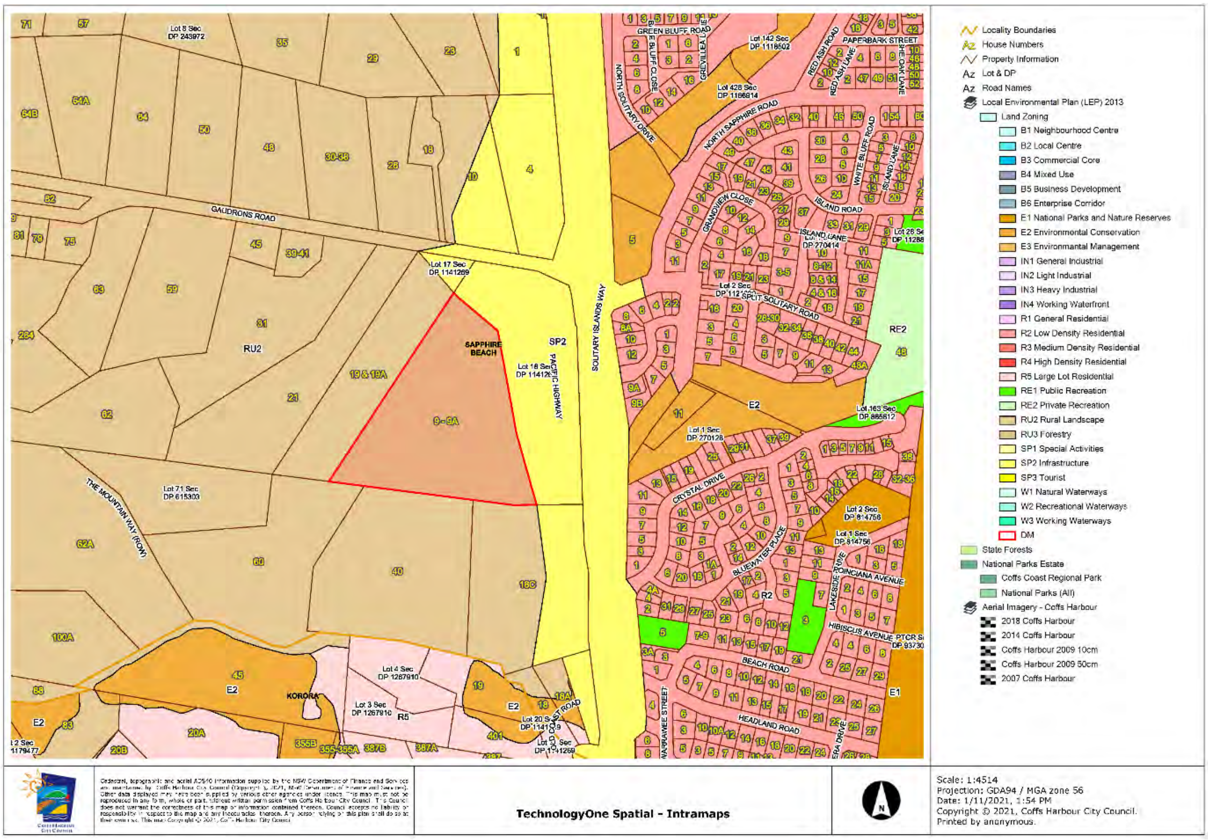


Figure 4. Land zoning applicable to the Site (red boundary).

2.2 Proposed Development & Planning Provisions

The purpose of this Planning Proposal is to amend LEP 2013 to allow large lot residential development on Lot 11 DP1141269. The Planning Proposal will:

- rezone the subject land from Zone RU2 Rural Landscape to Zone R5 Large Lot Residential,
- Change to the Minimum Lot Size (MLS) for the new R5 zoned land from the current 40 hectares. A new MLS of 6,000 m^2, is sought for this precinct.

The proposed subdivision concept layout is shown as Fig. 5. Notably, the exiting dwellings and associated infrastructure would be retained within proposed lots 1 & 2 respectively. Whilst the banana orchard, greenhouses, sheds etc would be removed. The dam to the south east will also be filled in. Vegetation along the western boundary and the planted row of Bangalow Palms will be retained.

As noted in s. 1.1, pre-lodgement meeting notes from CHCC dated 17/06/20 indicated that a LUCRA is required to support this planning proposal due to existing RU2 Zoning and its past use for the cultivation of bananas and surrounding land uses.

Accordingly, a future subdivision will be required to address the CHCC DCP 2015 provisions, specifically:

- C1.5 SUBDIVISION-DESIGN REQUIREMENTS FOR RURAL AND LARGE LOT RESIDENTIAL ZONES

C1.5 also details the provisions regarding the preparation of a LUCRA. The relevant clause states:

> (2) Subdivisions are to incorporate **adequate buffers between dwelling envelopes and adjoining agricultural land to ensure that the agricultural potential of those lands will not be diminished** (refer to the Land Use Conflict Risk Assessment Guide prepared by the NSW Department of Primary Industries).

In summary, the proposed change in landuse from rural to large lot residential is to occur over a property currently utilised for horticulture (banana plantation and hydroponics figs) and residential landuse. The proposal area is surrounded by predominantly lifestyle rural residential, roads and

medium density residential land. Whilst immediately to the south is rural land, which can support low level grazing. Notably, the predominant landuse surrounding the planning proposal area is of a rural residential nature and does not include intensive agricultural or horticultural landuse.

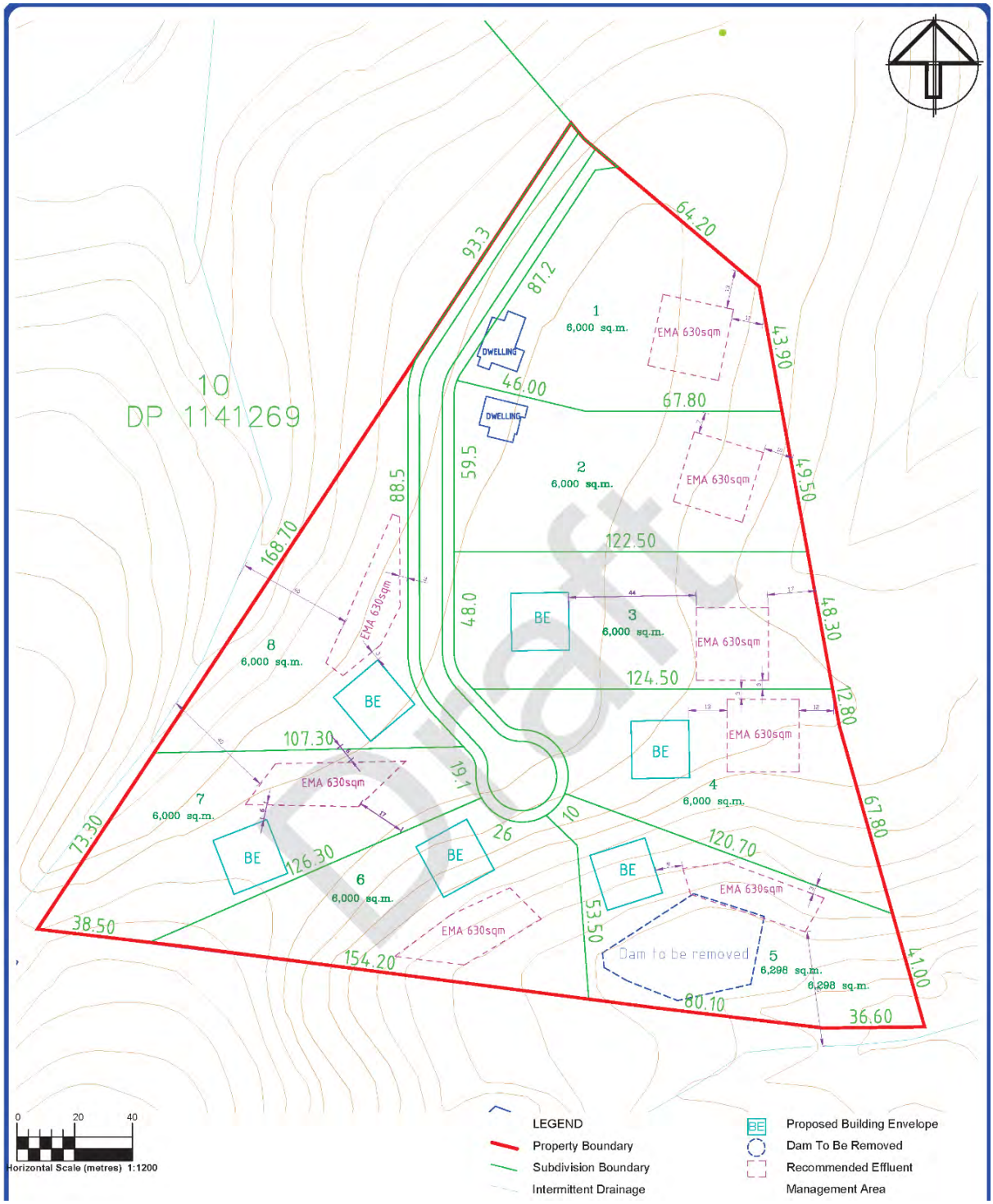


Figure 5. Proposed subdivision concept layout. Source: Earth Water Consulting (2020)

Nevertheless, this landuse conflict assessment will evaluate potential landuse conflict arising from the proposed **residential land uses and the RU2 Rural Landscape zoned land (see Fig. 4) found to the west, northwest and south.** Importantly, the LUCRA will not address the potential land contamination issue within the Site due to its past use for the cultivation of bananas. The latter is to be addressed by undertaking a preliminary site investigation in accordance with the NSW EPA Guidelines for Assessing Banana Plantation Sites (1997) and Council's Contaminated Land Policy to assess the suitability of the land for residential use by certified contaminated land practitioner.

2.3 Site History and Land Use

The Site has been utilised as a banana plantation and intensive horticulture (greenhouses) for a number of decades. Review of Google aerial imagery shows that the Site has been utilised for banana plantation since at least 2004. In 2011, the eastern portion of the Site became part of the Pacific Motorway upgrade including the construction of the major interchange to the north east. By 2014 one of the large greenhouses was constructed to be utilised for intensive edible figs production. A second greenhouse was constructed by 2017. In the meantime, the area utilised for banana plantation steadily decreased and by 2019 only the south western corner of the property was under banana production.

The surrounding properties have similarly remained consistent with the current landuse apart from the properties to the south of the Site, which supported banana plantation until around 2011. Since then, the banana plantation has been cleared, and the land has remained vacant and possibly utilised for low-key grazing. Council GIS mapping indicate that banana cultivation has occurred at the Site and to the south, west and east from 1943 to 1994. As noted previously, the land is bounded by Gaudrons Road to the north, the Pacific Motorway to the east, rural lifestyle lots to the west and south. Two residential dwellings are found on Site as well as large greenhouses, sheds, water tanks and sealed driveway access.

The land is zoned RU2 Rural Landscape in the Coffs Harbour Local Environmental Plan 2013 (refer to Fig. 4).

2.4 Surrounding Land Use

Adjoining landuse to the planning proposal Site, which are illustrated on Fig. 1, are as follows:

- North: Extensive interchange roundabout and overpass over the Pacific Motorway and predominantly lifestyle lots beyond it
- East: Pacific Motorway with associated road reserve, Solitary Islands Way (see Figs. 1 & 2) and the residential area of Sapphire Beach
- South: Rural lots currently unutilised and further south general residential
- West: Rural land predominantly utilised as lifestyle lots

The proposed large lots residential subdivision will be consistent with surrounding landuse to the east, north east and further south. To the west, north west and south, the predominant landuse surrounding the planning proposal area is of a rural residential nature and, apart for a couple of greenhouses to west, north west, does not include intensive agricultural or horticultural landuse. Nevertheless, this landuse conflict assessment will evaluate potential landuse conflict arising from the proposed residential land uses and the RU2 Rural Landscape zoned land (see Fig. 4) found to the west, northwest and south.

2.5 Landuse Summary & Activities Arising from the Proposal

As noted, this landuse conflict assessment will evaluate potential landuse conflict arising from the proposed **residential land uses and the RU2 Rural Landscape zoned land (see Fig. 4) found to the west, northwest and south.** It is necessary to identify any potential causes for conflict, which may arise from the development of the Site. Table 1 summarises the proposal within the context of the locality and surrounding landuse and the activities/impacts which may occur on neighbouring properties.

Table 1. Activities likely to occur as a result of the proposal

Parameter	Details
The nature of the landuse change & development proposed	The proposal will result in the introduction of higher density (0.6ha minimum lot size) large lot residential landuse within land currently utilised for horticulture. There are exiting dwellings/rural infrastructures at the Site.
The nature of the precinct where the land use change & development is proposed	The proposed change in lot size and potential large lot residential subdivision is to occur over currently rural land utilised for horticulture. The proposal area is surrounded by grazing land, rural lifestyle lots, roads and low-density residential development.
Topography, climate & natural features	The Subject Site consists of a central ridge-oriented north to south with a maximum elevation of 32m AHD. The ridge downslopes to the east, west and south, reaching 10m AHD elevation to the south east. The Planning Proposal area is predominantly cleared with scattered trees and windbreaks on the southern portion. A row of Bangalow Palms is found along the southern boundary. A narrow stand of predominantly Wet Sclerophyll Forest is found along the western boundary of the Site. The southern eastern portion of the Site is dominated by Grassland with scattered trees, whilst the south western portion is under banana cultivation. The eastern and northeaster portion of the Site consists of Grassland and lawns. A creek runs along the western boundary. The main soil landscape is 'Megan' with the south east corner featuring the 'Monee' soil Landscape (Everick Heritage Pty Ltd 2020). The 'Megan' Soil Landscape consists of moderately deep to deep (>100 cm), well drained structured Red Earths, Brown Earths, Brown Podzolic Soils and Red Podzolic Soils. The 'Monee' Soil Landscape consists of moderately deep to deep (>100 cm), poorly drained Humic Gleys. The Site is mapped as having Class 5 Acid Sulfate Soils. The proposal Site is outside of the 100-year ARI Flood Extent. The climate in the Coffs Harbour LGA is typical of subtropical northern NSW, with warm summers and mild winters. The prevailing morning wind is from the southwest with calm conditions being experienced 15% of the time, and the prevailing afternoon winds are from the north east and south with calm conditions being experienced 3% of the time (refer to Appendix B - Wind Direction Rose from Coffs Harbour MO Weather Station - Site number: 059040)
Typical industries & land uses in the area	Industries: Predominantly grazing & horticulture Land uses: Residential, grazing, horticulture and rural lifestyle
The main activities of the proposed land use for the development & regularity of activity	The main activities associated with the proposed residential subdivision are the same as the ones associated with the existing surrounding development to the east (beyond the M1), north east and further south, these are: o Low Density and Large Lots Residential development: o Activities: mowing, traffic = some noise - ongoing; o Construction activities = noise, dust, loss of amenity- high intensity short duration
The main activities of adjoining land uses & their regularity	Land to the north west, west and immediately south: o Grazing - Activities: slashing, tractor use - some odour & noise– ongoing o Horticulture (greenhouses) - Activities: spraying, fertilising, slashing, tractor use - some spray drift, odour & noise– ongoing Land to east and far south: o General & Low Density Residential development: o Activities: mowing, traffic = some noise - ongoing; o Construction activities = noise, dust, loss of amenity- high intensity short duration

Parameter	Details
Compatibility of the proposal with surrounding land use issues	The proposal is wholly compatible with the predominant surrounding landuse, i.e. general and low density residential landuse to the east, north east & far south. However, there is a potential landuse conflict with the grazing land on neighbouring properties to the south and lifestyle rural residential and small-scale rural activities to the west & north west

3. Risk Level Evaluation (Step 2)

3.1 Risk Evaluation & Ranking

As noted in Table 1, the main activities associated with the proposed development are the same as the ones associated with the predominant surrounding development to the east, north east and far south. However, there is a potential landuse conflict with the grazing land on neighbouring properties to the south and lifestyle rural residential and small-scale rural activities to the west & north west. Accordingly, the DCP provisions requires that buffers between dwelling envelopes and adjoining agricultural land are to be considered to ensure that the agricultural potential of those lands will not be diminished.

Thus, this assessment focuses on the adequacy of the following buffers between the proposed dwelling envelopes on the potential lots (refer to Fig. 5), which interface with the rural landuse to the west and/or south, namely:

- Proposed lot 1 – exiting dwelling separation to rural land to the west including exiting Forest vegetation buffer = ~94m
- Proposed Lot 2 – exiting dwelling separation to rural land to the west including exiting Forest vegetation buffer = ~97m
- Proposed Lot 3 - dwelling envelope separation to rural land to the west including exiting Forest vegetation buffer = ~128m
- Proposed Lot 4 - dwelling envelope separation to rural land to the south including exiting Bangalow Palms planted row along boundary = ~83m
- Proposed Lot 5 - dwelling envelope separation to rural land to the south including exiting Bangalow Palms planted row along boundary = ~42m
- Proposed Lot 6 - dwelling envelope separation to rural land to the south including exiting Bangalow Palms planted row along boundary = ~42m
- Proposed Lot 7 - dwelling envelope separation to rural land to the west including exiting Forest vegetation buffer = ~ 87m
- Proposed Lot 8 - dwelling envelope separation to rural land to the west including exiting Forest vegetation buffer = ~90m

Each proposed activity is recorded in Table 2 and an assessment of known landuse conflict level is assigned accordingly. Ranking is given before and after ameliorating measures are applied to mitigate the given activity impacts. The higher the risk level, the more attention it will require in order to reduce the ranking level. Risk rankings are derived from the risk ranking table attached as Appendix A.

Table 2. Risk Evaluation & Ranking

Activity	Identified Hazard	Risk Ranking	Control Methods	Controlled Ranking
o Building, access and services construction - intense activity, limited duration	Noise/Dust/Loss of Amenity	4C	o Adherence to approved daytime construction hours o Adherence to relevant legislation specifically re dust/noise management and implementation of erosion control measures o Good communication with neighbour	5C
Greenhouse horticulture o Pesticide control- off-target movement of agricultural chemical -	Agricultural Chemical Spray Drift	3B	o Nearest existing greenhouse (see Fig. 1) is more that 370m away from any proposed dwelling	5C

Activity	Identified Hazard	Risk Ranking	Control Methods	Controlled Ranking
intense activity, limited duration o Fertiliser use, effluent disposal – intense activity, moderate duration o Noise from tractor use- occasional	Odour noise		o If a new greenhouse was established immediately west of the Site, there would be a current separation buffer ~87m to 128m wide including a thick forested buffer from future dwellings at the Site o Adherence to relevant legislation specifically re herbicide use/dust/noise management and implementation of erosion control measures o Prevailing morning winds are from the southwest, and the prevailing afternoon winds are from the southeast and north east and south (Appendix B). Thus, the prevailing winds do not blow directly onto the future residential dwellings from a westerly or northerly direction	
Grazing o animals freely moving, some odour & noise o noise from occasional slashing	Some odour Some noise	4B	o Good communication with neighbour o ~42m – 83m wide respective building envelopes setbacks from southern boundary of future subdivision o Planted Bangalow Palms row along southern boundary providing buffering	5C
o Mowing - activity common within surrounding rural residential landuse and not significantly increased because of the proposal	Noise	N/A	none	N/A

3.2 Potential Conflict Issues (Risk Ratings)

In summary, the main issues arising from the proposed rezoning to residential use in respect to impact to current or future agricultural pursuits on RU2 zoned land to the north west, west and immediately south are:

- Noise/Dust/Loss of Amenity (temporary only) – from the building construction works
- Noise/Odour – from the low-key grazing to south (although the land appears unutilized presently and it is also identified for potential Large Lot Residential Candidate Areas)
- Noise/Dust/Spray Drift – from intensive horticulture including greenhouse horticulture to the west and north west

Table 2 gives a risk value for each of the above identified potential conflict areas before (Risk Ranking) and after (Controlled Ranking) a mitigating measure is applied. A rating of High, Medium and Low is then assigned to each risk ranking based on a combination of 'Probability' of occurrence and 'Consequence' from the activity. Thus, the rating of the potential landuse conflict risks identified on

Table 2 is displayed on Table 3. **It must be noted that, the highlighted scoring shown on Table 3 reflects the impact rating for the Controlled Ranking values.**

Table 3. Landuse Conflict Risk Assessment Matrix (Yellow highlight = Risk Rating for Controlled Ranking)

		Likelihood of a dispute/conflict over land use/activity				
		Almost Certain (A)	**Likely (B)**	**Possible (C)**	**Unlikely (D)**	**Rare (E)**
Likely consequence from a dispute/conflict over land use/activity	**Major consequences & impacts almost certain (1)**	HIGH (25)	HIGH (24)	HIGH (22)	MEDIUM (19)	LOW (15)
	High consequences & impacts likely (2)	HIGH (23)	HIGH (21)	MEDIUM (18)	LOW (14)	LOW (10)
	Moderate consequences & impacts possible (3)	HIGH (20)	MEDIUM (17)	LOW (13)	LOW (9)	LOW (6)
	Minimal consequences & impacts unlikely (4)	MEDIUM (16)	LOW (12)	LOW (8)	LOW (5)	LOW (3)
	Low consequence & impacts rare (5)	LOW (11)	LOW (7)	LOW (4)	LOW (2)	LOW (1)

The resulting risk rating of 4 shown on Table 3, which corresponds to the Controlled Ranking values of 5C is deemed an acceptable risk (refer to Appendix A). **This is because the identified potential conflict areas can be mitigated effectively with appropriate controls (summarised in s.3.1 and detailed in s. 4) and therefore yields a 'Low' likelihood of conflict and impact**.

4. Risk Mitigation Management Strategies (Step 3)

4.1 Control Measures

A number of measures have been listed on Table 2 to mitigate the potential landuse conflict which might arise from the proposal. These are as follows:

1. Good communication with neighbour
2. Adherence to relevant legislation
3. Current separation buffer ~87m to 128m wide including a thick forested buffer to the west from potential future dwellings at the Site (see Fig. 5), specifically:
    a. Proposed lot 1 – exiting dwelling separation to rural land to the west including exiting Forest vegetation buffer = ~94m
    b. Proposed Lot 2 – exiting dwelling separation to rural land to the west including exiting Forest vegetation buffer = ~97m
    c. Proposed Lot 3 - dwelling envelope separation to rural land to the west including exiting Forest vegetation buffer = ~128m
    d. Proposed Lot 7 - dwelling envelope separation to rural land to the west including exiting Forest vegetation buffer = ~ 87m
    e. Proposed Lot 8 - dwelling envelope separation to rural land to the west including exiting Forest vegetation buffer = ~90m
4. Current separation buffer ~42m – 83m wide from respective building envelopes (see Fig. 5) from southern boundary of future subdivision, and planted Bangalow Palms row along southern boundary providing buffering, specifically
    a. Proposed Lot 4 - dwelling envelope separation to rural land to the south including exiting Bangalow Palms planted row along boundary = ~83m
    b. Proposed Lot 5 - dwelling envelope separation to rural land to the south including exiting Bangalow Palms planted row along boundary = ~42m
    c. Proposed Lot 6 - dwelling envelope separation to rural land to the south including exiting Bangalow Palms planted row along boundary = ~42m

The following section will address in more detail the landuse buffer provisions.

4.2 Landuse Buffers

The DCP does not prescribe minimum buffers to adjoining agricultural landuse. Similarly, the LUCRA Guide (DPI 2011) does not specifically propose minimum buffers to agriculture landuse including grazing. It instead notes that the LUCRA process prompts land use managers to identify operators of adjacent properties to the effects of a proposed land use on neighbouring land, describe and record the main activities of the land uses, evaluate the type of activities on adjacent properties and their frequency, and finally identify the level of management strategies required to minimise such effects.

Accordingly, this assessment has evaluated this proposal in the context of the locality characteristics. It is noted that the current low density, general residential and lifestyle rural residential landuse in the locality coexist with adjoining horticulture (particularly greenhouse horticulture) and grazing landuse. As noted from the historical review, the occurrence of banana plantations in the locality has steadily declined in recent times. The further development of the M1 and nearby Sapphire Beach, and the tendency to rural lifestyle occupancy rather than traditional rural landuse activities have similarly reshaped the locality. This is further evidence by the fact that the whole area surrounding the Site west of the M1 is identified in the 'Korora' potential Large Lot Residential (Zone R5) Candidate Areas in the Coffs Harbour LGA.

The rural landuse activities to the west, north west and immediately south of the proposal Site are currently limited. To the south the land is predominantly unutilised or used for low-level grazing. To the west are lifestyle lots with manicured extensive lawns and no apparent agricultural pursuits. The closest intensive horticultural pursuits are a set of greenhouses more than 370m to the west of the Site. Even if the land to the west and northwest was developed for more intensive agricultural landuse, there is a thick forest buffering the Site along the west and south west including setback separation from potential future dwellings at the Site ranging from ~87m to 128m to the land immediately to the west. In addition, the prevailing morning winds are from the southwest, and the prevailing afternoon winds are from the southeast and north east south. Thus, the prevailing winds do not blow directly onto the future residential dwelling from a westerly or northerly direction.

Concerning the land immediately to the south, which is identified in the 'Korora' potential Large Lot Residential Candidate Areas, appears to be unutilised or used for low-level grazing. Further south is land zoned General Residential (see Fig. 4), accordingly any rural landuse intensification on this neighbouring land would have to be limited by the already zoned residential land further south. Assuming that stock grazing would be the predominant pursuit, any potential impacts (some odour and noise) on the proposed residential lots from neighbouring grazing land are considered to be minor (risk raking of 4B = Low likelihood of conflict and impact), as shown on Table 2 even before available separation buffers are considered. In any case, setbacks are available ranging from ~42m – 83m wide from respective building envelopes (see Fig. 5) from southern boundary of future subdivision including a planted Bangalow Palms row.

In summary, this LUCRA has duly appraised the potential conflicts which could arise from the proposal and has deemed that the building envelopes setbacks (i.e. buffers) detailed at points 3 & 4 (s. 4.1) and shown on Fig. 4 are adequate to minimise future potential conflicts and ensure that the agricultural potential of the neighbouring rural lands will not be diminished.

5. Summary, Conclusion & Recommendations (Step 4)

This LUCRA has been commissioned by Chris & Chris Bowen to support the **Planning Proposal for Lot 11 DP1141269, 9 Gaudrons Road, Sapphire Beach, NSW**.

Essentially, it was found that the potential future large lot residential subdivision will be consistent with surrounding landuse to the east, north east and further south. To the west, north west and south, the predominant landuse surrounding the planning proposal area is of a rural residential nature and, apart for a couple of greenhouses to west, north west, does not include intensive agricultural or horticultural landuse. Nevertheless, this landuse conflict assessment has evaluated potential landuse conflict arising from the proposed residential land uses and the RU2 Rural Landscape zoned land (see Fig. 4) found to the west, northwest and south.

The main activities associated with the proposed development are the same as the ones associated with the predominant surrounding development to the east, north east and far south. However, there is a potential landuse conflict with the grazing land on neighbouring properties to the south and lifestyle rural residential and small-scale rural activities to the west & north west. Accordingly, the DCP provisions requires that buffers between dwelling envelopes and adjoining agricultural land are to be considered to ensure that the agricultural potential of those lands will not be diminished.

The DCP does not prescribe minimum buffers to adjoining agricultural landuse. Similarly, the LUCRA Guide (DPI 2011) does not specifically propose minimum buffers to agriculture landuse including grazing and horticulture. Accordingly, the separation distances (buffers) between the proposed dwelling envelopes on the lots (refer to Fig. 5), which interface with the grazing to the south and potential horticultural landuse to the west and north west were assessed for adequacy.

Notably, the occurrence of banana plantations in the locality has steadily declined in recent times. The further development of the M1 and nearby Sapphire Beach, and the tendency to rural lifestyle occupancy rather than traditional rural landuse activities have similarly reshaped the locality. This is further evidence by the fact that the whole area surrounding the Site west of the M1 is identified in the 'Korora' potential Large Lot Residential (Zone R5) Candidate Areas in the Coffs Harbour LGA.

Following the risk evaluation, ranking and rating step by step process, a risk rating of 4 (see Table 3) was determined, which is deemed an acceptable risk. This is because the identified potential conflict areas can be mitigated effectively with appropriate control and therefore results in a 'Low' likelihood of conflict and impact.

The control measures to be implemented to reduce the risk of landuse conflict are as follows:

1. Good communication with neighbour
2. Adherence to relevant legislation
3. Current separation buffer ~87m to 128m wide including a thick forested buffer to the west from potential future dwellings at the Site (see Fig. 5), specifically:
    a. Proposed lot 1 – exiting dwelling separation to rural land to the west including exiting Forest vegetation buffer = ~94m
    b. Proposed Lot 2 – exiting dwelling separation to rural land to the west including exiting Forest vegetation buffer = ~97m
    c. Proposed Lot 3 - dwelling envelope separation to rural land to the west including exiting Forest vegetation buffer = ~128m

d. Proposed Lot 7 - dwelling envelope separation to rural land to the west including exiting Forest vegetation buffer = ~ 87m
e. Proposed Lot 8 - dwelling envelope separation to rural land to the west including exiting Forest vegetation buffer = ~90m

4. Current separation buffer ~42m – 83m wide from respective building envelopes (see Fig. 5) from southern boundary of future subdivision, and planted Bangalow Palms row along southern boundary providing buffering, specifically:
    a. Proposed Lot 4 - dwelling envelope separation to rural land to the south including exiting Bangalow Palms planted row along boundary = ~83m
    b. Proposed Lot 5 - dwelling envelope separation to rural land to the south including exiting Bangalow Palms planted row along boundary = ~42m
    c. Proposed Lot 6 - dwelling envelope separation to rural land to the south including exiting Bangalow Palms planted row along boundary = ~42m

In summary, this LUCRA has duly appraised the potential conflicts which could arise from the proposal and has deemed that the building envelopes setbacks (i.e. buffers) detailed at points 3 & 4 are adequate to minimise future potential conflicts so that the agricultural potential of those lands will not be diminished.

6. References

GeoLINK 2020, *Biodiversity Constraints Mapping Lot 11 DP1141269*, dated 2 November 2020.

Earth Water Consulting 2020, *MLS and LCA at Nos. 9, 148 and 189 Gaudrons Road, Sapphire Beach*, Report ver. A, dated 25/11/2020.

Everick Heritage Pty Ltd 2020, *Gaudrons Road Subdivision Sapphire Beach, Draft Aboriginal Cultural Heritage Assessment,* written for Stephen Sawtell, November 2020.

Learmonth R., Whitehead R., Boyd B., & Fletcher S., 2007, *Living and Working in Rural Areas. A handbook for managing land use conflict issues on the NSW North Coast,* Centre for Coastal Agricultural Landscapes.

Department of Primary Industry (DPI) 2011, *Land Use Conflict Risk Assessment (LUCRA) Guide*, <http://www.dpi.nsw.gov.au/land-and-water/land-use/lup/development-assessment2/lucra>.

Milford H.B. 1999, *Soil Landscapes of the Coffs Harbour 1:100 000 Sheet - Department of Land and Water Conservation*, Sydney.

Appendices

Appendix A – Risk Ranking & Rating

Risk Ranking

The consequences (environmental/public health and amenity) are combined with a 'probability' (of those outcomes) in the Risk Ranking table to identify the risk rank of each environmental/public health and amenity impact.

Measure of Consequence (Severity of Environmental Impact) table

Level: 1	**Descriptor: Severe**
Description	• Severe and/or permanent damage to the environment • Irreversible • Severe impact on the community • Neighbours are in prolonged dispute and legal action involved
Example/ Implication	• Harm or death to animals, fish, birds or plants • Long term damage to soil or water • Odours so offensive some people are evacuated or leave voluntarily • Many public complaints and serious damage to Council's reputation • Contravenes Protection of the Environment & Operations Act and the conditions of Council's licences and permits. Almost certain prosecution under the POEO Act
Level: 2	**Descriptor: Major**
Description	• Serious and/or long-term impact to the environment • Long-term management implications • Serious impact on the community • Neighbours are in serious dispute
Example/ Implication	• Water, soil or air impacted, possibly in the long term • Harm to animals, fish or birds or plants • Public complaints. Neighbour disputes occur. Impacts pass quickly • Contravenes the conditions of Council's licences, permits and the POEO Act • Likely prosecution
Level:3	**Descriptor: Moderate**
Description	• Moderate and/or medium-term impact to the environment and community • Some ongoing management implications • Neighbour disputes occur
Example/ Implication	• Water, soil or air known to be affected, probably in the short term • No serious harm to animals, fish, birds or plants • Public largely unaware and few complaints to Council • May contravene the conditions of Council's Licences and the POEO Act • Unlikely to result in prosecution
Level: 4	**Descriptor: Minor**
Description	• Minor and/or short-term impact to the environment and community • Can be effectively managed as part of normal operations • Infrequent disputes between neighbours

Example/ Implication	• Theoretically could affect the environment or people but no impacts noticed • No complaints to Council • Does not affect the legal compliance status of Council
Level: 5	**Descriptor: Negligible**
Description	• Very minor impact to the environment and community • Can be effectively managed as part of normal operations • Neighbour disputes unlikely
Example/ Implication	• No measurable or identifiable impact on the environment • No measurable impact on the community or impact is generally acceptable

Probability (Measure of Likelihood of Risk) table

Level	Descriptor	Description
A	Almost certain	Common or repeating occurrence
B	Likely	Known to occur, or it has occurred
C	Possible	Could occur or 'I've heard it happening'
D	Unlikely	Could occur in some circumstances, but not likely to occur
E	Rare	Practically impossible

Risk Rating

The risk ranking matrix yields a risk ranking from 25 to 1. It covers each combination of five levels of 'probability' - a letter A to E as defined in **Probability (Measure of Likelihood of Risk) table** - and 5 levels of 'consequence', - a number 1 to 5 as defined in **Measure of Consequence (Severity of Environmental Impact) table** - to identify the risk ranking of each impact. For example an activity with a 'probability' of D and a 'consequence' of 3 yields a risk rank of 9

	Probability				
Consequence	**A**	**B**	**C**	**D**	**E**
1	25	24	22	19	15
2	23	21	18	14	10
3	20	17	13	9	6
4	16	12	8	5	3
5	11	7	4	2	1

	HIGH
	MEDIUM
	LOW

A risk rating of 20-25 would normally be deemed as an unacceptable risk
A risk rating of less than 20 would normally be deemed as an acceptable risk

Appendix B - Wind Direction Rose

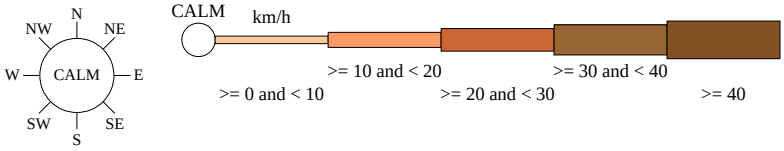
Source: Coffs Harbour MO Weather Station - Site number: 059040

Rose of Wind direction versus Wind speed in km/h (01 Feb 1943 to 24 Aug 2015)
Custom times selected, refer to attached note for details

COFFS HARBOUR MO

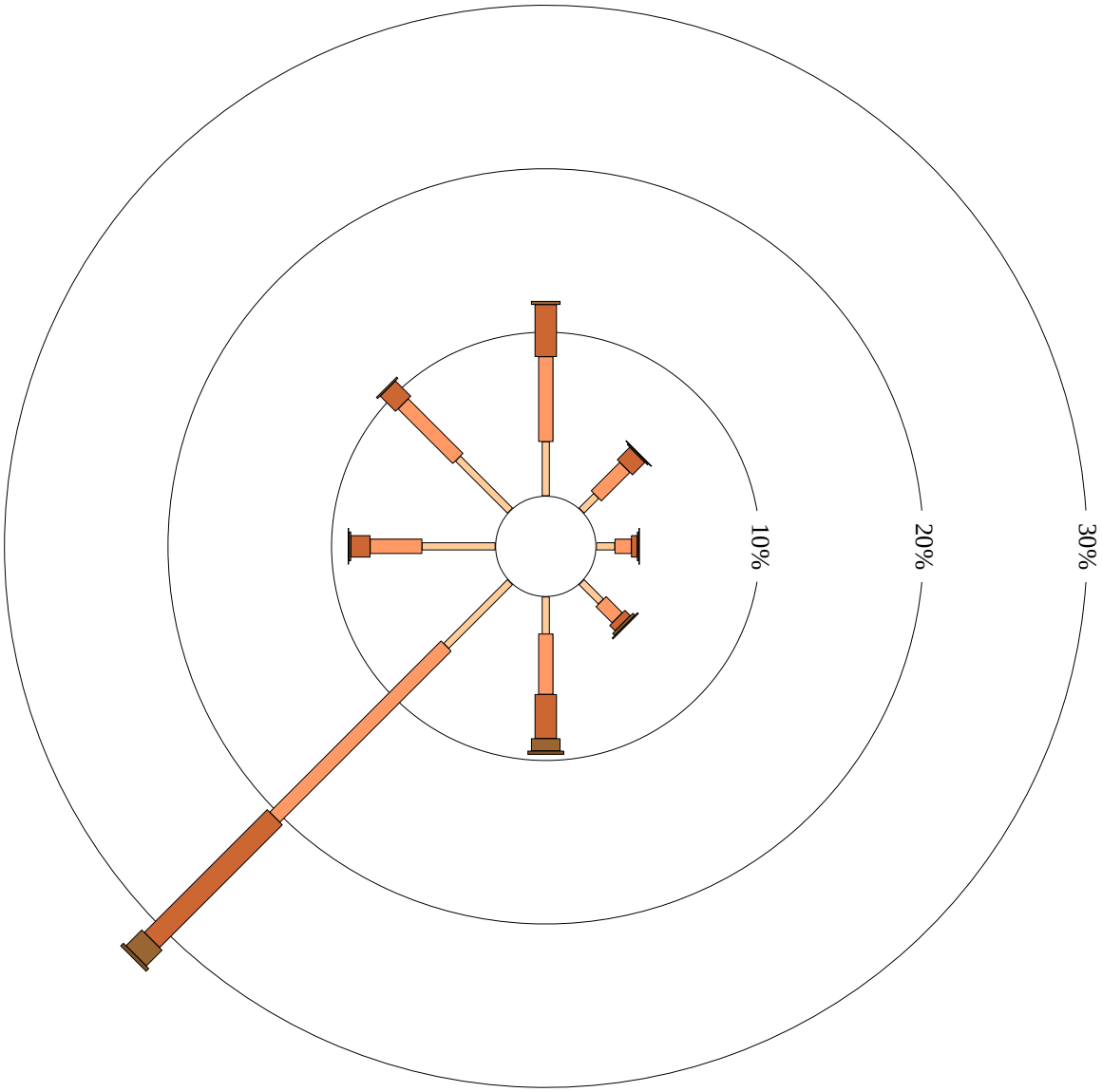
Site No: 059040 • Opened Jan 1943 • Closed Aug 2015 • Latitude: -30.3107° • Longitude: 153.1187° • Elevation 5m

An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.



9 am
24228 Total Observations

Calm 15%



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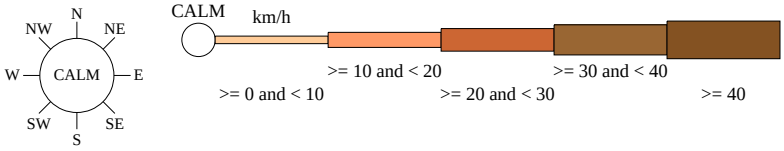
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Rose of Wind direction versus Wind speed in km/h (01 Feb 1943 to 24 Aug 2015)
Custom times selected, refer to attached note for details

COFFS HARBOUR MO

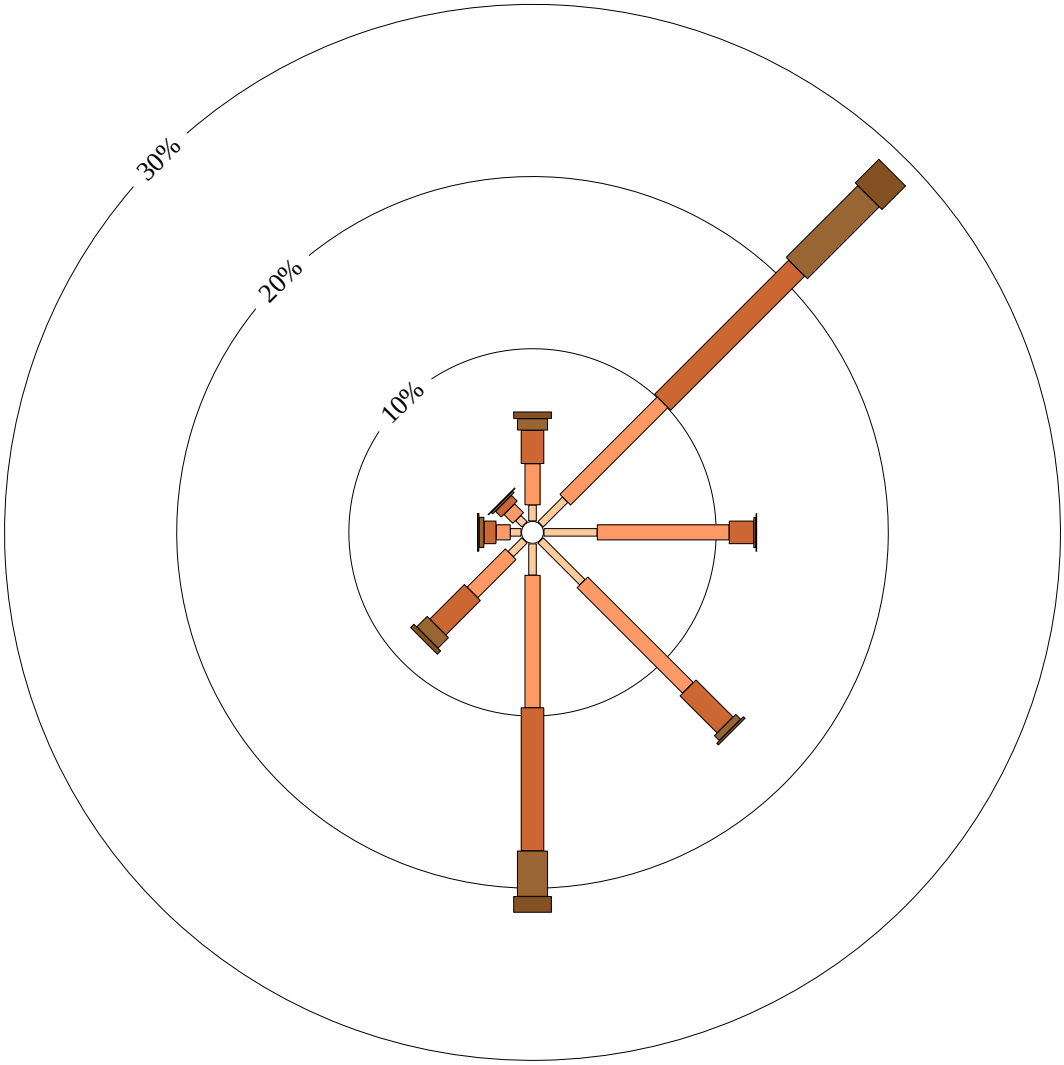
Site No: 059040 • Opened Jan 1943 • Closed Aug 2015 • Latitude: -30.3107° • Longitude: 153.1187° • Elevation 5m

An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.



3 pm
24262 Total Observations

Calm 3%



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LAND USE CONFLICT RISK ASSESSMENT
FOR PLANNING PROPOSAL
Lot 7 DP 555490
148-158 Gaudrons Road, Sapphire Beach, NSW



Prepared By: Paola Rickard
Land & Fire Assessments Pty Ltd
For: Kerrie Hunter
Project No.: LFA20041
Date: 1 April 2021

APPENDIX 9 - LAND USE CONFLICT RISK ASSESSMENT

Disclaimer

Land & Fire Assessments Pty Ltd (LFA) have conducted work concerning the environmental status of the site, which is the subject of this report, and has prepared this report on the basis of that assessment. The work was conducted, and the report has been prepared, in response to specific instructions from the client or a representative of the client and in reliance on certain data and information made available to LFA. The analysis, evaluations, opinions and conclusions presented in this report are based on that information, and they could change if the information is in fact inaccurate or incomplete.

Due consideration has been given to site conditions and to appropriate legislation and documentation available at the time of preparation of the report. As these elements are liable to change over time, the report should be considered current at the time of preparation only. Should further information become available regarding the conditions at the site, LFA reserves the right to review the report in the context of the additional information. LFA has made no allowance to update this report and has not taken into account events occurring after the time its assessment was conducted.

This report is intended for the sole use of the client and only for the purpose for which it was prepared. Any representation contained in the report is made only to the client unless otherwise noted in the report. Any third party who relies on this report or on any representation contained in it does so at his or her own risk

Revision List

Revision No.	Revision Date	Report Title	Report Author	Field Survey By	Status
00	03.02.2021	Land Use Conflict Risk Assessment for Lot 7 DP 555490, 148-158 Gaudrons Road, Sapphire Beach, NSW	Main Author: Paola Rickard (LFA - Senior Environmental Planner)	Paola Rickard undertaken on the 04.11.20	Final
01	01.04.21				Final

LFA contact details: Paola Rickard - 0427 809 352

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1. Introduction and Background

1.1 Introduction

Land & Fire Assessments Pty Ltd (LFA) has been commissioned by Kerri Hunter to prepare a Land Use Conflict Risk Assessment (LUCRA) to support the **Planning Proposal for Lot 7 DP 555490, 148-158 Gaudrons Road, Sapphire Beach, NSW**. The site is shown on Figs. 1 & 2. Sapphire Beach is located in the Coffs Harbour City Council (CHCC) Local Government Area (LGA) approximately 10 km north of Coffs Harbour.

This Planning Proposal applies to Lot 7 DP555490 (the Site), which is zoned RU2 Rural Landscape under the Coffs Harbour Local Environmental Plan (LEP) 2013 (refer to Fig. 4). The purpose of this Planning Proposal is to amend LEP 2013 to allow large lot residential development.

Pre-lodgement meeting notes from CHCC dated 17/06/20 indicated that a LUCRA is required to support this planning proposal.

Council planning provisions concerning the preparation of LUCRAs do not specify requirements to support a Planning Proposal. Therefore, this LUCRA has been undertaken following the CHCC Development Control Plan 2015 (DCP) provisions specified to support Development Applications for subdivisions, specifically:

- C1.5 SUBDIVISION-DESIGN REQUIREMENTS FOR RURAL AND LARGE LOT RESIDENTIAL ZONES

C1.5 also details the provisions regarding the preparation of a LUCRA. The relevant clause states:

> (2) Subdivisions are to incorporate **adequate buffers between dwelling envelopes and adjoining agricultural land to ensure that the agricultural potential of those lands will not be diminished** (refer to the Land Use Conflict Risk Assessment Guide prepared by the NSW Department of Primary Industries).

The LUCRA will address land use interface issues and risks between rural land uses and a future rural residential development. The LUCRA will be prepared in accordance with the Land Use Conflict Risk Assessment Guide, which has been promoted by the NSW Department of Primary Industries (DPI 2011) and is based on Learmonth *et al* (2007).

The purpose of the LUCRA is to identify landuse compatibility and potential conflict between neighbouring landuses, and therefore, assists in the identification of the potential for future landuse conflict. The LUCRA aims to:

- *Objectively assess the effect and level of proposed landuse on neighbouring land uses;*
- *Accurately identify the risk of conflict between neighbouring land uses;*
- *Complement development control and buffer requirements with an understanding of likely landuse conflict;*
- *Proactively address landuse issues and risks before a new landuse proceeds or before a dispute arises; and*
- *Highlight or recommend strategies to help minimise conflict and contribute to the negotiation, proposal, implementation and evaluation of separation strategies.*

In summary, the LUCRA is a tool aimed at:

- Identifying the effects of the landuse on neighbouring landuse; and
- Evaluate the level of impact of these effects.

In order to achieve those aims, a four-step assessment process is undertaken as follows:

1. **Information Gathering** – The site geophysical characteristics, the nature of the development proposed and the surrounding landuses are described.

2. **Risk Level Evaluation** - Each proposed activity is recorded and an assessment of potential landuse conflict level is assigned. The higher the risk level, the more attention it will require.
3. **Identification of Risk Mitigation Management Strategies** – Management strategies are identified which can assist in lowering the risk of potential conflict.
4. **Record Results –** Key issues, risk level and recommended management strategies are recorded and summarised.

Accordingly, this landuse conflict risk assessment will utilise the aforementioned four-step assessment process**.**

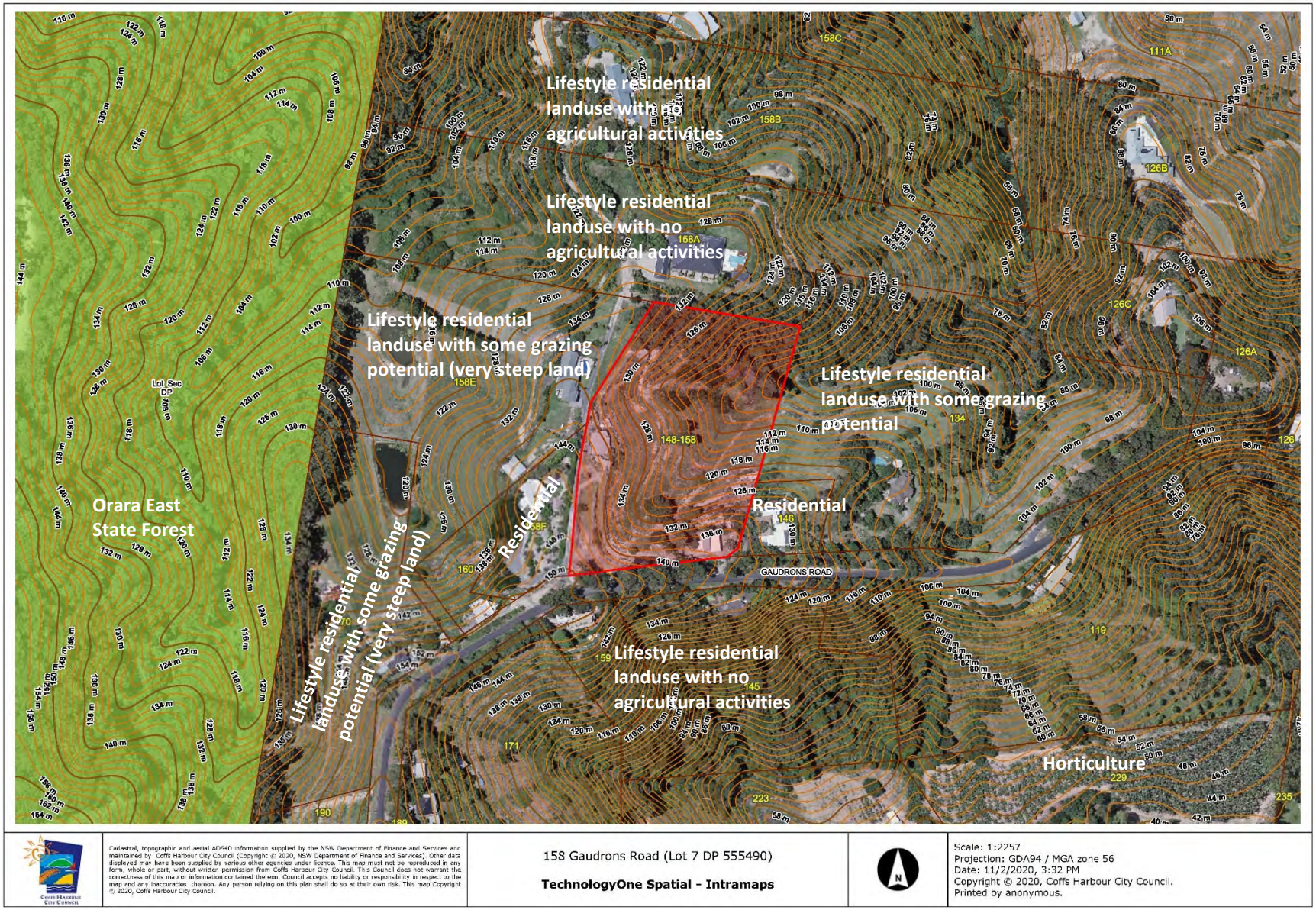


Figure 1. The Site (red boundary) within the locality context & predominant landuse. Source: CHCC Intramaps

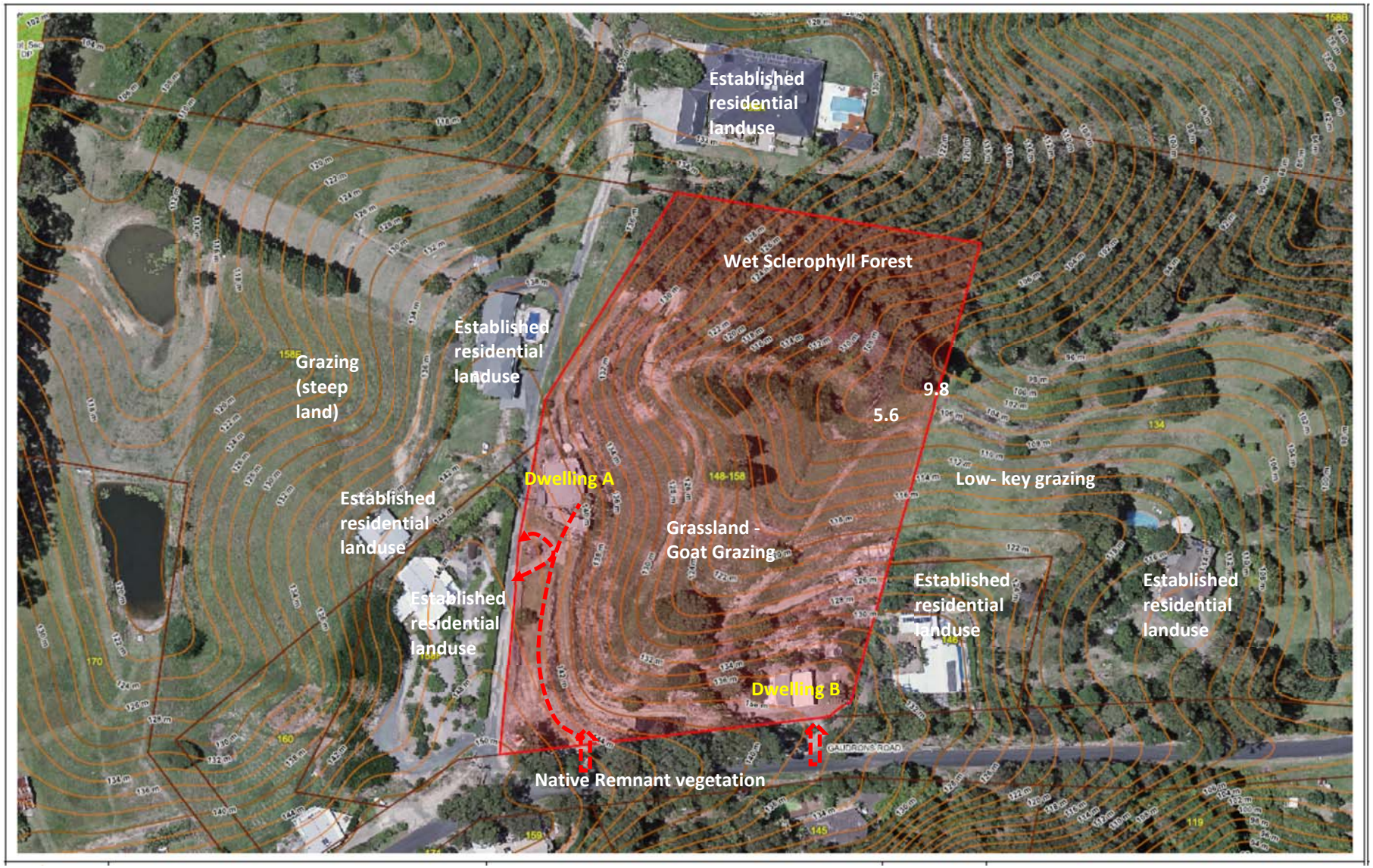


Figure 3. 148-158 Gaudrons Road (Lot 7 DP 555490) - Showing current access (red dashed line) to each existing dwelling, vegetation and landuse. Source: CHCC Intramaps

2. Information Gathering (Step 1)

2.1 The Subject Site

The Subject Site (i.e. Lot 7 DP555490), which is 2.05 Ha in size, is directly accessed from Gaudrons Road. The land in context with the locality is shown on Figs. 1 & 2. It entails a developed property utilised for rural residential landuse and low-level grazing by goats, as shown on Plates 1-13. Two approved dwellings, one to the west (Dwelling A at 158 Gaudrons Rd) and one to the south (Dwelling B at 148 Gaudrons Rd), and associated sheds and water tanks are present on the Site (Fig. 2 & Plates 1, 2, 6, 7 & 9). Each dwelling has separate access to Gaudrons Road (see Fig. 2 & Plates 4, 5, 10 to 13). In addition, a right of carriageway along western boundary provides alternative access to Dwelling A (Plate 13). Terracing and retaining walls are found on the sloping side of each dwelling (Plates 12, 6, 6 to 8). The Site is bounded by Gaudrons Road to the south and surrounded by predominantly lifestyle residential lots.

The Site is located ~1.6km west of the established residential areas of Sapphire Beach. Whilst the property and its immediate surrounds are zoned RU2 Rural landscape (see Fig. 4), the Site and the neighbouring land is identified in the 'Korora' and 'Sapphire Beach' potential Large Lot Residential (Zone R5) Candidate Areas in the Coffs Harbour LGA. The Site does not contain Biodiversity Values land and it is not located near High Values Habitats.

The Site, which consists of steep north east to east facing slope draining to the north east, is predominantly cleared with scattered trees and landscaping. Upslope to the north of the Site is a forested area consisting of Wet Sclerophyll Forest, as shown on Fig. 2. This vegetation is mapped as Tertiary Koala Habitat in CHCC GIS mapping. Along Gaudrons Road to the south is also predominantly Wet Sclerophyll Forest and Remnant vegetation.



Plate 1. Looking north towards the existing residential Dwelling A found along the western boundary. Note existing farm access tracks



Plate 2. Looking north west from the western Dwelling A towards the Forest vegetation on an upslope. Note terracing and retaining wall



Plate 3 (left). Looking south across the access point onto Gaudrons Rd for Dwelling A.



Plate 4 (right). Looking south along the access for Dwelling A



Plate 5 (left). Looking north further along across access to Dwelling A.



Plate 6 (top). Looking east, south east towards Dwelling B to the right of photo. Note extensive terracing and ~4-5m high retaining wall

Plate 7. Dwelling B, retaining wall & terracing



Plate 8. Looking westward from Dwelling B terrace towards Dwelling A left and Forest on upslope (right)



Plate 9 (top - photo collage). Dwelling B and surrounding grounds



Plate 10 (left). Looking westward along Gaudrons Rd, access point to Dwelling A to the right



Plate 11 (right). Looking eastward along Gaudrons Rd towards access point to Dwelling B



Plate 12 (left). Access to Dwelling B (148 Gaudrons Rd)

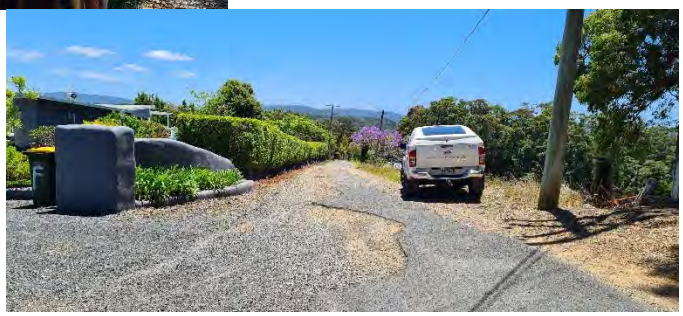


Plate 13 (right). Right of carriageway along western boundary to Site providing access to neighbouring land as well as alternative access to Dwelling A

Elevation at the Site ranges from 150m AHD to the south west corner to 103m AHD to the north east of the Site. The upper slopes have been previously terraced to assist with agricultural practices and numerous access tracks associated with a former banana plantation crisscross the property.

The surrounding vegetation includes the Wet Sclerophyll Forest to the north, north east and Wet Sclerophyll Forest to the south. Otherwise, the predominant vegetation surrounding the Site is Grassland and landscaped/managed land as shown on Figs. 1 & 2.

The soil landscape at Site is the 'Suicide' soil Landscape (Everick Heritage Pty Ltd 2020). The proposal Site is outside of the 100-year ARI Flood Extent.

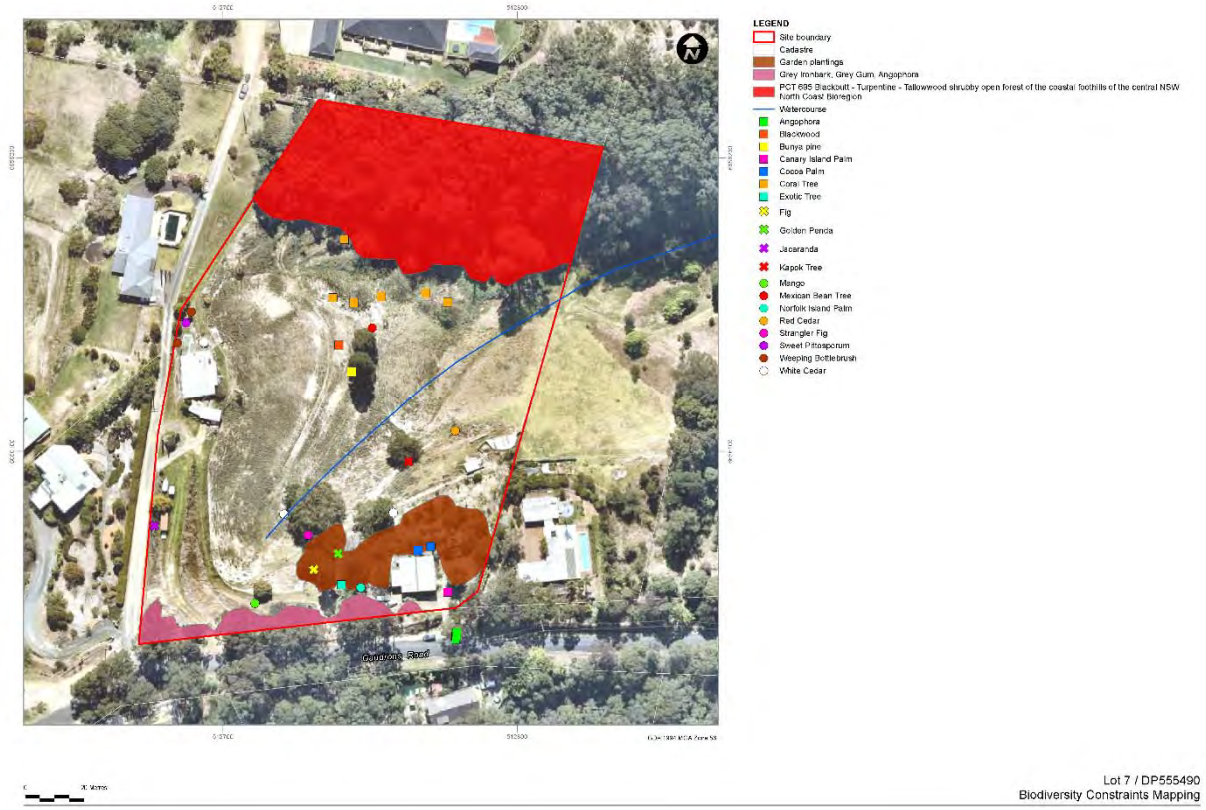


Figure 3. Vegetation mapping for the Site. Source: GeoLINK 2020 - Biodiversity Constraints Mapping

As noted previously, the Site is not mapped or is in proximity to Biodiversity Values land and it is not located near any sensitive ecosystems. The preliminary biodiversity mapping by GeoLINK indicate that no threatened plant species were recorded for the Site, as shown on Fig. 3. GeoLINK identify one Plant Community Types (PCT) as occurring at the Site namely, PCT 695 Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central North Coast. This PCT is not identified as a Threatened Ecological Community (TEC). In any case, it is not proposed to impact on the Forest vegetation occurring along the northern portion of the Site.

An Aboriginal Cultural Heritage Assessment (ACHA) has been undertaken by Everick Heritage Pty Ltd (2020). The ACHA findings regarding the Site indicate that considerable soil disturbance has occurred historically due cut and fill earthworks associated with the terracing and driveway entrance to the adjoining property. The ACHA concluded that that subdivision works within 148 Gaudrons Road are unlikely to impact on Aboriginal objects and will not impact on any known places or sites of cultural significance to the Aboriginal community. As such additional consultation and archaeological investigation is not required for this Site.

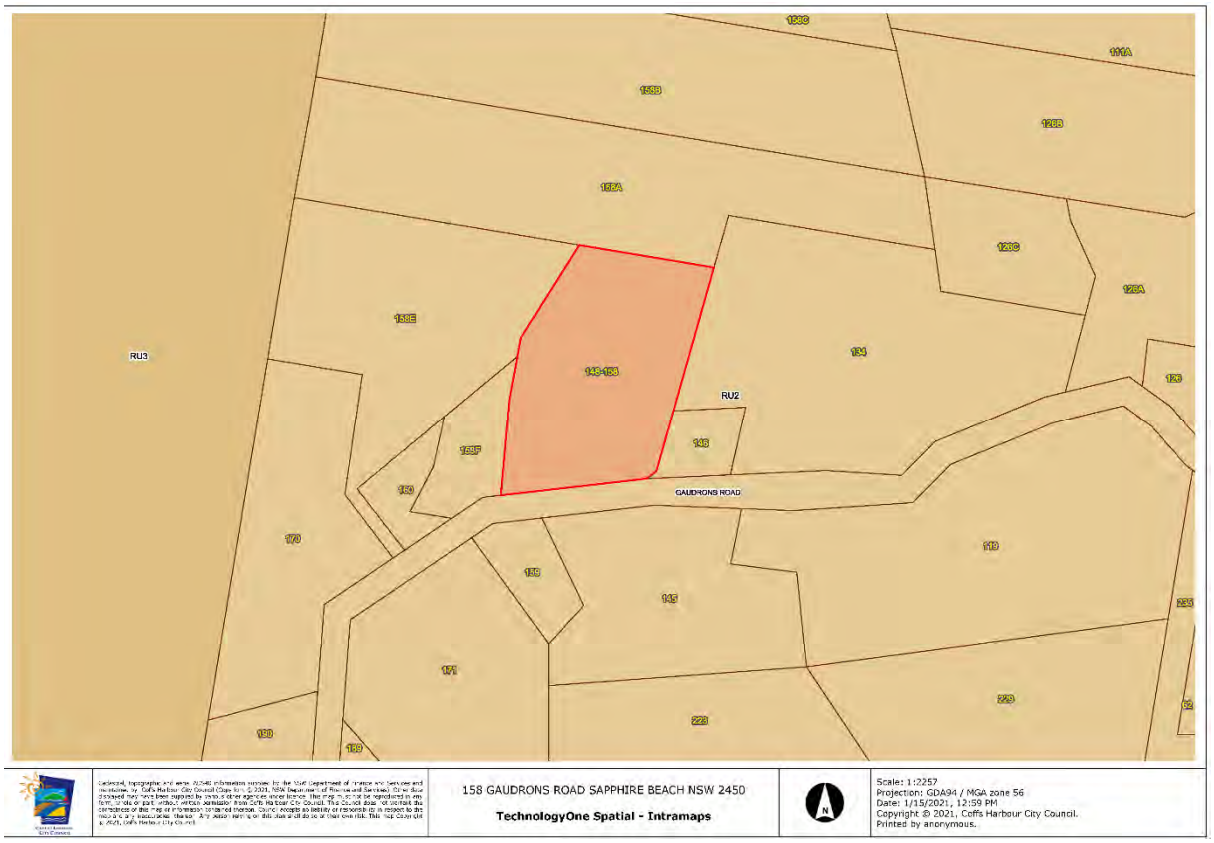


Figure 4. Land zoning applicable to the Site (red boundary).

2.2 Proposed Development & Planning Provisions

The purpose of this Planning Proposal is to amend LEP 2013 to allow large lot residential development on Lot 7 DP555490. The Planning Proposal will:

- Rezone the subject land from Zone RU2 Rural Landscape to Zone R5 Large Lot Residential; and
- Change to the Minimum Lot Size (MLS) for the new R5 zoned land from the current 40 hectares. A new MLS of 1Ha is sought for this precinct.

The proposed subdivision concept layout is shown as Fig. 5. Notably, the exiting dwellings and associated infrastructure would be retained within proposed lots 1 & 2 respectively.

The Site is identified in the 'Korora' and 'Sapphire Beach' potential Large Lot Residential (Zone R5) Candidate Areas in the Coffs Harbour LGA. The proposed rezoning is a compatible landuse on this land as the Site occurs in proximity to similar rural lifestyle residential development, and it is serviced by capable road infrastructure and electricity services. The proposed development Site is surrounded by predominantly rural (lifestyle) residential development and a public road. Importantly, the proposed rezoning and future subdivision is only contemplating the creation of two lots, each containing an existing approved dwelling serviced by separate access driveways. Therefore, no further intensification and/or change of landuse is proposed and the status quo will remain.

As noted in s. 1.1, pre-lodgement meeting notes from CHCC dated 17/06/20 indicated that a LUCRA is nevertheless required to support this planning proposal. Accordingly, a future subdivision will be required to address the CHCC DCP 2015 provisions, specifically:

- C1.5 SUBDIVISION-DESIGN REQUIREMENTS FOR RURAL AND LARGE LOT RESIDENTIAL ZONES

C1.5 also details the provisions regarding the preparation of a LUCRA. The relevant clause states:

> (2) Subdivisions are to incorporate **adequate buffers between dwelling envelopes and adjoining agricultural land to ensure that the agricultural potential of those lands will not be diminished** (refer

to the Land Use Conflict Risk Assessment Guide prepared by the NSW Department of Primary Industries).

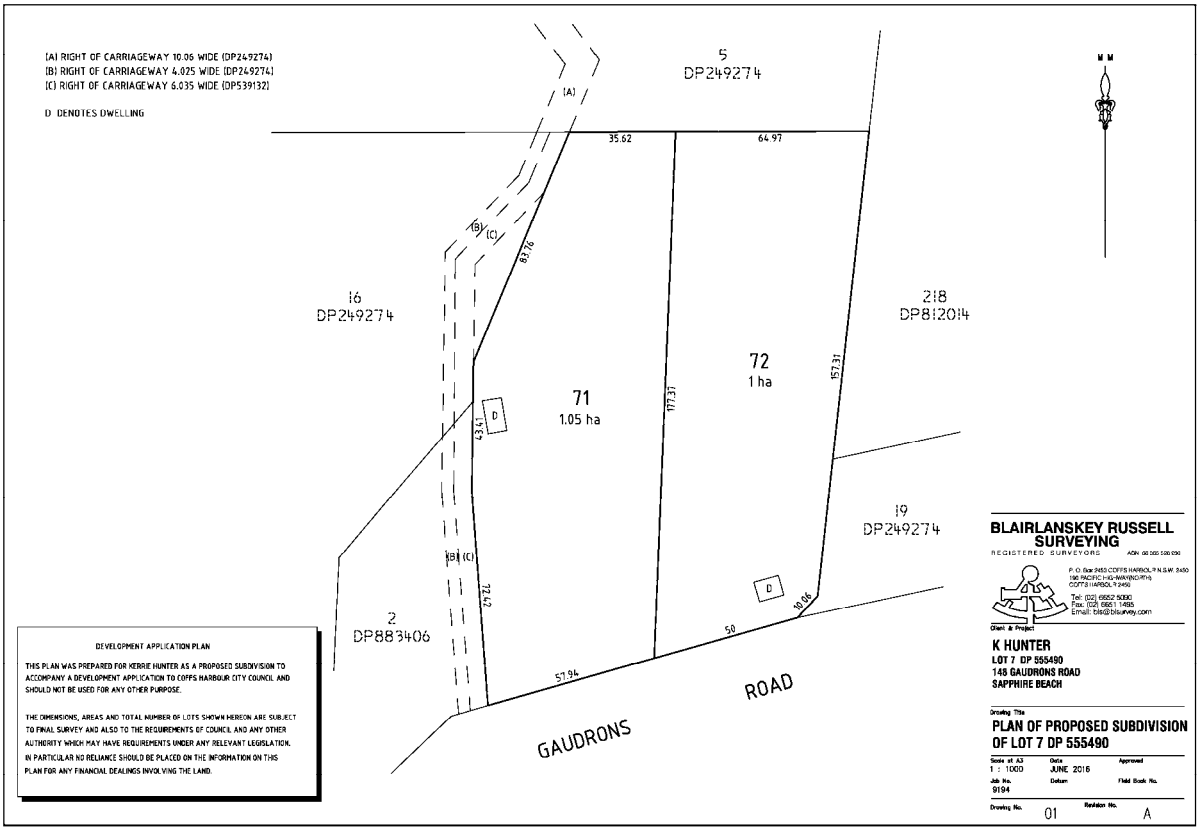


Figure 5. Proposed concept layout. Source: Earth Water Consulting (2020)

In summary, the proposed change in landuse from rural to large lot residential is to occur over a property currently utilised for low-key grazing by goats and residential landuse. The grazing is undertaken mainly as a landscaping/vegetation maintenance tool in conjunction with regular slashing. The current land management will continue to apply post rezoning (if approved).

The proposal area is bounded by predominantly lifestyle rural residential with no agricultural activities and Gaudrons Road (Fig. 2). Within the locality as shown in Fig. 1, some grazing or land potentially utilised for grazing (associated with lifestyle residential landuse) is found to the east and west. The closest intensive agricultural use consists of south facing orchards to the south east of the Site more than 200m away from the closest dwelling (B) and separated by thick forested land. Accordingly, the predominant landuse surrounding the planning proposal area is of a rural lifestyle residential nature and does not include intensive agricultural or horticultural landuse.

Nevertheless, this landuse conflict assessment will evaluate potential landuse conflict arising from the proposed large lot residential land uses and the surrounding RU2 Rural Landscape zoned land (see Fig. 4).

2.3 Site History and Land Use

Council GIS mapping indicate that banana cultivation has occurred at the Site from 1943 to 1994. However, any banana cultivation was long gone by 2004. In fact, review of Google aerial imagery shows that the current landuse (residential and low-key grazing) at the Site has not significantly changed since at least 2004. The southern portion of the Site was a little overgrown in 2004, but by 2010 the current grassland was fully established.

The surrounding properties have similarly remained consistent with the current landuse apart from the properties to the south of the Site, which supported banana plantation until around 2013. Since then, the banana plantation has been steadily cleared and only portion of this land (see Fig. 1) is currently under horticultural landuse. Council GIS mapping indicate that banana cultivation has occurred in the locality from 1943 to 1994. As noted previously, the land is bounded by Gaudrons Road to the south and rural lifestyle lots to the north, east and west. Two residential dwellings are found on Site as well as sheds, water tanks and several driveway accesses.

The land is zoned RU2 Rural landscape in the Coffs Harbour Local Environmental Plan 2013 (refer to Fig. 4).

2.4 Surrounding Land Use

Adjoining landuse to the planning proposal Site, which are illustrated on Figs. 1 & 2, are as follows:

- North: Lifestyle residential landuse with no agricultural activities
- East & west: Lifestyle residential landuse with some grazing potential and Residential to the south east
- South: Lifestyle residential landuse with no agricultural activities. The closest intensive agricultural use consists of south facing orchards to the south east of the Site more than 200m away from the closest dwelling (B) and separated by thick forested land.

The proposed large lots residential subdivision will be consistent with surrounding landuse. The predominant landuse surrounding the planning proposal area is of a rural residential nature and, apart for an orchard more than 200m away to the south east, does not include intensive agricultural or horticultural landuse. Nevertheless, this landuse conflict assessment will evaluate potential landuse conflict arising from the proposed residential land uses and the surrounding RU2 Rural Landscape zoned land (see Fig. 4).

2.5 Landuse Summary & Activities Arising from the Proposal

As noted, this landuse conflict assessment will evaluate potential landuse conflict arising from the proposed large lot residential land uses and the surrounding RU2 Rural Landscape zoned land (see Fig. 4). It is necessary to identify any potential causes for conflict, which may arise from the development of the Site. Table 1 summarises the proposal within the context of the locality and surrounding landuse and the activities/impacts which may occur on neighbouring properties.

Table 1. Activities likely to occur as a result of the proposal

Parameter	Details
The nature of the landuse change & development proposed	The proposal will result in the introduction of large lot residential landuse within land currently utilised for rural dual occupancy and low-key goat grazing. There are exiting dwellings/rural infrastructures at the Site.
The nature of the precinct where the land use change & development is proposed	The proposed change in lot size and potential large lot residential subdivision is to occur over currently rural land utilised for rural residential landuse. The proposal area is surrounded by some grazing land, rural lifestyle lots, roads and rural residential development.
Topography, climate & natural features	The Subject Site consists of a steep north-east to east facing slope draining to the north east. Elevation at the Site ranges from 150m AHD to the south west corner to 103m AHD to the north east of the Site. The upper slopes have been previously terraced to assist with agricultural practices and numerous access tracks associated with a former banana plantation crisscross the property. The surrounding vegetation includes the Wet Sclerophyll Forest to the north, north east and Wet Sclerophyll Forest to the south. Otherwise, the predominant vegetation surrounding the Site is Grassland and landscaped/managed land as shown on Figs. 1 & 2.

Parameter	Details
	The soil landscape at Site is the 'Suicide' Soil Landscape (Everick Heritage Pty Ltd 2020). This soil landscape consists of moderately deep to deep (>100 cm), well drained, stony structured Yellow Earths (Gn3.71) on crests and upper slopes, with stony Lithosols (Um1.41) and structured Red Earths (Gn3.11) on mid-slopes and footslopes (Milford 1999). The proposal Site is outside of the 100-year ARI Flood Extent. The climate in the Coffs Harbour LGA is typical of subtropical northern NSW, with warm summers and mild winters. The prevailing morning wind is from the southwest with calm conditions being experienced 15% of the time, and the prevailing afternoon winds are from the north east and south with calm conditions being experienced 3% of the time (refer to Appendix B - Wind Direction Rose from Coffs Harbour MO Weather Station - Site number: 059040)
Typical industries & land uses in the area	Industries: Predominantly grazing & horticulture Land uses: Residential, grazing, horticulture and rural lifestyle
The main activities of the proposed land use for the development & regularity of activity	The main activities associated with a proposed large lot residential subdivision are the same as the ones associated with the existing surrounding development these are: o Lifestyle rural residential development: o Activities: mowing, traffic = some noise - ongoing; o Construction activities = noise, dust, loss of amenity- high intensity short duration
The main activities of adjoining land uses & their regularity	Land to the west and east: o Lifestyle residential landuse with some grazing potential and Residential to the south east – o Activities: slashing, tractor use - some odour & noise– ongoing o Activities: mowing, traffic = some noise - ongoing; o Construction activities = noise, dust, loss of amenity- high intensity short duration Land to the far south east (more than 200m away from closest dwelling): o Horticulture (orchard) – o Activities: spraying, fertilising, slashing, tractor use - some spray drift, odour & noise– ongoing Land to north and south: o Lifestyle residential landuse with no agricultural activities - o Activities: mowing, traffic = some noise - ongoing; o Construction activities = noise, dust, loss of amenity- high intensity short duration
Compatibility of the proposal with surrounding land use issues	The proposal is wholly compatible with the predominant surrounding landuse, i.e. lifestyle residential landuse with no agricultural activities or with some grazing potential. However, there is a potential landuse conflict with possible intensification of small-scale rural activities to the west & east, in particular, where cleared land is found.

3. Risk Level Evaluation (Step 2)

3.1 Risk Evaluation & Ranking

As noted in Table 1, the main activities associated with the proposed development are the same as the ones associated with the predominant surrounding development (i.e. Lifestyle residential landuse with no agricultural activities or with some grazing potential). There is extensive forested vegetation bounding the proposal area to the north, north east and south, accordingly any potential rural landuse intensification on this neighbouring land would have be already be buffered by this extensive vegetation. Still, there is a potential for landuse conflict with possible intensification of small-scale rural activities to the west & east in particular where cleared land is found. Accordingly, the DCP provisions requires that buffers between dwelling envelopes and adjoining agricultural land are to be considered to ensure that the agricultural potential of those lands will not be diminished.

Thus, this assessment focuses on the adequacy of the following existing separation buffers between the current dwellings (see Fig. 2), which interface with the rural landuse to the west and east, namely:

- Dwelling A – exiting dwelling separation to potential rural land intensification to the west including exiting residential properties and landscaping = ~40m.
- Dwelling A – exiting dwelling separation to potential rural land intensification to the east including exiting property landscaping = ~106m.
- Dwelling B – exiting dwelling separation to potential rural land intensification to the west including exiting residential properties and landscaping = ~173m.
- Dwelling B – exiting dwelling separation to potential rural land intensification to the east including exiting property landscaping = ~45m.

Each proposed activity is recorded in Table 2 and an assessment of known landuse conflict level is assigned accordingly. Ranking is given before and after ameliorating measures are applied to mitigate the given activity impacts. The higher the risk level, the more attention it will require in order to reduce the ranking level. Risk rankings are derived from the risk ranking table attached as Appendix A.

Table 2. Risk Evaluation & Ranking

Activity	Identified Hazard	Risk Ranking	Control Methods	Controlled Ranking
o Building, access and services construction - intense activity, limited duration	Noise/Dust/Loss of Amenity	4C	o Adherence to approved daytime construction hours o Adherence to relevant legislation specifically re dust/noise management and implementation of erosion control measures o Good communication with neighbour	5C
Horticulture o Pesticide control- off-target movement of agricultural chemical - intense activity, limited duration o Fertiliser use, effluent disposal – intense activity, moderate duration o Noise from tractor use- occasional	Agricultural Chemical Spray Drift Odour noise	3B	o No likelihood of intensive horticulture in the immediate proximity of the two exiting dwellings because the allotments are small and thus unlikely to be viable for intense horticulture; landuse history confirms that neighbouring landuse has not changed since 2004; and extensive forested vegetation on steep slopes is unlikely to be cleared	5C

Activity	Identified Hazard	Risk Ranking	Control Methods	Controlled Ranking
			o Nearest existing orchard to the far south east (see Fig. 1) is more that 200m away from Dwelling B and 312m from Dwelling A o The orchard extent has been consistently reduced over the years and in any case is separated by Gaudrons Road and a thick forested buffer o The orchard occurs from an elevation of 50m AHD on a south facing slope, downslope from the Site (elevation 140m AHD) o Adherence to relevant legislation specifically re herbicide use/dust/noise management and implementation of erosion control measures	
Grazing o animals freely moving, some odour & noise o noise from occasional slashing	Some odour Some noise	4B	o Good communication with neighbour o ~40m – 173m wide respective current buildings setbacks to current and/or potential low-key grazing to the east and west o The setbacks areas include neighbouring residential properties with landscaped gardens and extensive lawns	5C
o Mowing - activity common within surrounding rural residential landuse and not significantly increased because of the proposal	Noise	N/A	none	N/A

3.2 Potential Conflict Issues (Risk Ratings)

In summary, the main issues arising from the proposed rezoning to residential use in respect to impact to current or future agricultural pursuits on the surrounding RU2 zoned land are:

- Noise/Dust/Loss of Amenity (temporary only) – from the building construction works
- Noise/Odour – from the low-key grazing to east and west (although neighbouring grazing land appears unutilized presently and it is also identified for potential Large Lot Residential Candidate Areas)
- Noise/Dust/Spray Drift – from intensive horticulture to the far south east (notably, it is highly unlikely that intensive horticulture will be undertaken in the future in the immediate proximity of the two exiting dwellings because the landholdings are small and thus unlikely to be viable for intense horticulture; landuse history confirms that neighbouring landuse has not changed since 2004; and extensive forested vegetation on steep slopes is unlikely to be cleared)

Table 2 gives a risk value for each of the above identified potential conflict areas before (Risk Ranking) and after (Controlled Ranking) a mitigating measure is applied. A rating of High, Medium and Low is then assigned to each risk ranking based on a combination of 'Probability' of occurrence and 'Consequence' from the activity. Thus, the rating of the potential landuse conflict risks identified on Table 2 is displayed on Table 3. **It must be noted that, the highlighted scoring shown on Table 3 reflects the impact rating for the Controlled Ranking values.**

Table 3. Landuse Conflict Risk Assessment Matrix (Yellow highlight = Risk Rating for Controlled Ranking)

		Likelihood of a dispute/conflict over land use/activity				
		Almost Certain (A)	**Likely (B)**	**Possible (C)**	**Unlikely (D)**	**Rare (E)**
Likely consequence from a dispute/conflict over land use/activity	**Major consequences & impacts almost certain (1)**	HIGH (25)	HIGH (24)	HIGH (22)	MEDIUM (19)	LOW (15)
	High consequences & impacts likely (2)	HIGH (23)	HIGH (21)	MEDIUM (18)	LOW (14)	LOW (10)
	Moderate consequences & impacts possible (3)	HIGH (20)	MEDIUM (17)	LOW (13)	LOW (9)	LOW (6)
	Minimal consequences & impacts unlikely (4)	MEDIUM (16)	LOW (12)	LOW (8)	LOW (5)	LOW (3)
	Low consequence & impacts rare (5)	LOW (11)	LOW (7)	LOW (4)	LOW (2)	LOW (1)

The resulting risk rating of 4 shown on Table 3, which corresponds to the Controlled Ranking values of 5C is deemed an acceptable risk (refer to Appendix A). **This is because the identified potential conflict areas can be mitigated effectively with appropriate controls (summarised in s.3.1 and detailed in s. 4) and therefore yields a 'Low' likelihood of conflict and impact**.

4. Risk Mitigation Management Strategies (Step 3)

4.1 Control Measures

A number of measures have been listed on Table 2 to mitigate the potential landuse conflict which might arise from the proposal. These are as follows:

1. Good communication with neighbour
2. Adherence to relevant legislation
3. ~40m to 173m wide setbacks from current buildings (A & B) to current and/or potential low-key grazing to the east and west. The setbacks areas include neighbouring residential properties with landscaped gardens and extensive lawns.
4. Current separation buffer to nearest existing orchard to the far south east (see Fig. 1) is more that 200m away from Dwelling B and 312m from Dwelling A, and
    a. The orchard extent has been consistently reduced over the years and in any case is separated by Gaudrons Road and a thick forested buffer, and
    b. The orchard occurs from an elevation of 50m AHD on a south facing slope, downslope from the Site (elevation 140m AHD).
5. The likelihood of intensive horticulture being undertaken in the immediate proximity of the two exiting dwellings is low because of the following reasons:
    a. the allotments are small and thus unlikely to be viable for intense horticulture;
    b. landuse history confirms that neighbouring landuse has not changed since 2004; and
    c. extensive forested vegetation on steep slopes is unlikely to be cleared

The following section will address in more detail the landuse buffer provisions.

4.2 Landuse Buffers

The DCP does not prescribe minimum buffers to adjoining agricultural landuse. Similarly, the LUCRA Guide (DPI 2011) does not specifically propose minimum buffers to agriculture landuse including grazing. It instead notes that the LUCRA process prompts land use managers to identify operators of adjacent properties to the effects of a proposed land use on neighbouring land, describe and record the main activities of the land uses, evaluate the type of activities on adjacent properties and their frequency, and finally identify the level of management strategies required to minimise such effects.

Accordingly, this assessment has evaluated this proposal in the context of the locality characteristics. It is noted that the current large lot residential and lifestyle rural residential landuse in the locality coexist with horticulture (where still undertaken) and grazing landuse. As identified in the historical review, the occurrence of banana plantations in the locality has steadily declined in recent times. The tendency to rural lifestyle occupancy rather than traditional rural landuse activities have similarly reshaped the locality. This is further evidence by the fact that the whole area surrounding the Site is identified in the 'Korora' and 'Sapphire Beach' potential Large Lot Residential (Zone R5) Candidate Areas in the Coffs Harbour LGA.

The rural landuse activities to the east and west of the proposal Site are currently limited to low level grazing and are unlikely to support intensive agriculture in the future. To the immediate north, south, east and west are lifestyle lots with manicured extensive lawns and no apparent agricultural pursuits. The closest intensive horticultural pursuit, separated by extensive forested vegetation, is an orchard more than 200m to the south east from the nearest Dwelling B.

There is extensive forested vegetation bounding the proposal area to the north, north east and south, accordingly any potential rural landuse intensification on this neighbouring land would have be already be buffered by this extensive vegetation.

As noted, the only areas in proximity of the Site, which supports current or potential grazing occur to the east and west. Any potential impacts (some odour and noise) on the existing dwellings at the Site from neighbouring grazing land are considered to be minor (risk raking of 4B = Low likelihood of conflict and impact), as shown on Table 2 even before available separation buffers are considered. In any case, setbacks are available ranging from ~40m to 173 m wide from the respective buildings. The setbacks areas include neighbouring residential properties with landscaped gardens and extensive lawns.

Importantly, the proposed rezoning and future subdivision is only contemplating the creation of two lots, each containing an existing approved dwelling serviced by separate access driveways. Therefore, no further intensification and/or change of landuse is proposed and the status quo will remain.

In summary, the proposed change in landuse from rural to large lot residential is to occur over a property currently utilised for low-key grazing by goats and residential landuse. The grazing is undertaken mainly as a landscaping/vegetation maintenance tool in conjunction with regular slashing. The current land management will continue to apply post rezoning (if approved).

Accordingly, this LUCRA has duly appraised the potential conflicts, which could arise from the proposal and has deemed that the control measures detailed in s. 4.1 are adequate to minimise future potential conflicts and ensure that the agricultural potential of the neighbouring rural lands will not be diminished.

5. Summary, Conclusion & Recommendations (Step 4)

This LUCRA has been commissioned by Kerri Hunter to support the **Planning Proposal for Lot 7 DP 555490, 148-158 Gaudrons Road, Sapphire Beach, NSW**

Essentially, it was found that the proposed rezoning is a compatible landuse on this land as the Site occurs in proximity to similar rural lifestyle residential development, and it is serviced by capable road infrastructure and electricity services. The proposed development Site is surrounded by predominantly rural (lifestyle) residential development and a public road. Importantly, the proposed rezoning and future subdivision is only contemplating the creation of two lots, each containing an existing approved dwelling serviced by separate access driveways. Therefore, no further intensification and/or change of landuse is proposed and the status quo will remain.

Hence, the proposal is wholly compatible with the predominant surrounding landuse, i.e. lifestyle residential landuse with no agricultural activities or with some grazing potential. There is extensive forested vegetation bounding the proposal area to the north, north east and south, accordingly any potential rural landuse intensification on this neighbouring land would have be already be buffered by this extensive vegetation. Still, there is a potential for landuse conflict with possible intensification of small-scale rural activities to the west & east in particular where cleared land is found.

Accordingly, the DCP provisions requires that buffers between dwelling envelopes (or existing dwellings in this case) and adjoining agricultural land are to be considered to ensure that the agricultural potential of those lands will not be diminished. The DCP does not prescribe minimum buffers to adjoining agricultural landuse. Similarly, the LUCRA Guide (DPI 2011) does not specifically propose minimum buffers to agriculture landuse including grazing and horticulture.

This assessment has evaluated this proposal in the context of the locality characteristics. It is noted that the current large lot residential and lifestyle rural residential landuse in the locality coexist with horticulture (where still undertaken) and grazing landuse. As identified in the historical review, the occurrence of banana plantations in the locality has steadily declined in recent times. The tendency to rural lifestyle occupancy rather than traditional rural landuse activities have similarly reshaped the locality. This is further evidence by the fact that the whole area surrounding the Site is identified in the 'Korora' and 'Sapphire Beach' potential Large Lot Residential (Zone R5) Candidate Areas in the Coffs Harbour LGA.

The rural landuse activities to the east and west of the proposal Site are currently limited to low level grazing and are unlikely to support intensive agriculture in the future. To the immediate north, south, east and west are lifestyle lots with manicured extensive lawns and no apparent agricultural pursuits. The closest intensive horticultural pursuit, separated by extensive forested vegetation, is an orchard more than 200m to the south east from the nearest Dwelling B.

In summary, the proposed change in landuse from rural to large lot residential is to occur over a property currently utilised for low-key grazing by goats and residential landuse. The grazing is undertaken mainly as a landscaping/vegetation maintenance tool in conjunction with regular slashing. The current land management will continue to apply post rezoning (if approved).

Following the risk evaluation, ranking and rating step by step process, a risk rating of 4 (see Table 3) was determined, which is deemed an acceptable risk. This is because the identified potential conflict areas can be mitigated effectively with appropriate control and therefore results in a 'Low' likelihood of conflict and impact.

The control measures to be implemented to reduce the risk of landuse conflict are as follows:

1. Good communication with neighbour
2. Adherence to relevant legislation
3. ~40m to 173m wide setbacks from current buildings (A & B) to current and/or potential low-key grazing to the east and west. The setbacks areas include neighbouring residential properties with landscaped gardens and extensive lawns.
4. Current separation buffer to nearest existing orchard to the far south east (see Fig. 1) is more that 200m away from Dwelling B and 312m from Dwelling A, and
    a. The orchard extent has been consistently reduced over the years and in any case is separated by Gaudrons Road and a thick forested buffer, and
    b. The orchard occurs from an elevation of 50m AHD on a south facing slope, downslope from the Site (elevation 140m AHD)
5. The likelihood of intensive horticulture being undertaken in the immediate proximity of the two exiting dwellings is low because of the following reasons:
    a. the allotments are small and thus unlikely to be viable for intense horticulture;
    b. landuse history confirms that neighbouring landuse has not changed since 2004; and
    c. extensive forested vegetation on steep slopes is unlikely to be cleared

In conclusion, this LUCRA has duly appraised the potential conflicts, which could arise from the proposal and has deemed that the control measures detailed in s. 4.1 are adequate to minimise future potential conflicts and ensure that the agricultural potential of the neighbouring rural lands will not be diminished.

6. References

GeoLINK 2020, *Biodiversity Constraints Mapping Lot 11 DP1141269*, dated 2 November 2020.

Earth Water Consulting 2020, *MLS and LCA at Nos. 9, 148 and 189 Gaudrons Road, Sapphire Beach*, Report ver. A, dated 25/11/2020.

Everick Heritage Pty Ltd 2020, *Gaudrons Road Subdivision Sapphire Beach, Draft Aboriginal Cultural Heritage Assessment,* written for Stephen Sawtell, November 2020.

Learmonth R., Whitehead R., Boyd B., & Fletcher S., 2007, *Living and Working in Rural Areas. A handbook for managing land use conflict issues on the NSW North Coast,* Centre for Coastal Agricultural Landscapes.

Department of Primary Industry (DPI) 2011, *Land Use Conflict Risk Assessment (LUCRA) Guide*, <http://www.dpi.nsw.gov.au/land-and-water/land-use/lup/development-assessment2/lucra>.

Milford H.B. 1999, *Soil Landscapes of the Coffs Harbour 1:100 000 Sheet - Department of Land and Water Conservation*, Sydney.

Appendices

Appendix A – Risk Ranking & Rating

Risk Ranking

The consequences (environmental/public health and amenity) are combined with a 'probability' (of those outcomes) in the Risk Ranking table to identify the risk rank of each environmental/public health and amenity impact.

Measure of Consequence (Severity of Environmental Impact) table

Level: 1	**Descriptor: Severe**
Description	• Severe and/or permanent damage to the environment • Irreversible • Severe impact on the community • Neighbours are in prolonged dispute and legal action involved
Example/ Implication	• Harm or death to animals, fish, birds or plants • Long term damage to soil or water • Odours so offensive some people are evacuated or leave voluntarily • Many public complaints and serious damage to Council's reputation • Contravenes Protection of the Environment & Operations Act and the conditions of Council's licences and permits. Almost certain prosecution under the POEO Act
Level: 2	**Descriptor: Major**
Description	• Serious and/or long-term impact to the environment • Long-term management implications • Serious impact on the community • Neighbours are in serious dispute
Example/ Implication	• Water, soil or air impacted, possibly in the long term • Harm to animals, fish or birds or plants • Public complaints. Neighbour disputes occur. Impacts pass quickly • Contravenes the conditions of Council's licences, permits and the POEO Act • Likely prosecution
Level:3	**Descriptor: Moderate**
Description	• Moderate and/or medium-term impact to the environment and community • Some ongoing management implications • Neighbour disputes occur
Example/ Implication	• Water, soil or air known to be affected, probably in the short term • No serious harm to animals, fish, birds or plants • Public largely unaware and few complaints to Council • May contravene the conditions of Council's Licences and the POEO Act • Unlikely to result in prosecution
Level: 4	**Descriptor: Minor**
Description	• Minor and/or short-term impact to the environment and community • Can be effectively managed as part of normal operations • Infrequent disputes between neighbours

Example/ Implication	• Theoretically could affect the environment or people but no impacts noticed • No complaints to Council • Does not affect the legal compliance status of Council
Level: 5	**Descriptor: Negligible**
Description	• Very minor impact to the environment and community • Can be effectively managed as part of normal operations • Neighbour disputes unlikely
Example/ Implication	• No measurable or identifiable impact on the environment • No measurable impact on the community or impact is generally acceptable

Probability (Measure of Likelihood of Risk) table

Level	Descriptor	Description
A	Almost certain	Common or repeating occurrence
B	Likely	Known to occur, or it has occurred
C	Possible	Could occur or 'I've heard it happening'
D	Unlikely	Could occur in some circumstances, but not likely to occur
E	Rare	Practically impossible

Risk Rating

The risk ranking matrix yields a risk ranking from 25 to 1. It covers each combination of five levels of 'probability' - a letter A to E as defined in **Probability (Measure of Likelihood of Risk) table** - and 5 levels of 'consequence', - a number 1 to 5 as defined in **Measure of Consequence (Severity of Environmental Impact) table** - to identify the risk ranking of each impact. For example an activity with a 'probability' of D and a 'consequence' of 3 yields a risk rank of 9

	Probability				
Consequence	**A**	**B**	**C**	**D**	**E**
1	25	24	22	19	15
2	23	21	18	14	10
3	20	17	13	9	6
4	16	12	8	5	3
5	11	7	4	2	1

	HIGH
	MEDIUM
	LOW

A risk rating of 20-25 would normally be deemed as an unacceptable risk
A risk rating of less than 20 would normally be deemed as an acceptable risk

Appendix B - Wind Direction Rose

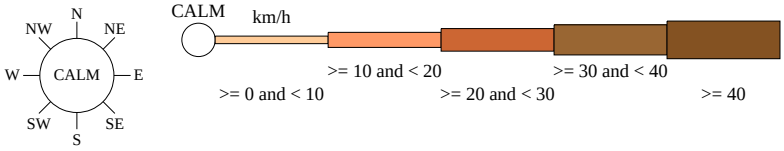
Source: Coffs Harbour MO Weather Station - Site number: 059040

Rose of Wind direction versus Wind speed in km/h (01 Feb 1943 to 24 Aug 2015)
Custom times selected, refer to attached note for details

COFFS HARBOUR MO

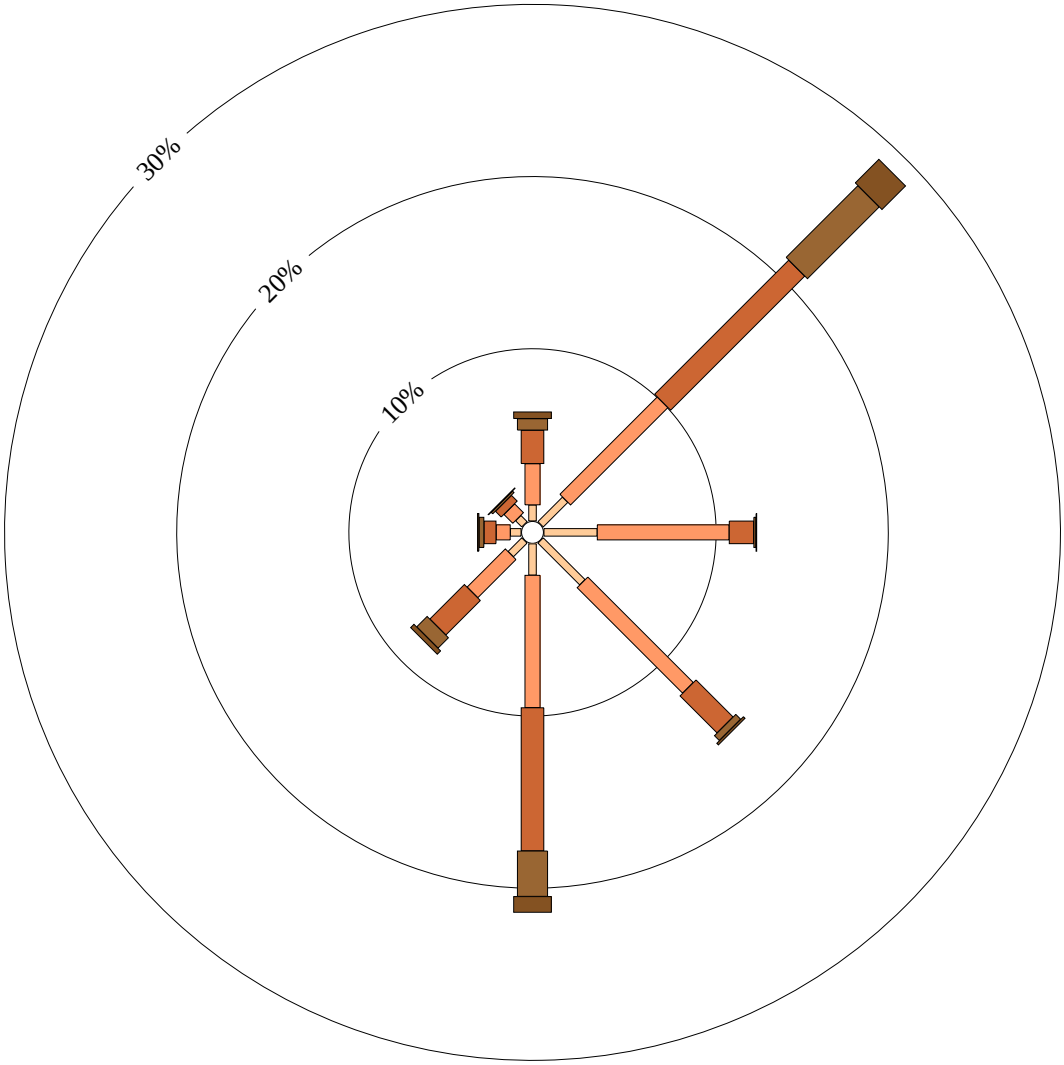
Site No: 059040 • Opened Jan 1943 • Closed Aug 2015 • Latitude: -30.3107° • Longitude: 153.1187° • Elevation 5m

An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.



3 pm
24262 Total Observations

Calm 3%



Australian Government
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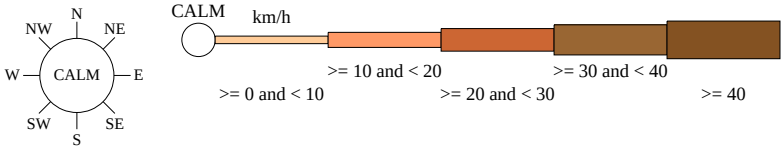
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Rose of Wind direction versus Wind speed in km/h (01 Feb 1943 to 24 Aug 2015)
Custom times selected, refer to attached note for details

COFFS HARBOUR MO

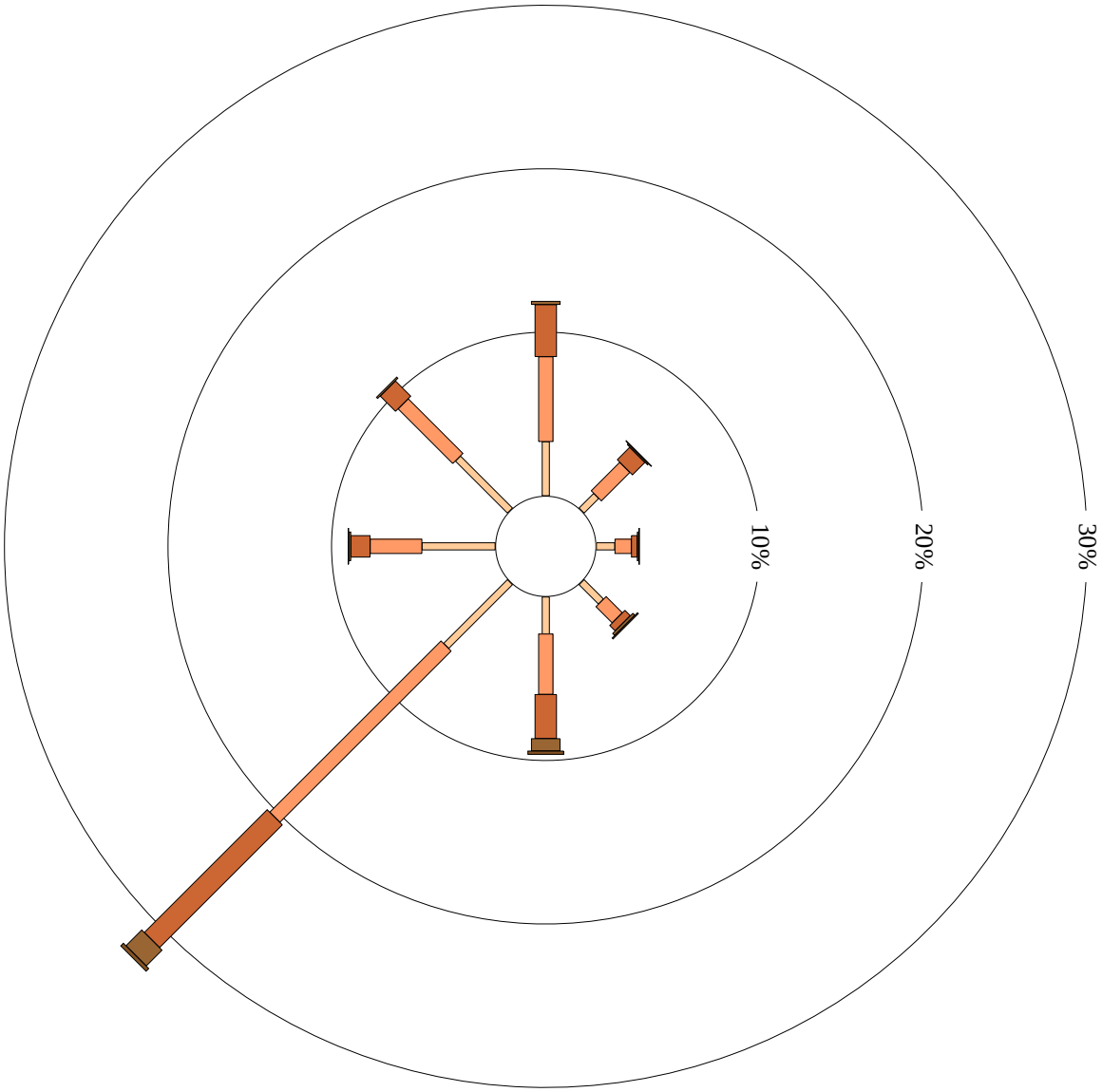
Site No: 059040 • Opened Jan 1943 • Closed Aug 2015 • Latitude: -30.3107° • Longitude: 153.1187° • Elevation 5m

An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.



9 am
24228 Total Observations

Calm 15%



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Report

Noise Assessment for Rezoning

9 Gaudrons Rd, Sapphire Beach

FactorXSolutions

16 February, 2021
Rev 1 (Final)

Report Details

Noise Assessment for Rezoning - 9 Gaudrons Rd, Sapphire Beach

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Date	Revision	Comments
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Endorsements

Function	Signature	Name and Title	Date
Prepared by		Natasha Pegler Acoustic Scientist	16 February, 2021
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APPENDICES

Appendix I Development near Rail Corridors and Busy Roads: Appendix C - Acoustic Treatment of Residences

Appendix II Modelling Results

1. INTRODUCTION

Advitech Pty Limited (trading as Advitech Environmental) was engaged by FactorX Solutions to conduct a noise assessment for the property at 9 Gaudrons Rd, Sapphire Beach. A proposal exists to rezone the land at this address for residential use, and then divide the lots into multiple residential addresses. As the land is adjacent to the Pacific Motorway, a noise assessment is required in order to determine the exposure of potential residences to road noise, and provide recommendations for management of potential road noise impacts.

It should be noted that this report was prepared by Advitech Pty Limited for FactorXSolutions ('the customer') in accordance with the scope of work and specific requirements agreed between Advitech and the customer. This report was prepared with background information, terms of reference and assumptions agreed with the customer. The report is not intended for use by any other individual or organisation and as such, Advitech will not accept liability for use of the information contained in this report, other than that which was intended at the time of writing. It should also be noted that information contained within any draft report is subject to change as a result of final checking or the availability of additional information.

2. BACKGROUND AND OBJECTIVES

This assessment concerns the property at 9 Gaudrons Rd, Sapphire Beach. The property is located immediately west of the Pacific Highway, adjacent to the Sapphire Beach interchange. A horticultural business currently operates on the site; however the proponent seeks to rezone subdivide the property into residential housing blocks.

As part of determining the suitability of the area for residential housing, an assessment of noise impacts from the Pacific Motorway is required. This assessment will use the guidelines in the NSW Road Noise Policy (RNP) and *Development near Rail Corridors and Busy Roads* (DNRCBR) to determine the suitability of the site for residential development (including any requirements for noise mitigation). An aerial image of the current site and surrounds is provided in **Figure 1**.



Figure 1: Monitoring locations at 9 Gaudrons Rd

9 Gaudrons Road ( ) and Pacific Highway ( ). Attended monitoring locations are marked ( )

3. METHODOLOGY

Road noise levels across the site were evaluated using noise propagation modelling software Predictor. In order to accurately evaluate road noise at the site, the local traffic volumes and road conditions must be accounted for in the model. Modelled noise levels may be then compared to limit conditions, and recommendations made for potential noise mitigation requirements.

3.1 Assessment of Road Noise Impacts

Guidelines for the assessment of road traffic noise are provided by the NSW RNP and DNRCBR. The RNP establishes the following guidance on acceptable noise levels for *existing* residential receivers adjacent:

- existing motorways or arterial roads:
  - day period (7am to 10pm): external $L_{Aeq,15hour}$ 60dB(A)
  - night period (10pm to 7am): external $L_{Aeq,9hour}$ 55dB(A)
- new motorways or arterial roads:
  - day period (7am to 10pm): external $L_{Aeq,15hour}$ 55dB(A)
  - night period (10pm to 7am): external $L_{Aeq,9hour}$ 50dB(A)

While the RNP provides context around acceptable noise levels, the DNRCBR supports the practical implementation of the Infrastructure SEPP (2008) and establishes requirements for assessment of *new* residential developments adjacent to existing busy roads. For the purposes of the DNRCBR, a busy road is defined as:

- any road specified in Clause 102 of the Infrastructure State Environmental Planning Policy (SEPP); or
- any other road with an average annual daily traffic (AADT) volume of more than 20,000 vehicles.

The DNRCBR provides guidance on acceptable *internal* noise levels for new residential development adjacent to busy roads (or rail corridors). These internal noise goals may be applied in lieu of external noise limits for the purposes of assessing acceptability of a development. The internal noise level goals outlined in the DNRCBR (via the Infrastructure SEPP) are:

- 35dB(A) for bedrooms during the night-time period; and
- 40dB(A) for other habitable rooms.

Paired with an understanding of road traffic noise levels at the development site, the DNRCBR also provides guidance on typical acoustic treatments that would be required to achieve the internal noise level goals. Specific requirements for acoustic treatment may be referenced against DNRCBR 'Categories of Noise Control Treatment' as a means of:

- evaluating the level of development constraint that road traffic noise may impose on the site,
  - and used to identify areas where residential development may be unsuitable (based on noise levels) or prohibitively costly (based on acoustic treatment requirements); and / or
- providing recommendations for acoustic treatment that may subsequently be adopted as a condition of any development approval.

The DNRCBR establishes treatment categories 1 through 6. Category 1 represents the lowest level of noise mitigation, whereas Category 6 indicates a high level of road noise impact and typically carries recommendation for professional design of acoustic treatment. The DNRCBR treatment categories are often used in concert with road traffic noise contours to map acoustic requirements (if any) across the development site. That methodology is applied to this assessment.

3.2 Site Inspection

In order to determine the effect of existing road conditions on noise levels, a series of attended and unattended noise measurements were undertaken on 26 November and 8 December 2020. During these measurements, sound level meters recorded noise levels at various locations on the site (marked in **Figure 1**). At the same time, traffic movements for both directions on the Pacific Highway were counted for a period of one hour (via manual survey).

Traffic on the exit ramp to Gaudrons Rd was not counted. This road segment is much lower volume and slower speed than the Pacific Highway and site topography also provides significant shielding of this carriageway. Noise contributions from this road segment were expected to be minimal, and this was confirmed as part of initial site inspection and evaluation of road noise impacts.

The equipment used for noise measurements is listed in **Table 1**, and the vehicle counts and measured levels during monitoring are given in **Table 2**. These values are used as inputs to the validation model detailed in **Section 3.4**. The sound level meters were calibrated before and after the measurements, and the calibrations were found to be within 0.5 dB.

Table 1: Monitoring Equipment

Make / Model	Serial no.	Last Calibrated
ARL EL-316	16-203-513	22/3/2018
SVAN 971	60686	23/4/2020
SVAN SV-30A	7906	24/7/2020

Table 2: Attended Monitoring Results

Date & Time	Measurement Location	Measured Level ($L_{Aeq,1hr}$)	Light Vehicles		Heavy Vehicles	
			Northbound	Southbound	Northbound	Southbound
26 Nov 12:35	Northeast	62	842	789	56	74
26 Nov 12:35	South	53				
8 Dec 6:40	Northeast	62	582	1128	104	77

3.3 Traffic Volume Calculations

Traffic volumes used in this assessment were taken from the 2019 Coffs Harbour Bypass Environmental Impact Statement (EIS) – Appendix G (Noise and Vibration Assessment). This document provides projected traffic volumes for the opening year of the bypass (2024) and ten years afterward (2034). These volumes are listed at various points on the bypass; the northernmost point is the closest to the section of motorway under assessment in this report and so these values were adopted. The relevant vehicle speed was listed as 110 km/hr.

The Coffs Harbour EIS includes average one-hour light and heavy vehicle volumes for daytime (7am-10pm) and night-time (10pm-7am). These 1-hour average data were used to evaluate volumes relevant to the day (15hours) and night (9hours) period. The relevant traffic volumes are stated in **Table 3**.

Table 3: Modelled Traffic Volumes

Time	Direction	Average Hourly Volume		Heavy Vehicle %	
		2024	2034	2024	2034
Day	Northbound	726	851	12%	12%
	Southbound	843	912	10%	10%
Night	Northbound	267	379	17%	17%
	Southbound	301	374	13%	13%

3.4 Noise Model

Open source terrain data representative of the site and surrounds was obtained via query of the ELVIS – Elevation and Depth – Foundation Spatial Data portal. The query returned a series of Tiled 1km x 1km Digital Elevation Models (DEM) for the domain; these were merged and analysed (extraction of 2m contour intervals) using QGIS (an open source Geographic Information System software package).

Following assembly of terrain data, a noise model representing the site was constructed in Predictor (version 8.11). The model was run using the Calculation of Road Traffic Noise (CoRTN) algorithm, with road surface and inclination adjustments used as variables during the validation process.

Initially, the model was validated by constructing 1-hour traffic flows equivalent to those observed by manual traffic counts during the attended noise measurements. The resulting calculated levels at the attended monitoring positions were compared to measured levels during the attended monitoring; the results are compared in **Table 4**.

Table 4: Model Validation

Date & Location	Measured ($L_{Aeq,1h}$)	Modelled ($L_{Aeq,1h}$)	Difference
25 Nov Northeast	62	61	-0.3
25 Nov South	53	54	0.3
8 Dec Northeast	62	62	0.1

As the modelled levels are within 2 dB of the measured levels, the model is considered to be valid in accordance with the *Noise Model Validation Guideline.* Once successfully validated, the model was run again using the longer term traffic volume data provided in **Table 3** . Final versions of the model were then run using a gridded receiver layer, enabling extrapolation of road traffic noise level contours across the site.

3.5 Assessment of Suitability and Recommendations for Acoustic Treatment

Once road traffic noise levels across the site are understood, evaluation of site suitability (or requirements for acoustic treatment) may be undertaken in line with the DNRCBR. Noise contours may be used to map acoustic constraints, and condition requirements for acoustic treatment across the site. In providing this analysis, it must be noted that as the design and placement of the residences (or subdivision Lots) has not yet been determined, potential shielding of houses positioned behind other houses was not accounted for. This ensures the assessment represents the 'worst case' impacts. Levels were calculated at a height of 1.5 metres, appropriate for a single storey residence.

4. RESULTS

The DNRCBR provides information regarding construction categories which are appropriate to facades receiving various levels of road noise. These construction categories are designed to ensure new residences constructed near existing busy roads are able to achieve appropriate internal levels (gas established in Table 3.1 of the DNRCBR and reproduced in **Section 3.1**) so that residential amenity is not affected. The aim of this report is to map out the requirements for the DNRCBR construction categories that would apply to any residences that may be constructed on the site.

Modelled noise levels associated with road traffic on the Pacific Highway were used to infer the relevant DNRCBR construction categories across the site. Examination of the modelling results indicates that the 10-year horizon (2034) daytime (7am-10pm) noise levels show the greatest potential for noise impacts on residences. As such, these results are used as the basis for recommendations. The relationship between noise levels and DNRCBR construction categories was inferred from:

- modelled external road noise levels;
- acceptable internal noise levels;
- typical noise reductions provided by glazing (as this is typically the acoustically weakest point of a dwelling).

Analysis provided in **Table 5** and **Figure 2** indicate the level of acoustic treatment (as per the DNRCBR construction category) that would be required for residential dwellings across the site to ensure internal noise levels consistent with the requirements of the DNRCBR.

Table 5: Construction Tiers

Construction Category	Façade Noise Level (L_{Aeq})[1]	Additional Comments
Category 1	35-49	Alternative ventilation should be provided (so that residents may keep windows closed)
Category 2	49-52	Alternative ventilation should be provided (so that residents may keep windows closed)
Category 3	52-57	Alternative ventilation should be provided (so that residents may keep windows closed)
Category 4	57-60	Alternative ventilation should be provided (so that residents may keep windows closed)
Category 5	60-68	Specialist acoustic advice is required for entry doors located in these areas. Alternative ventilation should be provided (so that residents may keep windows closed)

Note 1: Façade noise levels included in **Table 5** represent free field road noise levels, while analysis of construction categories presented in **Figure 2** does include a +2.5dB façade correction.

Further detail outlining the requirements of each construction categories (as per DNRCBR appendix C) are included as **Appendix I** of this report. It is noted that jagged lines present in contour plots are cosmetic, and an artefact of the contour calculation. Noise contour maps for all modelled periods are included in **Appendix II**.

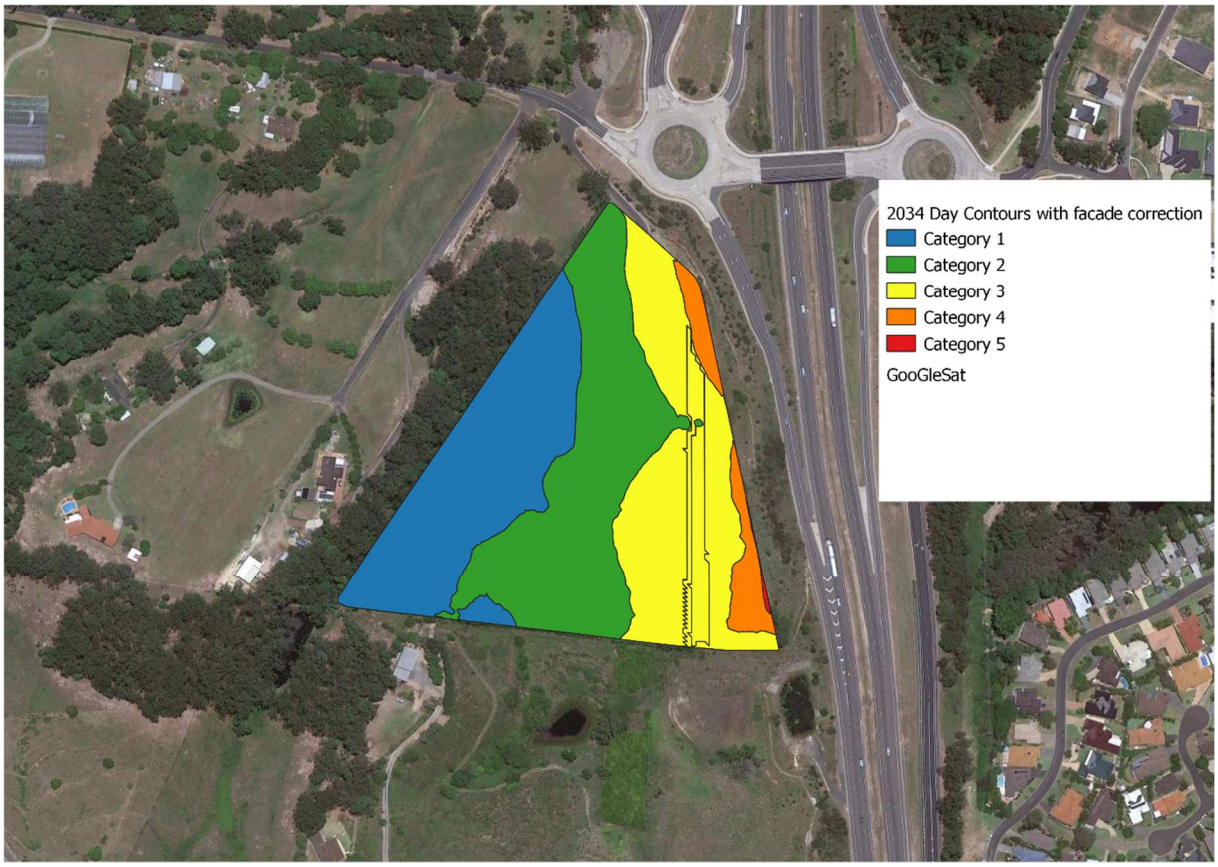


Figure 2: Construction tiers as per Table 5

5. RECOMMENDATIONS AND CONCLUSIONS

The results of modelling show that the site is affected by road noise across its entire area. As such, care must be taken in the design and construction of residences to ensure residential amenity is maintained. Most of the site falls into Category 1 to Category 3 construction categories, with smaller areas requiring Category 4 or 5. Noise mitigation goals may be assisted by preferentially siting residences to the west of the subdivisions, where noise levels experienced will be lower.

Architectural decisions will also play a role in determining the amenity of residents. For example, placing less sensitive areas (e.g. bathrooms, laundries, kitchens) along the façade facing the road and more sensitive areas (e.g. living rooms, bedrooms) in positions where they will be shielded will provide a significant improvement in noise isolation without introducing additional costs from heavier construction materials. The DNRCBR provides advice regarding such decisions which may prove valuable in the residential development of the site.

While this assessment (or the DNRCBR) does not seek to provide detailed guidance or specific recommendations for the acoustic treatment of individual dwellings, it demonstrates the extent of road traffic noise impacts. It also indicates that management of these impacts may be reasonably achieved via at-dwelling treatments, and thus that road noise levels should not preclude residential development at this site.

6. REFERENCES

The following information was used in the preparation of this report:

1. AS1055-2018: Acoustics – Description and measurement of environmental noise;
2. AS 2706-1984: Numerical Values: Rounding and interpretation of limiting values;
3. ELVIS – Elevation and Depth – Foundation Spatial Data (web portal, https://elevation.fsdf.org.au (accessed 8 December, 2020);
4. Google Maps aerial imagery (2021);
5. NSW Department of Planning (2008): *Development near Rail Corridors and Busy Roads – Interim Guideline;*
6. NSW Department of Environment, Climate Change & Water (2011): *Road Noise Policy;*
7. NSW Roads & Maritime Services (2019): *Coffs Harbour Bypass Environmental Impact Statement – Appendix G & Sub-appendix F;*
8. NSW Roads & Maritime Services (2018). *Noise Model Validation Guideline;*
9. NSW Spatial Services: *SIX Maps* (cadastral data).

Appendix I Development near Rail Corridors and Busy Roads: Appendix C - Acoustic Treatment of Residences

Appendix C – Acoustic Treatment of Residences

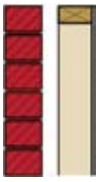
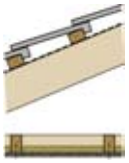
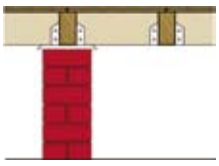
The following table sets out standard (or deemed-to-satisfy) constructions for each category of noise control treatment for the sleeping areas and other habitable areas of single / dual occupancy residential developments only. The assumptions made in the noise modelling are as follows:

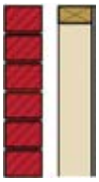
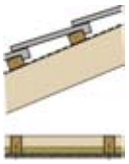
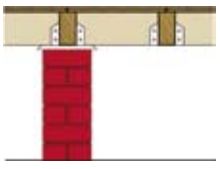
- Typical layout of a modern dwelling taken from a recent large residential development in an outer Sydney suburb
- Bedrooms and other habitable rooms are exposed to road noise

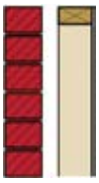
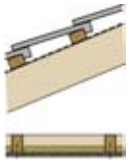
ACOUSTIC PERFORMANCE OF BUILDING ELEMENTS

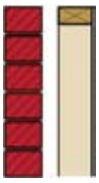
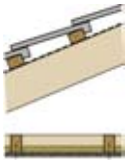
The acoustic performances assumed of each building element in deriving the Standard Constructions for each category of noise control treatment presented in the preceding Table, are presented below in terms of Weighted Sound Reduction Index (Rw) values, which can be used to find alternatives to the standard constructions presented in this Appendix:

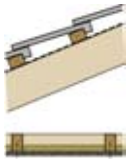
Category of Noise Control Treatment	R_w of Building Elements (minimum assumed)				
	Windows/Sliding Doors	Frontage Facade	Roof	Entry Door	Floor
Category 1	24	38	40	28	29
Category 2	27	45	43	30	29
Category 3	32	52	48	33	50
Category 4	35	55	52	33	50
Category 5	43	55	55	40	50

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	

Appendix II Modelling Results

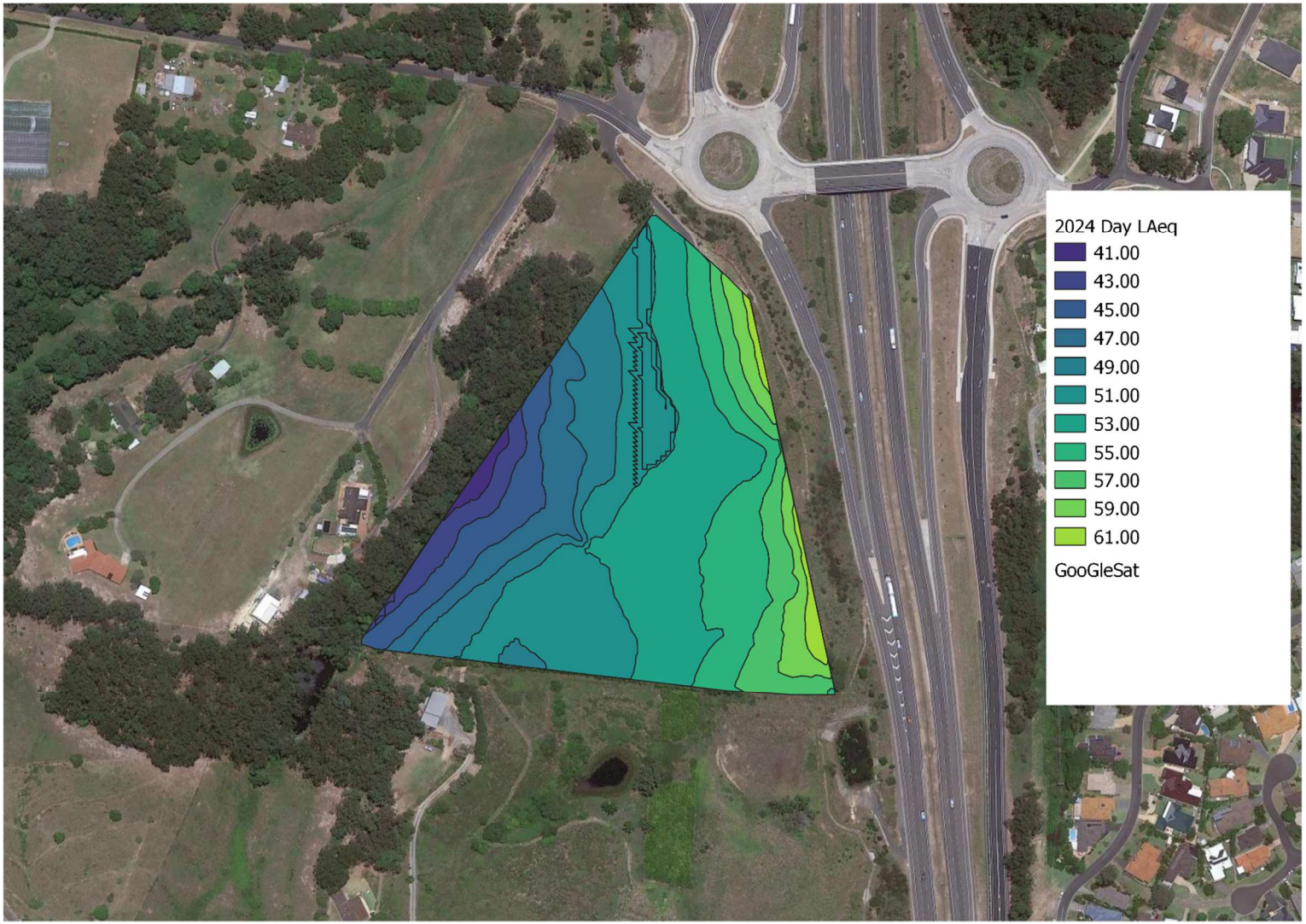


Figure 3: Noise contours for daytime ($L_{Aeq,15hr}$) levels, 2024 traffic

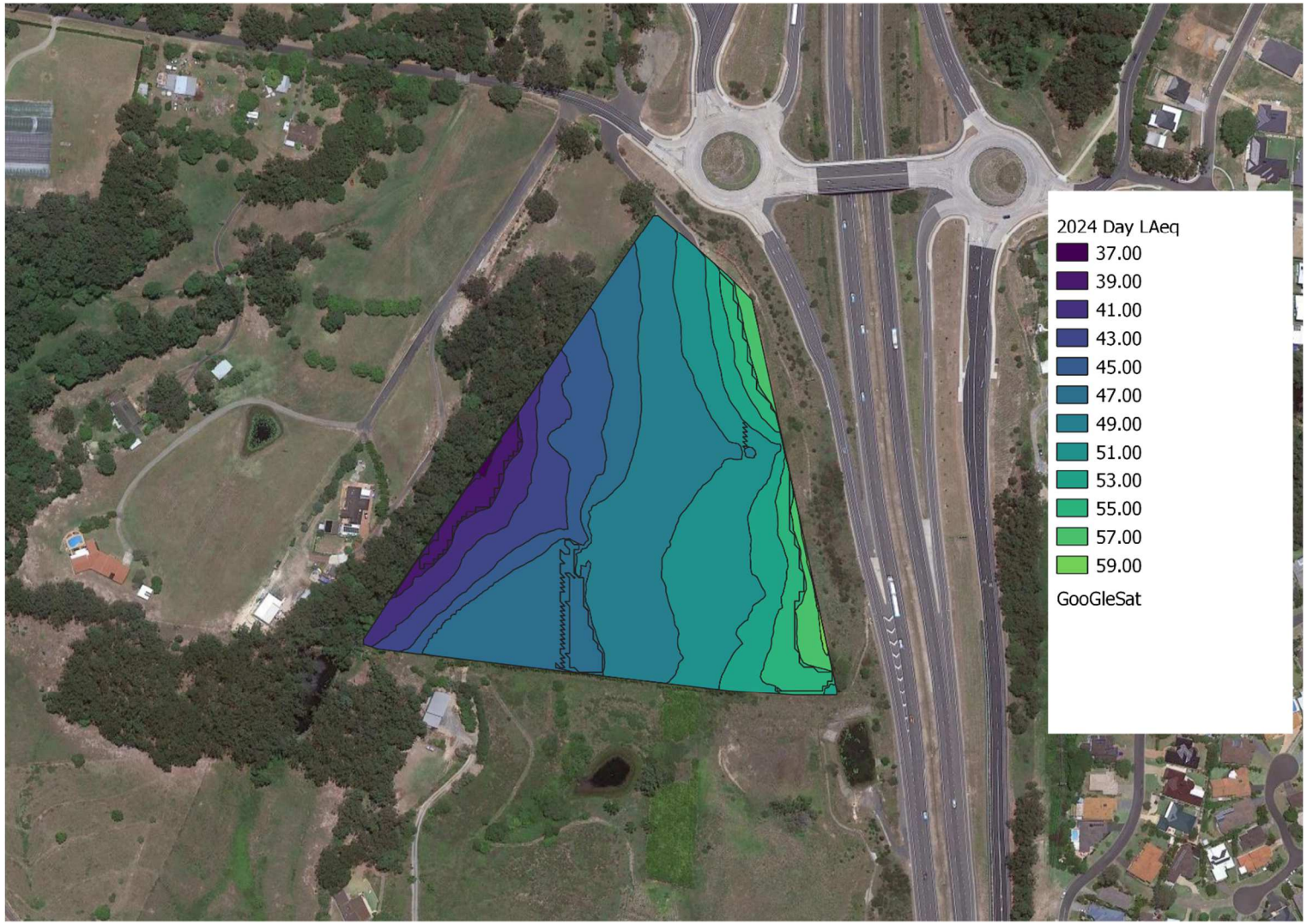


Figure 4: Noise contours for night-time ($L_{Aeq,9hr}$) levels, 2024 traffic

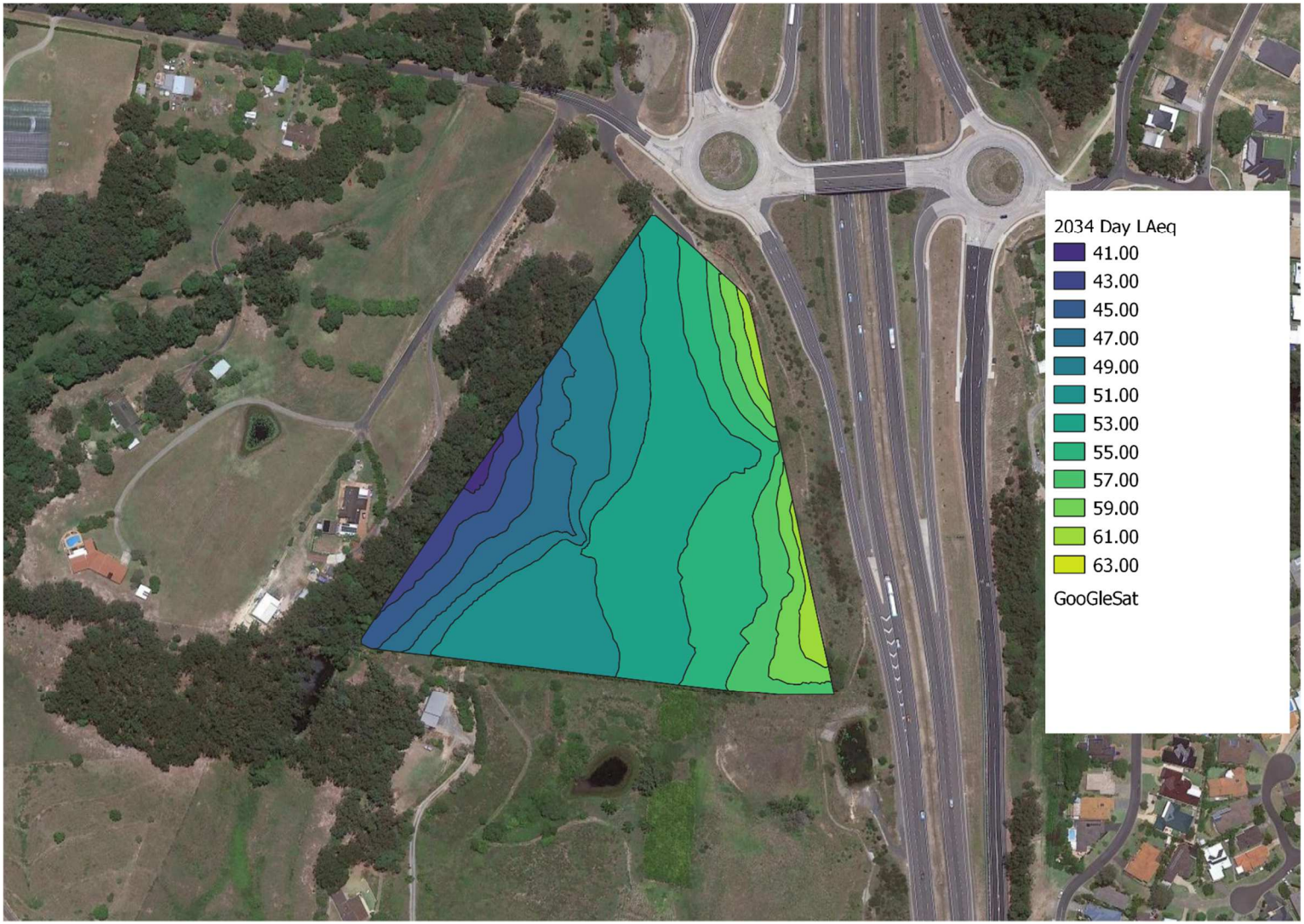


Figure 5: Noise contours for daytime ($L_{Aeq,15hr}$) levels, 2034 traffic

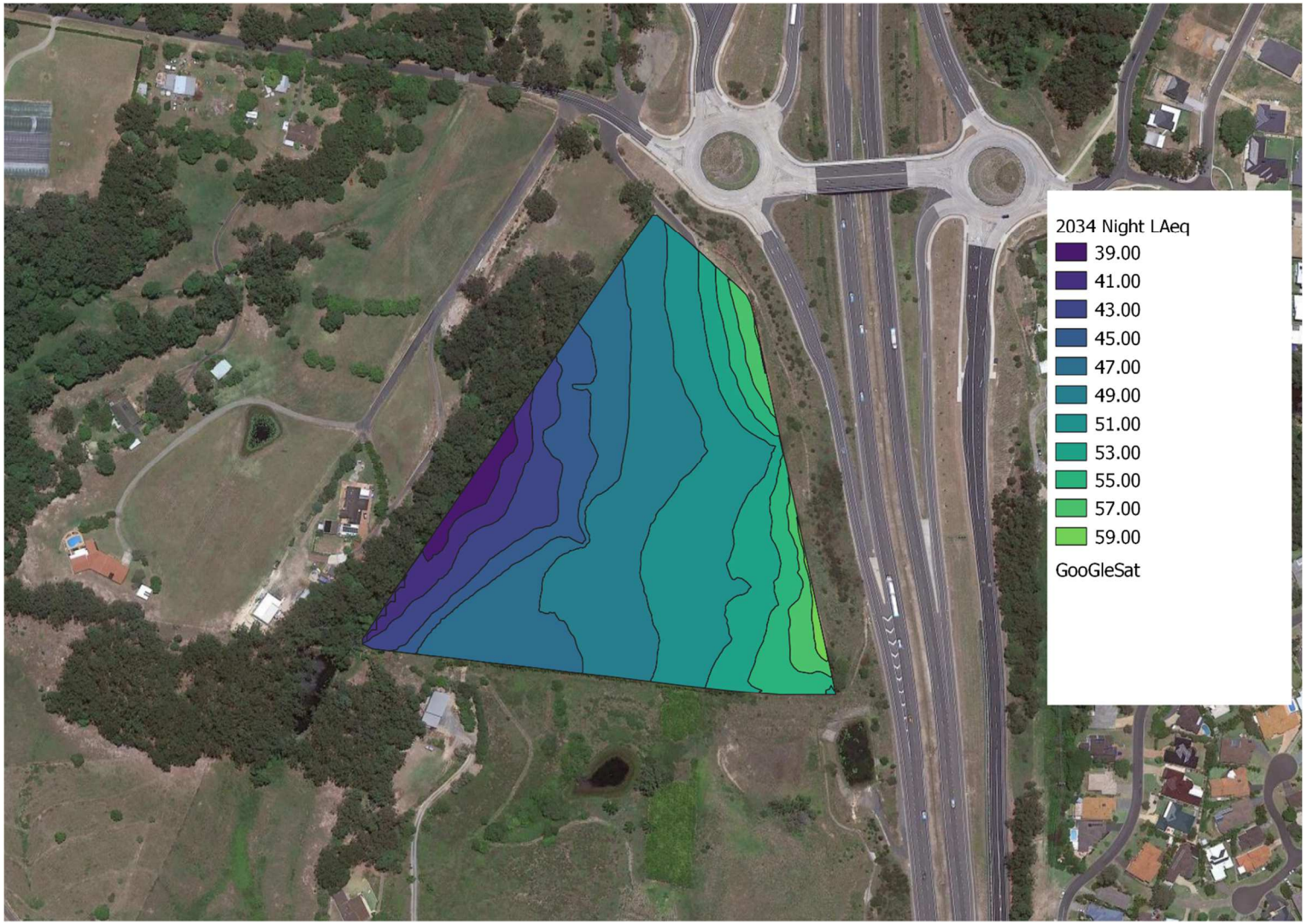
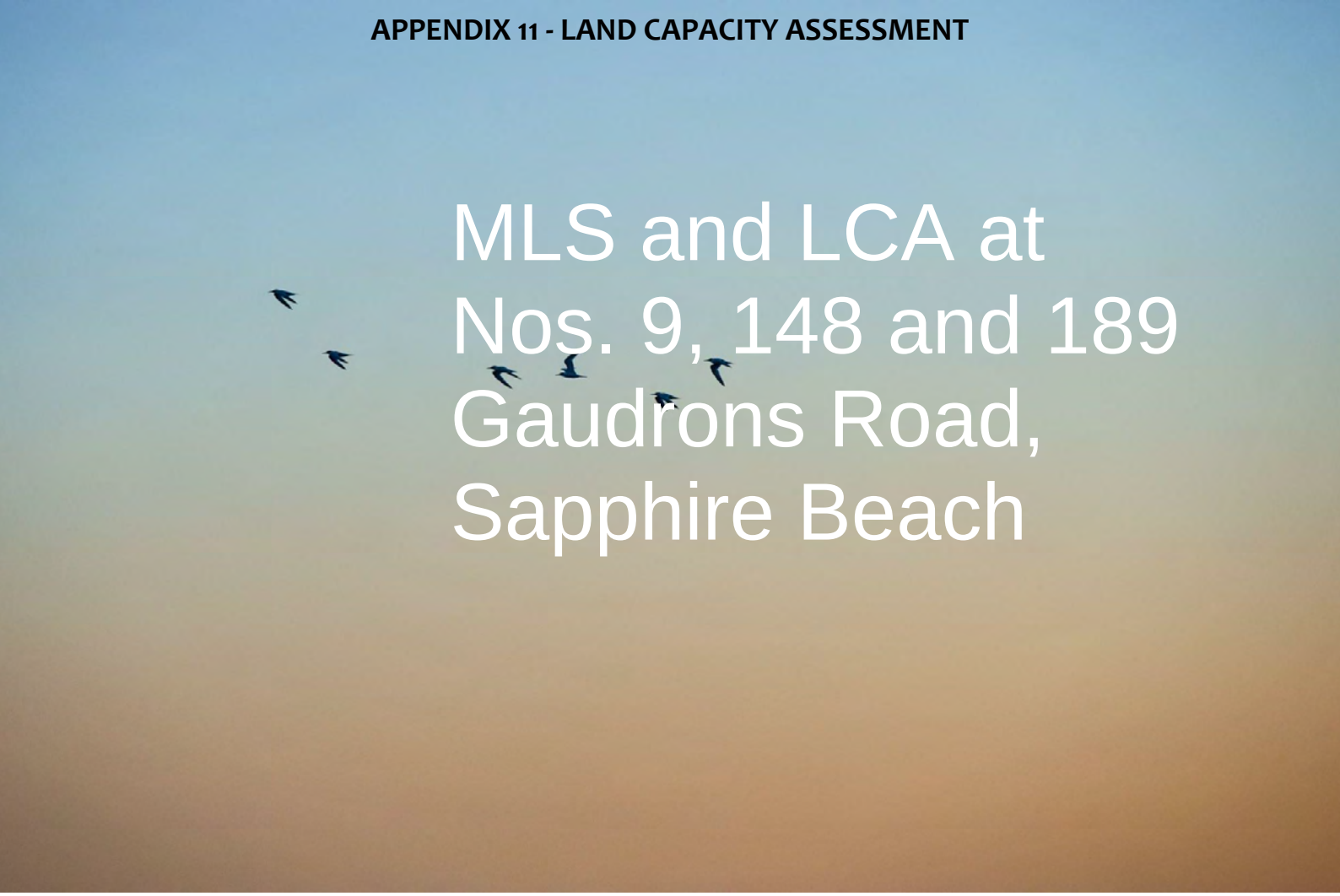


Figure 6: Noise contours for nighttime ($L_{Aeq,9hr}$) levels, 2034 traffic



MLS and LCA at Nos. 9, 148 and 189 Gaudrons Road, Sapphire Beach

15 June 2021

For: Factor X Solutions Pty Ltd: Stephen Sawtell

Authored by: Strider Duerinckx

Ref	Ver	Date	Distribution
2021-71-02	A	25/11/20	Client, Planner
	B	15/6/21	Client, Planner

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Figure 11 No.189 Gaudrons Road Recommended Effluent Management Areas

Appendices

Appendix A Borehole Logs

Appendix B Soil Chemistry

Appendix C Water and Nutrient Balance

1 Introduction

Earth Water Consulting Pty Limited (EWC) were engaged by Stephen Sawtell to undertake a Minimum Lot Size (MLS) and Land Capability Assessment (LCA) for the proposed subdivision of Nos. 9, 148 and 189 Gaudrons Road, Sapphire Beach, as shown on Figure 1.

The purpose of the MLS and LCA is to show that wastewater from an On-site Sewage Management System (OSMS) can be sustainably applied on the proposed lots.

2 Proposed Development

Based on plans of the proposed subdivision layout by Ian G Evison & Partners, it is understood that it is proposed to subdivide the subject properties as follows in **Table 1** and shown in Figures 2-4.

A single road per property will be constructed on No. 9 and No. 189 to allow vehicular access to the proposed lots.

Table 1: Property Details

Existing Property	Lot & DP	Existing Size (m^2)	Proposed No. of Lots	Proposed Building Envelopes (m^2)	Proposed Lot Size (m^2)
No. 9	L11, DP1141269	52,939	3	1 @ 1,500	6,700-25,000
No. 148	L7, DP555490	20,496	2	NIL additional	10,000-10,500
No. 189	L2, DP5550362	44,594	4	3 x @ 1,344 to 1,395	10,000-10,400

3 Scope of Work

The MLS and LCA were undertaken by Strider Duerinckx of EWC. The study methodology included:

- A desktop review of Site conditions including geology, hydrogeology, soils, and landscape features;
- A site inspection to map site and soil constraints plus an audit of the existing dwelling OSMS in relation to the proposed subdivision boundary;
- Drilling of two boreholes to assess soil conditions across the Site;
- Assessment of a range of site constraints including landform, slope, aspect, drainage, flooding and proximity to sensitive environments;
- A minimum lot size analysis involving the review of a number of nearby lot sizes, developed, constrained and available land area footprints;
- Analysis of selected soil sample for a range of chemical properties including pH, EC, dispersibility, PSorp, CEC and ESP;

- Estimation of likely wastewater loads (quantity and quality) from future dwellings on the proposed lot, and undertake confirmation water and nutrient balance modelling to size suitable land application areas;
- Determining an appropriate level of wastewater treatment and the preferred method of land application of effluent to overcome the constraints on the proposed lots.

4 Site Details

The properties are zoned RU2 (rural landscape), except for a thin sliver of the southern edge of No.189 which is zoned E2 (environmental conservation).

4.1.1 No. 9 Gaudrons Road

No. 9 is located at about 30mAHD in the lower eastern portion of Gaudrons Road, on the southern side. The property straddles a ridgeline, with intermittent drainage present along the southern boundary draining east under the Pacific Highway, and along the northwestern boundary draining north. Both are First-order streams in accordance with the Strahler ordering system. Surface slopes are relatively shallow, and the property is currently an operating mixed banana plantation and hothouse fig farm, containing two dwellings and a number of sheds.



Photograph 1 – Looking east across Proposed Lot 1



Photograph 2 – Looking south across Proposed Lot 3

4.1.1 No. 148 Gaudrons Road

No. 148 is located at about 160mAHD on the northern side of Gaudrons Road, and is bisected by an incised intermittent First-order intermittent gully. The property is steely sloping down to the east and north to this gully across rocky ground. An existing dwelling is located in the southeastern corner of the property and a second dwelling along the western boundary. The property is a former banana plantation farm that has a number of disused access tracks but is now only used for hobby goat rearing.



Photograph 3 – Looking northwest from gully to illegal dwelling.



Photograph 4 – Looking north from existing dwelling towards gully.

4.1.2 No. 189 Gaudrons Road

No. 189 is located at about 190mAHD on the southern side of Gaudrons Road. The property has been heavily cleared, is generally east facing and is former banana plantation land crisscrossed by former agricultural tracks. A new road will be constructed generally along one of these. A number of First-order intermittent gullies drain east from the property. An existing dwelling is located in the northern edge of the property adjacent to Gaudrons Road.



Photograph 5 – Looking east towards Lot 2 building envelope (centre) and proposed EMA on right hand side.



Photograph 6 – Looking west across Lot 4 proposed EMA.



Photograph 7 – Looking north across Lot 3 proposed EMA.

4.2 Existing OSMS

4.2.1 No. 9 Gaudrons Road

Two separate OSMS's service the existing dwellings. Both consist of a new 3kL poly septic tank, draining to a single absorption bed located downslope to the west of the dwelling. The approximate locations are shown on Figure 4.

Based on the proposed Lot 1-2 boundary, the existing OSMS are satisfactorily located and no upgrade works are required.



Photograph 8 – Looking south at the existing OSMS on No. 9. The absorption trench for the southern tank runs parallel to slope from the tank past the tree and shed (background). The absorption trench for the northern house runs from the tank under the gravel and lawn in the foreground.

4.2.2 No. 148 Gaudrons Road

There are two existing OSMS's also at 148 Gaudrons Road. The existing approved dwelling has a 3kL poly septic tank and an absorption trench field both located downslope to the north of the dwelling.

The trench could not be located but given the positioning is likely located on an existing built up terrace (Figure 5). The OSMS is located well away from the subdivision boundary and no further works are required.

The OSMS attached to the second dwelling (on the western boundary) is located downslope to the east, and consists of a hand built besser block tank and an unknown land application method. There was no obvious outlet on the tank, which appeared to be in poor condition and cracked. Though the OSMS is located well away from the proposed subdivision boundary, it is failing and needs to be rectified.



Photograph 9 – Looking east at the existing absorption trench for the house on No. 148. The absorption trench is likely on the level terrace.



Photograph 10 – Looking northeast at the existing septic tank for the second dwelling on No. 148. The absorption trench location is uncertain.

4.2.3 No. 189 Gaudrons Road

The existing dwelling at 189 Gaudrons Road also has a septic tank and absorption trench combination OSMS. The 3kL poly septic tank is located downslope to the southeast of the dwelling, with a single absorption trench south of the septic tank (Figure 6).



Photograph 11 – Looking northeast at the existing septic tank beneath dark bush off the cnr of the dwelling (middle of photo) and absorption trench in grassed and mowed strip.

4.3 Site Constraints

4.3.1 No. 9 Gaudrons Road

Table 2 summarises the Site constraints for the primary and reserve EMAs for each of the proposed lots. 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 5.

Table 2: No. 9 Site Constraints

Constraint	Degree of Limitation		
	Minor	Moderate	Major
Landform: Lot 1, 2, 3 – Waxing planar crest to mid slope	All lots		
Exposure: Lot 1, 2, 3 - Good exposure. Minimal trees near the proposed EMAs.	All lots		
Slope: Lot 1, 2- Gentle slopes of 0-10% to the east and west. Lot 3 – Moderate slopes of 10-20% to the southeast.	1-2	3	
Rocks and Rock Outcrops: No rock outcrops were observed on the Site.	All lots		
Erosion Potential: Active erosion is lower on the gentle slopes and higher on steeper. Erodible subsoils are present.	All lots		
Climate: The Site experiences a sub-tropical-temperate climate, typical of north-eastern NSW.	All lots		
Vegetation: All lots – cleared former agricultural	All lots		
Fill: No filling at the proposed EMAs	All lots		
Surface Waters: Intermittent drainage line along the western boundary line, draining to the north. Intermittent drainage line along southeastern corner draining east. Lot 1, 2, 3 - >40m	All lots		

Constraint	Degree of Limitation		
	Minor	Moderate	Major
Groundwater: (NSW Office of Water: Groundwater Bore Search) A number of licensed bores are located along Gaudrons Road. The closest bores to No.9 are GW071130 and GW073072 located to the south and west of the property. 71130 was drilled to 61m with a hardrock aquifer encountered at 41m depth and a SWL of 18m depth. 73072 was drilled to 44m with a SWL of 18m depth. Groundwater vulnerability? Clay subsoil, distance and deep groundwater depth indicate that the risk to groundwater would be minimal.			All lots
Stormwater run-on and upslope seepage: The positions of the proposed EMAs on or just off a local crest means that runon would be minimal.	All lots		
Flood Potential: The property is not impacted by 1:100 year flood extents on the CHCC flood mapping.	All lots		

4.3.1 No. 148 Gaudrons Road

Table 3 summarises the Site constraints for the primary and reserve EMAs for each of the proposed lots. Site features are presented in Figure 6.

Table 3: No. 148 Site Constraints

Constraint	Degree of Limitation		
	Minor	Moderate	Major
Landform: Lot 1, 2 - Waxing planar mid slope	1, 2		
Exposure: Lot 1, 2 - Good exposure. Minimal trees near the proposed EMAs.	1, 2		
Slope: Lot 1, 2 – Steep slopes of 33-35% to the east and north.			1,2

Constraint	Degree of Limitation		
	Minor	Moderate	Major
Rocks and Rock Outcrops: No rock outcrops were observed on the Site but numerous weathered angular cobbles .		Both lots	
Erosion Potential: Active erosion is lower on the gentle slopes and higher on steeper. Erodible subsoils are present.			Both lots
Climate: The Site experiences a sub-tropical-temperate climate, typical of north-eastern NSW.	Both lots		
Vegetation: All lots – cleared former agricultural	Both lots		
Fill: No significant filling present	Both lots		
Surface Waters: Intermittent drainage line bisects the property draining northeast. Lot 1,2 – 40m buffer extends onto the lots		Both lots	
Groundwater: (NSW Office of Water: Groundwater Bore Search) A number of licensed bores are located along Gaudrons Road. The closest bores to No.148 are GW072518 and GW072526 located to the south of the property. Both bores were drilled to 67m with a hardrock aquifer encountered at 62m depth. Groundwater vulnerability? Clay subsoil, distance and deep groundwater depth indicate that the risk to groundwater would be minimal.			Both lots
Stormwater run-on and upslope seepage: The positions of the proposed EMAs on steep midslopes means that runon would be experienced.		Both lots	
Flood Potential:	Both lots		

Constraint	Degree of Limitation		
	Minor	Moderate	Major
The property is not impacted by 1:100 year flood extents on the CHCC flood mapping.			

4.3.1 No. 189 Gaudrons Road

Table 4 summarises the Site constraints for the primary and reserve EMAs for each of the proposed lots. Site features are presented in Figure 7.

Table 4: No. 189 Site Constraints

Constraint	Degree of Limitation		
	Minor	Moderate	Major
Landform: Lot A – Liner convergent mid slope Lot 1 – Linear divergent midslope Lot 3 – Linear divergent to convergent Lot 2 – Linear planar	1, 2	A, 3	
Exposure: Lot 1, 2, 3, 4 - Good exposure. Minimal trees near the proposed EMAs.	All lots		
Slope: Lot 1, 2, 3, a4 - Steep slopes of >30%.			All lots
Rocks and Rock Outcrops: No rock outcrops were observed on the Site but given landscape position would be expected.		All lots	
Erosion Potential: Erosion risk is higher on steeper slopes. Erodible subsoils are present.		All lots	
Climate: The Site experiences a sub-tropical-temperate climate, typical of north-eastern NSW.	All lots		
Vegetation: All lots – cleared former agricultural	All lots		

Constraint	Degree of Limitation		
	Minor	Moderate	Major
Fill: None observed.	All lots		
Surface Waters: Intermittent drainage bisects the proposed lots 1 and 2. Lot 2, 3 - >40m Lot A, 1 – 40m buffer extends onto the lots	3, 2	A, 1	
Groundwater: (NSW Office of Water: Groundwater Bore Search) A number of licensed bores are located along Gaudrons Road. The closest bore to No.189 is GW301923 located to the west of the property. No drillers log is available, but the elevated position in the landscape and nearby drillers logs suggest a deep hard rock aquifer. Groundwater vulnerability? Clay subsoil, distance and deep groundwater depth indicate that the risk to groundwater would be minimal.			All lots
Stormwater run-on and upslope seepage: The positions of the proposed EMAs on steeply sloping midslopes means runon would be expected .		All lots	
Flood Potential: The property is not impacted by 1:100 year flood extents on the CHCC flood mapping.	All lots		

4.4 Soil Survey and Description

4.4.1 Regional Soils

We reviewed the Soil Landscapes of the Coffs Harbour 1:100,000 Sheet (Milford, 1999) which indicates that No. 9 Gaudrons Road is underlain by the Megan Soil Landscape, No.148 by the Suicide Soil Landscape and No.189 by the Bobo Soil Landscape (**Error! Reference source not found.**).

Table 5: Soil Landscape

Existing Property	Soil Landscape	Type	Typical Profile	Limitations
No. 9	Megan	Erosional	moderately deep to deep (>100 cm), well drained structured Red Earths, Brown Earths, Brown or Red Podzolic Soils, with moderately deep to deep (>100 cm), structured Yellow Earths and Yellow Podzolic Soils in drier situations, and moderately deep to deep (>120 cm), well-drained in the moistest sites.	strongly acid, stony (localised) soils of high erodibility, aluminium toxicity potential and low subsoil fertility. Steep slopes (localised); mass movement hazard (localised); high water erosion hazard (localised); foundation hazard (localised).
No. 148	Suicide	Colluvial	moderately deep to deep (>100 cm), welldrained, stony structured Yellow Earths on crests and upper slopes, with stony Lithosols and structured Red Earths on mid-slopes and footslopes.	strongly acid stony soils with low wet bearing strength, strong subsoil acidity and low fertility. Steep slopes; mass movement hazard; high run-on; high water erosion hazard; foundation hazard; rockfall hazard (localised).
No. 189	Bobo	Colluvial	moderately deep, weakly structured Red Earths, with deep, imperfectly drained Red Podzolic Soils on footslopes and very shallow, well-drained Lithosols on very steep slopes with shallow soils.	strongly acid, stony, shallow (localised) soils with low fertility, high aluminium toxicity potential and low wet bearing strength. Very steep slopes; high mass movement hazard; high water erosion hazard; severe foundation hazard; shallow soils (localised on steepest slopes); rockfall hazard (localised on steepest slopes); rock outcrop (localised).

4.4.2 No.9 Gaudrons Soils

Soils were assessed by drilling three (3) boreholes (Figure 5) to 1.2m depth or refusal (Appendix A). In general, these soils comprised:

- Approximately 100-200mm of clay loam topsoil, dark brown to pale brown, no mottling, with earthy structure and up to 10% quartz gravel; overlying
- Approximately 600mm of light clay, orange brown, with slight red brown mottling increasing with depth, strong structure and up to 5% gravel; overlying
- At least 400mm of medium clay with silt, pale orange to pale grey with red brown mottling, and up to 30% phyllite gravel; overlying

Competent bedrock was not encountered in the boreholes. The borehole logs are provided in Appendix A.



Photograph 12 – BH3 soil profile.

4.4.3 No.148 Gaudrons Soils

Soils were assessed by one (1) borehole to 1.2m depth or refusal (Figure 6). In general, these soils comprised:

- Approximately 100mm of sandy clay loam topsoil, dark brown, no mottling, with earthy structure and up to 20% gravel; overlying
- Approximately 500mm of sandy clay loam, brown, earthy to strong structure and up to 20% angular metasediment gravel; overlying
- At least 600mm of silty clay, pale yellow brown, with slight pale grey mottling up to 30% angular gravel.

Competent bedrock was not encountered in the boreholes. The borehole logs are provided in Appendix A.



Photograph 13 – BH4 soil profile.

4.4.4 No.189 Gaudrons Soils

Soils were assessed by drilling two (2) boreholes and observing one cutting (Figure 7) to 1.2m depth or refusal. In general, these soils comprised:

- Approximately 250mm of clay loam topsoil, dark brown, no mottling, with earthy structure and up to 10% quartz gravel; overlying

- Approximately 100mm of clay loam pale brown, with 5-40% angular (in cutting) gravel; overlying
- Approximately 500mm of light clay, strong orange brown, strong structure and 5-40% (in cutting) gravel; overlying
- Up to 300mm of light to silty clay, pale orange brown, with slight pale yellow mottling, and up to 5% gravel.

Competent bedrock was not encountered in the boreholes, but BH6 refused on gravel at 1m depth. The borehole logs are provided in Appendix A.



Photograph 14 – BH5 soil profile.

4.5 Soil Chemistry

Error! Reference source not found. summarises the key soil physical and chemical assessments. Reference is made to the rating scale described in Table 6 of DLG (1998). Two samples were selected for laboratory analysis (BH1 0.6-0.8 and BH5 0.5-0.8). The laboratory report is included in Appendix B.

Table 6: Soil Assessment

Parameter	Constraint		
	Minor	Moderate	Major
Depth to bedrock or hardpan (m): Boreholes were terminated at 1.2m depth often in extremely weathered bedrock. No.9- It is believed that competent bedrock will be located at >1.5m based on soil landscape and position. Nos. 148 and 189 – It is believed that competent bedrock depth will be variable and may be present within 1m depth in places.	No.9		Nos. 148 and 189
Depth to high soil watertable: The depth of the vadose zone (i.e. non-saturated soil material above watertable) was greater than 1.2m at the time of the investigation. The depth to the permanent	All properties		

Parameter	Constraint		
	Minor	Moderate	Major
groundwater aquifer is expected to be more than 20m depth based on local groundwater bores.			
Coarse Fragments (%): No.9- The subsoils contained <20% coarse fragments. Nos. 148 and 189 – Gravelly colluvial soils were encountered with gravels and cobbles up to 40%	No. 9		Nos. 148 and 189
Hydraulic loading rate: Soil structure: Strong Soil texture: Light clay Permeability category: Category 5a Hydraulic loading recommended: 8mm/day for primary, and 12mm/day secondary treated effluent into an absorption bed field and 3mm/day for SSI. Reasons for the hydraulic loading recommendation: Strongly structured clay subsoils.		All properties	
pH: 4.36-4.33 pH Units from. Strongly acidic soils.			All properties
Electrical Conductivity (dS/m): 0.589-0.407dS/m. Not saline.	All properties		
Dispersiveness: Class 3/6 (Slake 3) for both samples. The instability of these aggregates is expected to increase slightly with the application of effluent.		All properties	
Sodicity (ESP): ESP of 1.2-1.7%. The ESP infers a minimal potential for structural degradation.	All properties		
Cation Exchange Capacity: CEC was measured between7.3-9.0cmol/kg, which indicates that the soils have a moderate ability to accept and release excess nutrients from effluent.		All properties	
Phosphorus Adsorption: Psorp of 11,186-16,824kg/ha were reported in the subsoils.	All properties		

5 Minimum Lot Size (MLS) Analysis

A minimum lot size analysis and modelling were completed to determine the maximum lot density suitable for subdivision on the Site.

5.1 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 area on a developed a lot is determined by the following factors:

- 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), and gardens/vegetated areas unsuitable for effluent reuse;
- dams, intermittent and permanent watercourses running through lots;
- maintenance of appropriate buffer distances from property boundaries, buildings, driveways and paths, dams and watercourses;
- 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.

The residual areas (areas not otherwise occupied by improvements, buffers, restrictions or conservation vegetation) were then calculated for the selected lots (Figure 8), and the available area compared to the wastewater envelope required.

5.2 MLS 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 secondary 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;
- 6m from downslope property boundaries and 3m from upslope property boundaries; and
- 6m from downslope buildings and 3m from upslope buildings.

In addition, developed areas such as inground water tanks and swimming pools were also buffered.

Secondary treatment was selected for modelling purposes. Primary treatment may be possible on a case by case for the proposed lots on No.9 and 189 Gaudrons Road subject to soil depth and buffer requirements for such OSMS.

5.3 MLS Comparative Lots Assessed

Six nearby R5 zoned representative lots were selected that have already been subdivided (**Error! Reference source not found.**) (Figure 7). The lots ranged in size from 1,689-4,212m^2 area. The next available lot sizes greater than this on Gaudrons Road were 20,000m^2, and given the 6000-10,000m^2 proposed for the properties the larger lot size was not considered appropriate to compare to. As such the smaller 1,689-4,212m^2 provide a worst case scenario of OSMS restrictions.

Table 7: Comparative Lots Assessed

Address	Lot Area (m^2)
39-41 Gaudrons Road	4,005
45 Gaudrons Road	4,001
75 Gaudrons Road	4,212
79 Gaudrons Road	1,689
81 Gaudrons Road	1,788
160 Gaudrons Road	2,830

The properties typically included a dwelling, garage/shed, landscaped trees, shrubs and gardens, 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.

5.4 MLS Assessed Available EMA

Error! Reference source not found. shows the assessment of available effluent management areas for each of the assessed lots. As is evident, the variability of lot sizes, on-lot improvements and restrictions of developed lots makes selection of a “typical” lot difficult, however comparison of the site constraints indicates that minimum lot size is the most significant issue to address.

Table 8: Minimum Lot Size Assessment Results

Id	Lot Area (m^2)	Developed Area (m^2)[1]	Total Restricted Area (m^2)[2]	Available Eff. Application Area (m^2)	Percent of Lot Available for Eff. Disp. (%)	>630m^2 Area Available for Secondary Treatment?
39-41	4,005	1,293	2,142	1,873	47	Yes
45	4,001	1,166	2,154	1,843	46	Yes
75	4,212	1,564	2,377	1,827	43	Yes
79	1,689	630	1,546	143	8	No
81	1,788	771	1,788	0	0	No
160	2,830	560	1,808	1,022	36	Yes

1. House, driveway, shed etc
2. Includes developed area, protected vegetation and buffers to waterways and boundaries

5.5 Discussion

A comparison of nearby properties suggests that:

- From the sample selection of lots investigated, three of the lots are significantly smaller than the nominated minimum 6,000m^2 lot size, being 1,689 1,788 and 2,830m^2. Of these only the 2,830m^2 property (No. 160) is available effluent management area. This is because the existing dwelling is located hard against the southern boundary with no associated sheds, garages, swimming pools etc. The other two small lots by nature of the lot size and buffer constraints to site features have in effect no available effluent management area and wastewater application is compromised;
- The remaining three properties of 4,001-4,212m^2 have each about 1,800m^2 of available unconstrained area for effluent application. Allowing for additional developed footprint such as sheds and swimming pools that may not be present currently, and constraints such as buffers to gullies and protected forest vegetation, the minimum 630m^2 footprint typically required for a secondary treatment and land application OSMS would still be able to be met;
- As such, given the low slopes and limited site and soil constraints, a minimum 6,000m^2 lot sizing at No.9 Gaudrons Road would be considered acceptable;
- The oversteep slopes of >30% with shallow stony soils at No.148 Gaudrons Road require more specialized design and construction, and a minimum 10,000m^2 lot size is considered prudent and acceptable; and
- Though deeper soils are present on No.189 Gaudrons Road pose no limitation (minor only), this positive is offset by the steep slopes of +30%, presence of numerous convergent-divergent landforms with separating frequent First-order gullies, and E2 zoning along the southern portion. As such a minimum 10,000m^2 lot size is considered prudent and acceptable.

6 Recommended OSMS Combination

Due to the cost of reticulated sewerage provision by Council, it is expected that the Site will not be sewered in the foreseeable future.

Based on the site and soil constraints and subdivision boundaries, the minimum treatment and land application combination selected for No.9, 148 and 189 Gaudrons Road are:

- Treatment to a secondary standard and subsurface application into an appropriately sized absorption bed or subsurface irrigation field.

During development application for a particular dwelling, with judicious placement of the dwelling and improvements, and limiting wastewater generation volumes, alternative OSMS combinations may be considered acceptable including treatment to a primary standard and land application by subsurface absorption, or wet or dry compost systems.

7 Effluent Management Areas

7.1 Design Hydraulic Load

For hydraulic loading purposes a proposed dwelling of four bedrooms on unlimited tank water was assumed for the proposed lots. AS/NZS1547:2012 recommends that a wastewater generation load of 150L per person per day for households supplied by tank with backup water be used as a basis for wastewater system design. The hydraulic load for the existing and proposed dwellings is based on 1.5 persons per bedroom. The design hydraulic loading for a four bedroom dwelling under full occupancy is presented in **Error! Reference source not found.**.

Table 9: Proposed Design Hydraulic Load

No. of Bedrooms	Design Wastewater Load (L/day)
4	900

7.2 Sizing of Effluent Management Areas

Water balance modelling was undertaken to determine sustainable effluent application rates, and from this estimate the necessary size of the 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 input data and results for the primary treated trench/ bed water balance are presented in **Error! Reference source not found.**, and calculation sheets in Appendix C.

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. A summary of the nutrient balance is provided in **Error! Reference source not found.**.

Table 10: Inputs and Results of Primary Treatment Modelling

Data Parameter	Units	Value	Comments
Hydraulic load	L/day	900	6 persons occupancy.
Precipitation	mm/month	Coffs Harbour	BoM, Median monthly.
Pan Evaporation	mm/month	Coffs Harbour MO	BoM, mean monthly.
Retained rainfall	unitless	0.85	Proportion of rainfall that remains onsite and infiltrates the soil, allowing for 15% runoff.
Crop Factor	unitless	0.6-0.8	Expected annual range for vegetation based on monthly values.
Design Loading Rate (DLR) - Primary	mm/day	12	Maximum rate for design purposes, based on strongly structured light clay subsoils.
Effluent total nitrogen concentration	mg/L	30	Target effluent quality for secondary treatment systems.
Effluent total phosphorus concentration	mg/L	12	Target effluent quality for primary treatment systems.
Soil phosphorus sorption capacity	kg/ha	11,500	Value based on soil testing.
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 basal area for hydraulic load (m^2)			85m^2 (115m^2 absorption trench field footprint)
Minimum area for total phosphorus load (m^2)			313m^2
Minimum area for total nitrogen load (m^2)			315m^2

Based on modelling an EMA and reserve EMA of 315m^2 each have been nominated for a four bedroom dwelling, totally 630m^2. The proposed locations of the EMAs are shown on Figures 9-11.

The actual size and configuration of the EMAs will be dependent on a wastewater management plan at the time of dwelling development planning and application to install or upgrade an OSMS.

8 Buffers

Buffer distances or setbacks from EMAs are required to minimise risk to public health, maintain public amenity and protect sensitive environments. The buffers from DLG (1998) are presented in **Error! Reference source not found.** below.

Table 11: Available Buffers

Site Feature	DLG (1998) Buffer	Achievable?
Intermittent watercourses, drainage channels and dams	40m	**Yes**
Permanent waterways	100m	**Yes**
Domestic groundwater bore	250m	**No, licensed bores are located with 250m of portions of each property.**
Property boundary	Secondary - 6m downslope of, and 3m sideslope or upslope of	**Yes**
Driveway and building	6m downslope of / 3m upslope of	**Yes**

Although some of the recommended EMAs fall within the 250m buffer to a domestic groundwater bore required by DLG (1998), the guideline did not provide any scientific justification for that buffer and the document is about 22 years old. AS/NZS1547:2012, a more recent document a national standard provides the ability to risk assess buffers based on site and soil constraints. The maximum risk assessed buffer in AS/NZS1547:2012 to bores or wells is 50m for primary treated wastewater, shallow high resource groundwater, aquifers in highly porous soils or rock, and surface or above ground effluent land application. The recommended minimum OSMS combination poses a lower risk than this worst case, and the local groundwater aquifer is relatively deep at >40m depth beneath a substantial clay capping layer. As such a lesser risk assessed buffer would be expected.

In any case, all recommended EMAs would be located >50m from the nearest bores.

9 Conclusions & Recommendations

Having undertaken a minimum lot size and land capability assessment for the proposed subdivision of No.9, 148 and 189 Gaudrons Road, EWC consider that there is the opportunity for the sustainable

application of wastewater following subdivision of the existing properties into smaller lots (**Error! Reference source not found.**).

Table 12: Summary of Development Recommendations

Property	Minimum Lot Size (m^2)	Minimum OSMS Combination*
9	6,000	Secondary treatment and subsurface bed or subsurface irrigation land application, 630m^2.
148	10,000	
189	10,000	
*Subject to final design, and primary treatment may be acceptable on a case by case basis.		

For any future system we recommend that:

- A dwelling specific OSMS should be designed by an experienced professional, taking into account the assumptions and recommendations contained in this report; and
- An OSMS should be installed by a suitably qualified plumber, ensuring that effluent is distributed evenly across the entire area serviced.

10 References

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.

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

FIGURES

APPENDIX 11 - LAND CAPACITY ASSESSMENT



LEGEND

Property Boundary

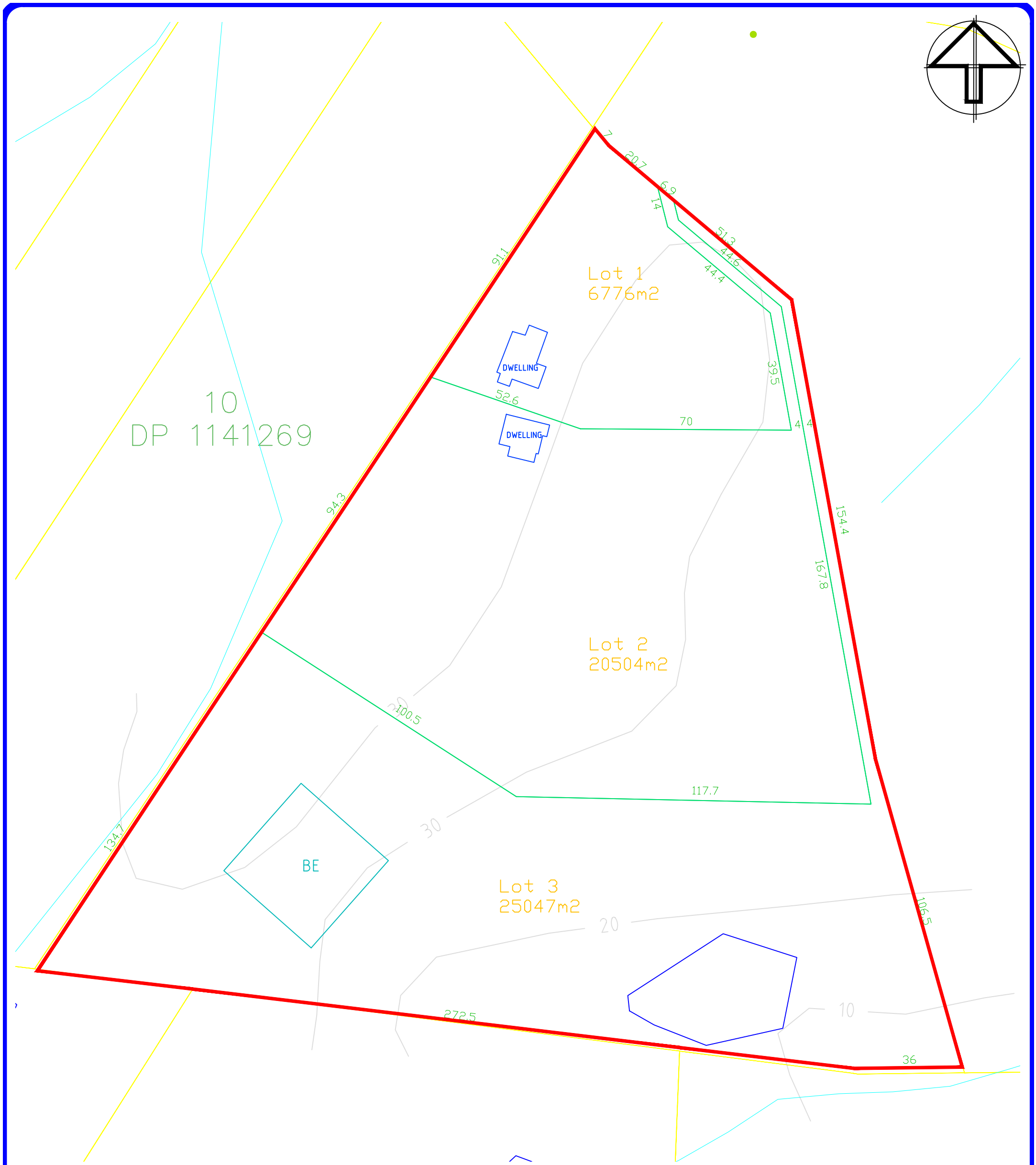
Adjacent Properties

Drainage Alignment

Dams

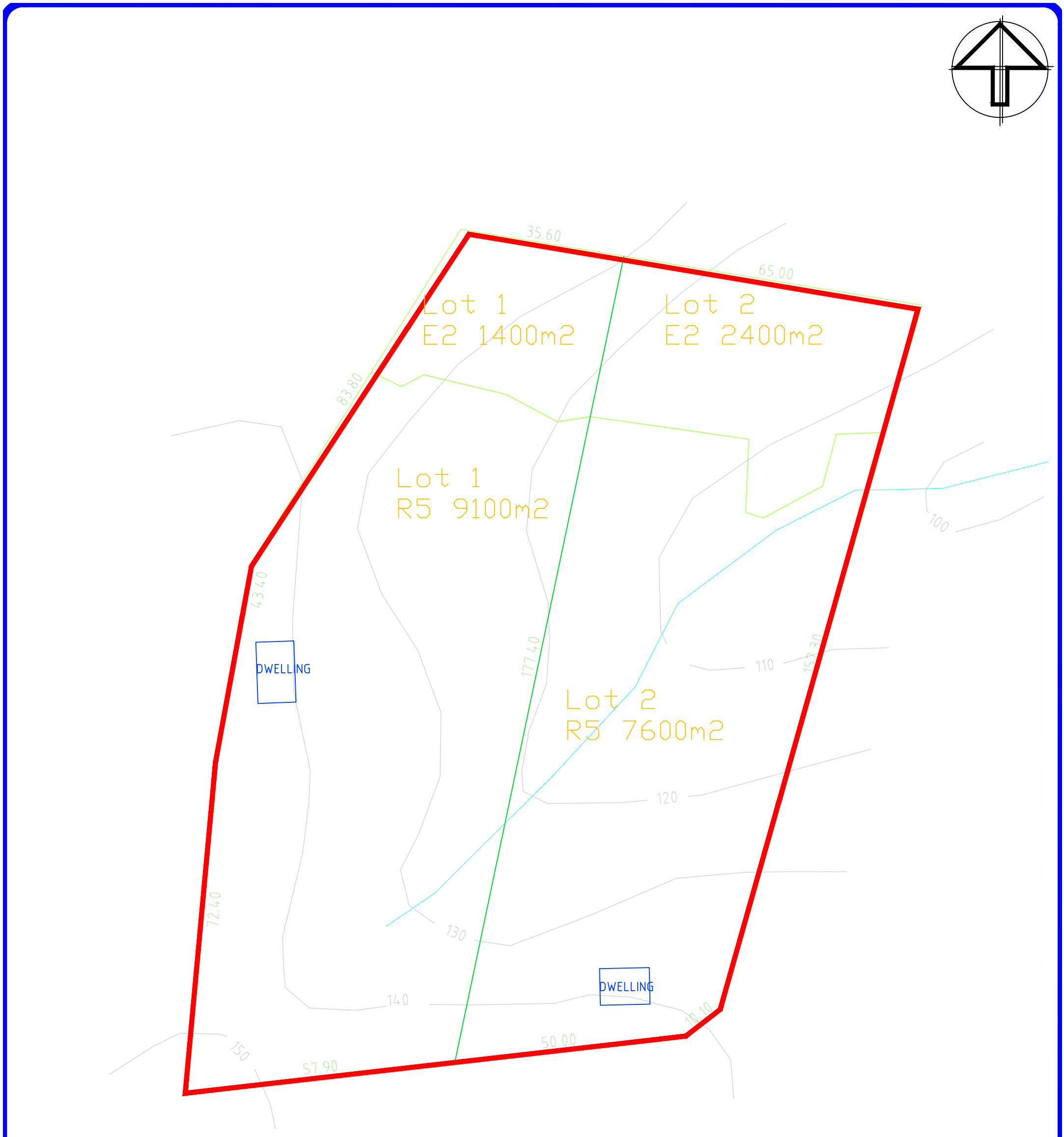
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TITLE: Site Location			PROJECT: LCA for Proposed Subdivision of No. 9, 148 and 189 Gaudrons Road, Sapphire Beach		CLIENT: Bowen, Duce & Hunter
FIGURE: Figure 1					
SHEET: 1 OF 1	ISSUE: A	AUTHOR: SD	DATE: 30/10/20	SCALE: 1:7000	PROJECT: 2021-71

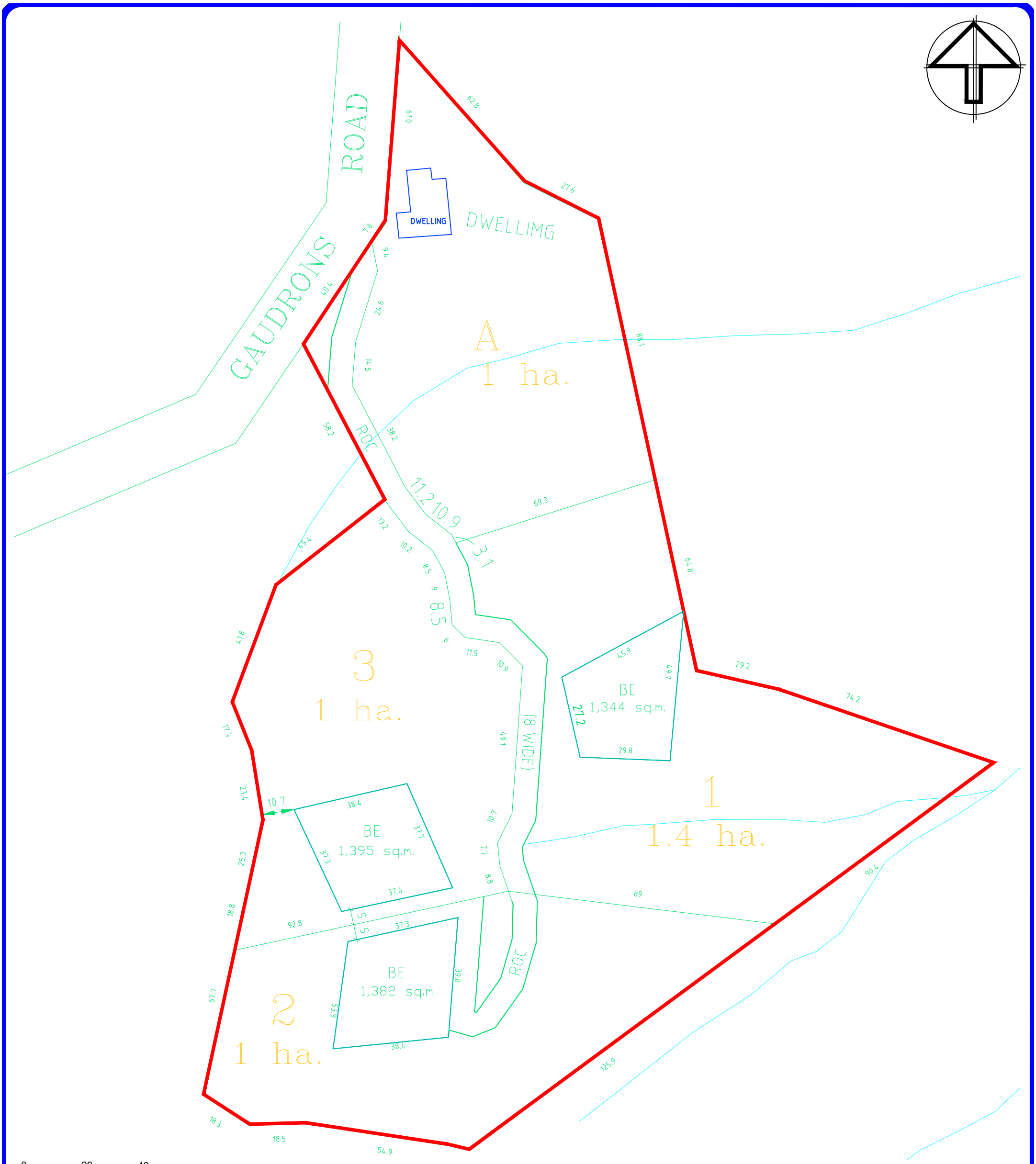


EARTH WATER CONSULTING

TITLE: No.9 Gaudrons Road Proposed Development Layout			FIGURE: Figure 2
			SHEET: 1 OF1 ISSUE: D
PROJECT: LCA for Proposed Subdivision of No. 9, 148 and 189 Gaudrons Road, Sapphire Beach			CLIENT: Bowen, Duce & Hunter
AUTHOR: SD	DATE: 15/6/21	SCALE: 1:1200	PROJECT: 2021-71



TITLE: No.148 Gaudrons Road Proposed Development Layout			FIGURE: Figure 3
			SHEET: 1 OF 1 / ISSUE: B
PROJECT: LCA for Proposed Subdivision of No. 9, 148 and 189 Gaudrons Road, Sapphire Beach			CLIENT: Bowen, Duce & Hunter
AUTHOR: SD	DATE: 15/6/21	SCALE: 1:800	PROJECT: 2021-71



TITLE: No.189 Gaudrons Road Proposed Development Layout			FIGURE: Figure 4
			SHEET: 1 OF1 ISSUE: A
PROJECT: LCA for Proposed Subdivision of No. 9, 148 and 189 Gaudrons Road, Sapphire Beach			CLIENT: Bowen, Duce & Hunter
AUTHOR: SD	DATE: 30/10/20	SCALE: 1:1200	PROJECT: 2021–71

APPENDIX 11 - LAND CAPACITY ASSESSMENT



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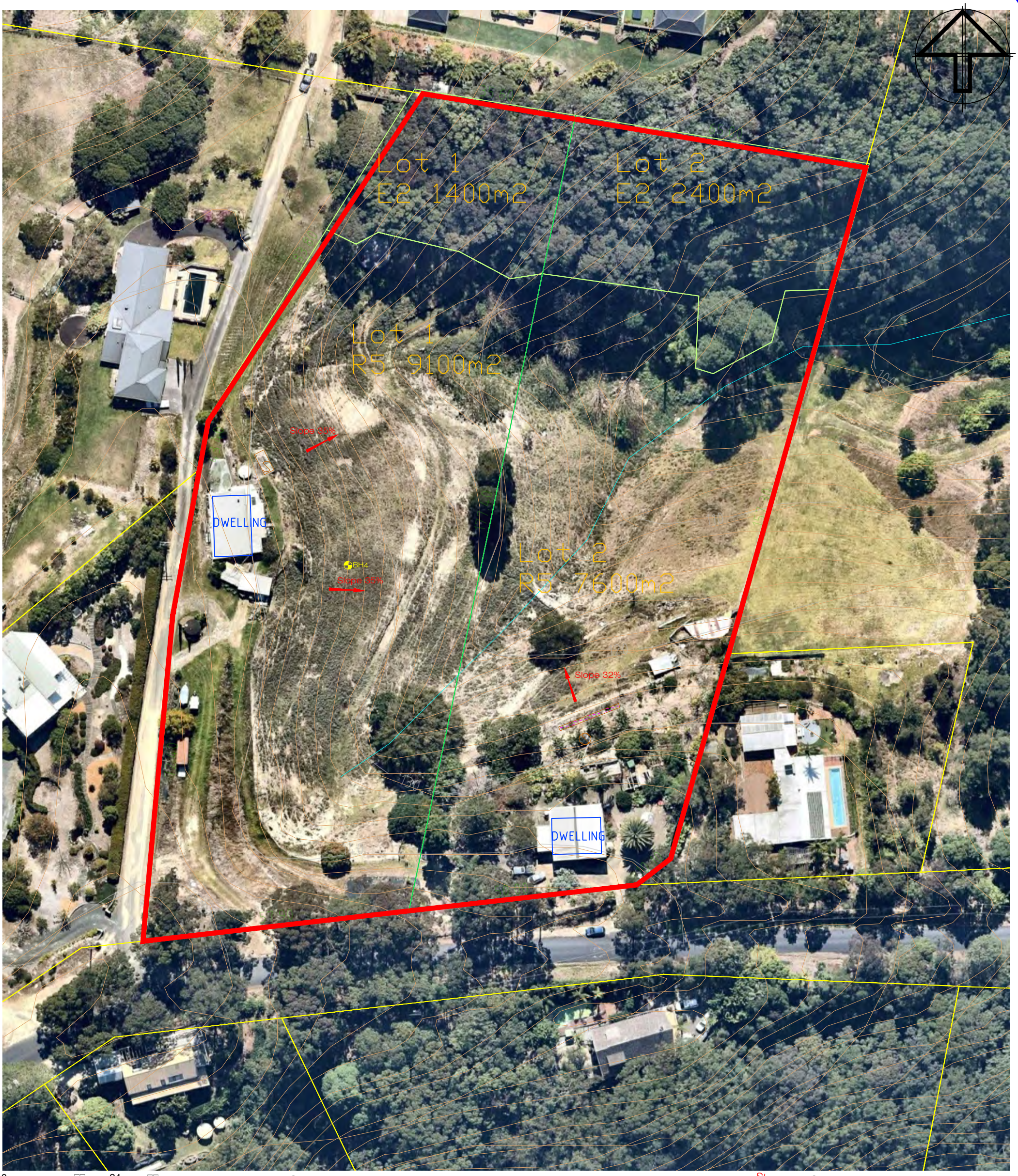
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LEGEND

- Property Boundary
- Contour Line (2m)
- Drainage Alignment
- □enceline
- Existing Dwelling
- Existing Treatment Tan□
- Existing EMA
- Slope % Slope Direction
- Borehole Location

EARTH WATER CONSULTING

TITLE: No.9 Gaudrons Road Existing Property Layout			FIGURE: Figure 5
			SHEET: 1 OF1 ISSUE: B
PROJECT: LCA for Proposed Subdivision of No. 9, 148 and 189 Gaudrons Road, Sapphire Beach			CLIENT: Bowen, Duce & Hunter
AUTHOR: SD	DATE: 15/6/21	SCALE: 1:1200	PROJECT: 2021-71



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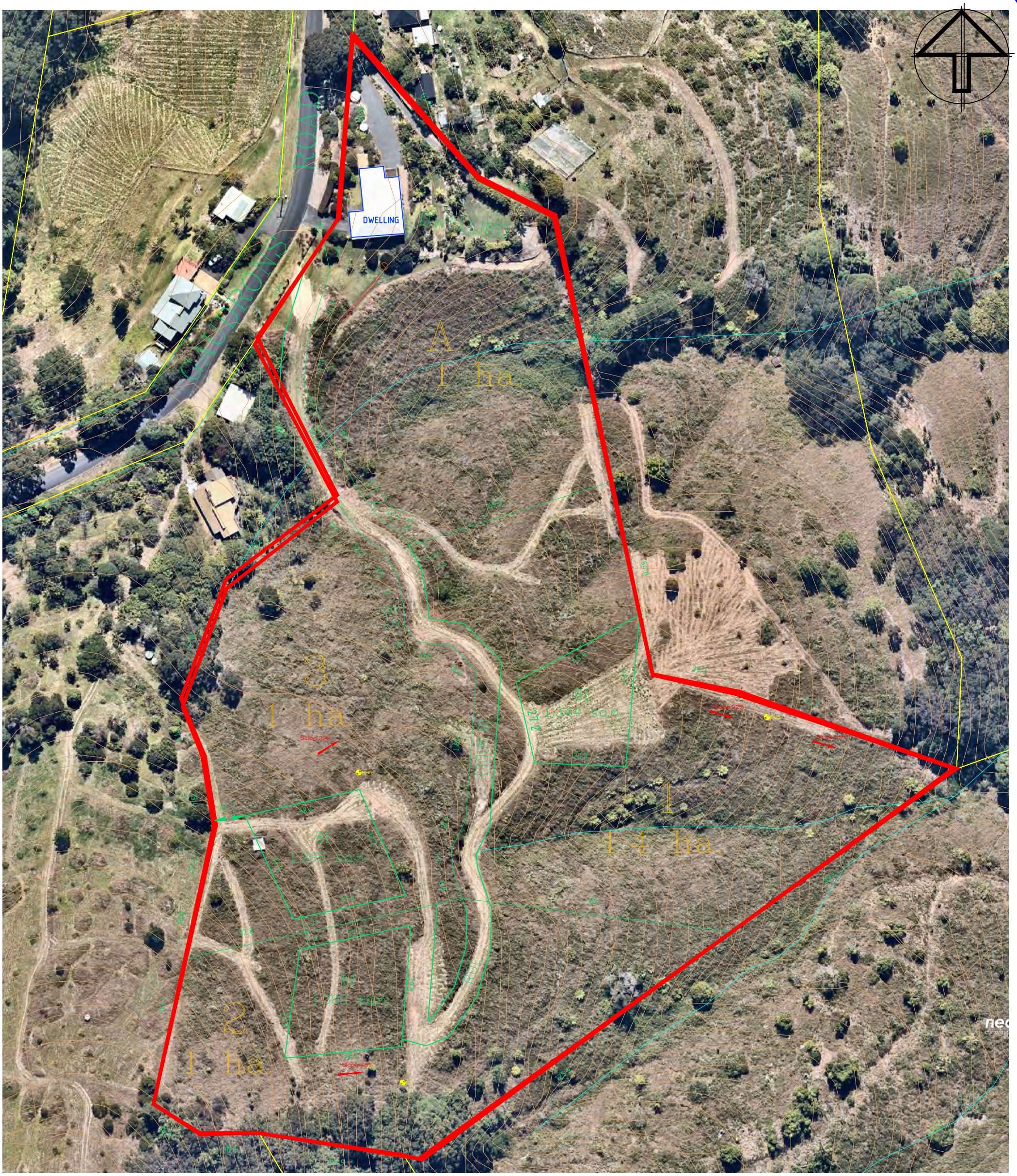
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LEGEND

- Property Boundary
- Contour Line (2m)
- Drainage Alignment
- □enceline
- Existing Dwelling
- Existing Treatment Tan□
- Existing EMA
- Slope % — Slope Direction
- Borehole Location

EARTH WATER CONSULTING

TITLE: No.148 Gaudrons Existing Property Layout			FIGURE: Figure 6
			SHEET: 1 OF1 ISSUE: A
PROJECT: LCA for Proposed Subdivision of No. 9, 148 and 189 Gaudrons Road, Sapphire Beach			CLIENT: Bowen, Duce & Hunter
AUTHOR: SD	DATE: 30/10/20	SCALE: 1:800	PROJECT: 2021–71



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Horizontal Scale (metres) 1:1200

LEGEND

- Property Boundary
- Contour Line (2m)
- Drainage Alignment
- □enceline
- Existing Dwelling
- Existing Treatment Tan□
- Existing EMA
- Slope % — Slope Direction
- Borehole Location

EARTH WATER CONSULTING

TITLE	No.189 Gaudrons Road Existing Property Layout
FIGURE	Figure 7
SHEET	1 OF1
ISSUE	A
PROJECT	LCA for Proposed Subdivision of No. 9, 148 and 189 Gaudrons Road, Sapphire Beach
CLIENT	Bowen, Duce & Hunter
AUTHOR	SD
DATE	30/10/20
SCALE	1:1200
PROJECT	2021-71

APPENDIX 11 - LAND CAPACITY ASSESSMENT



160 Gaudrons Road



MLS 75-81 Gaudrons Road



39-41 and 45 Gaudrons Road

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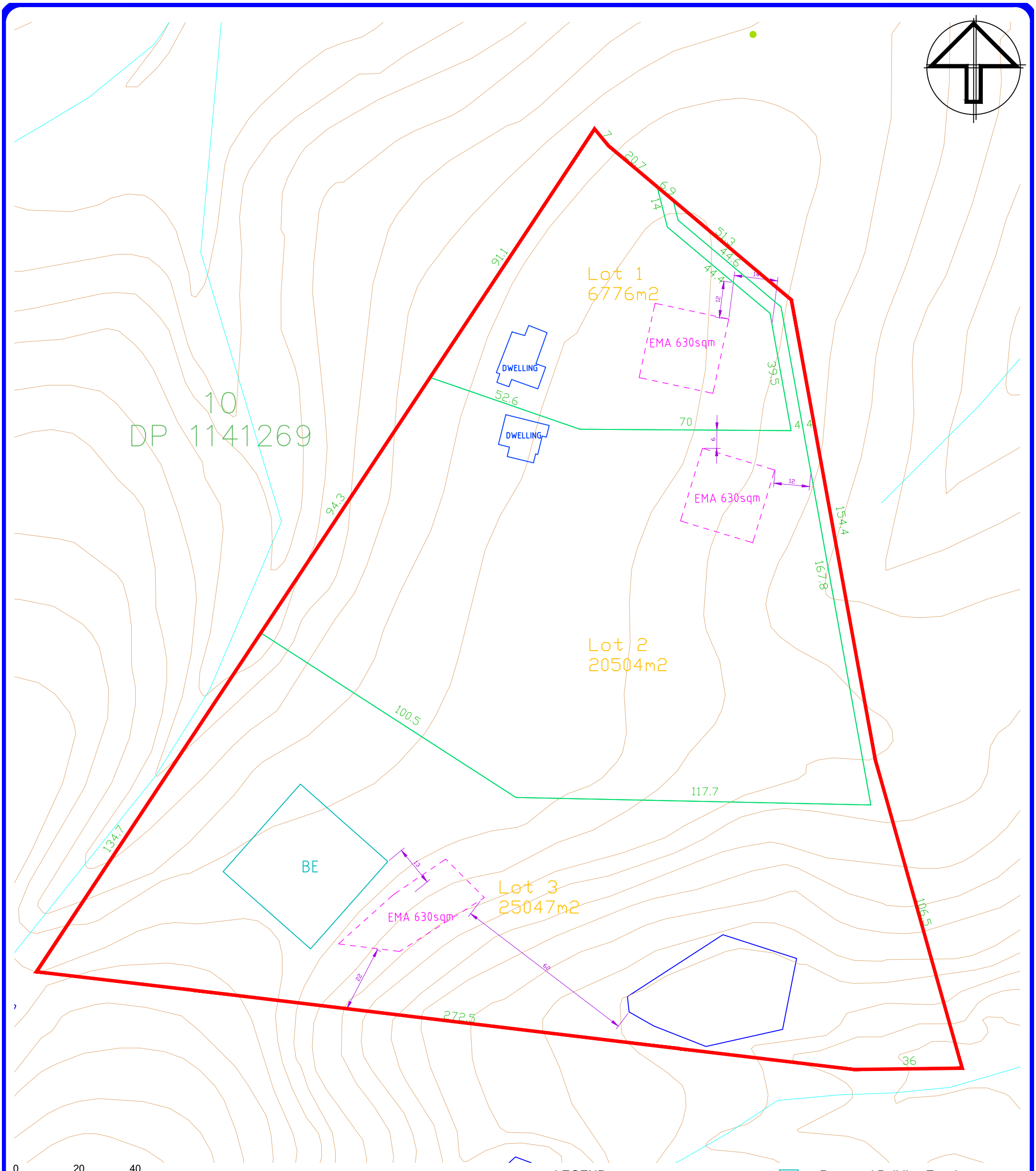
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LEGEND

- Property Boundary
- Adjacent Lot
- Drainage Alignment
- EMA Restricted Area
- EMA Available Area

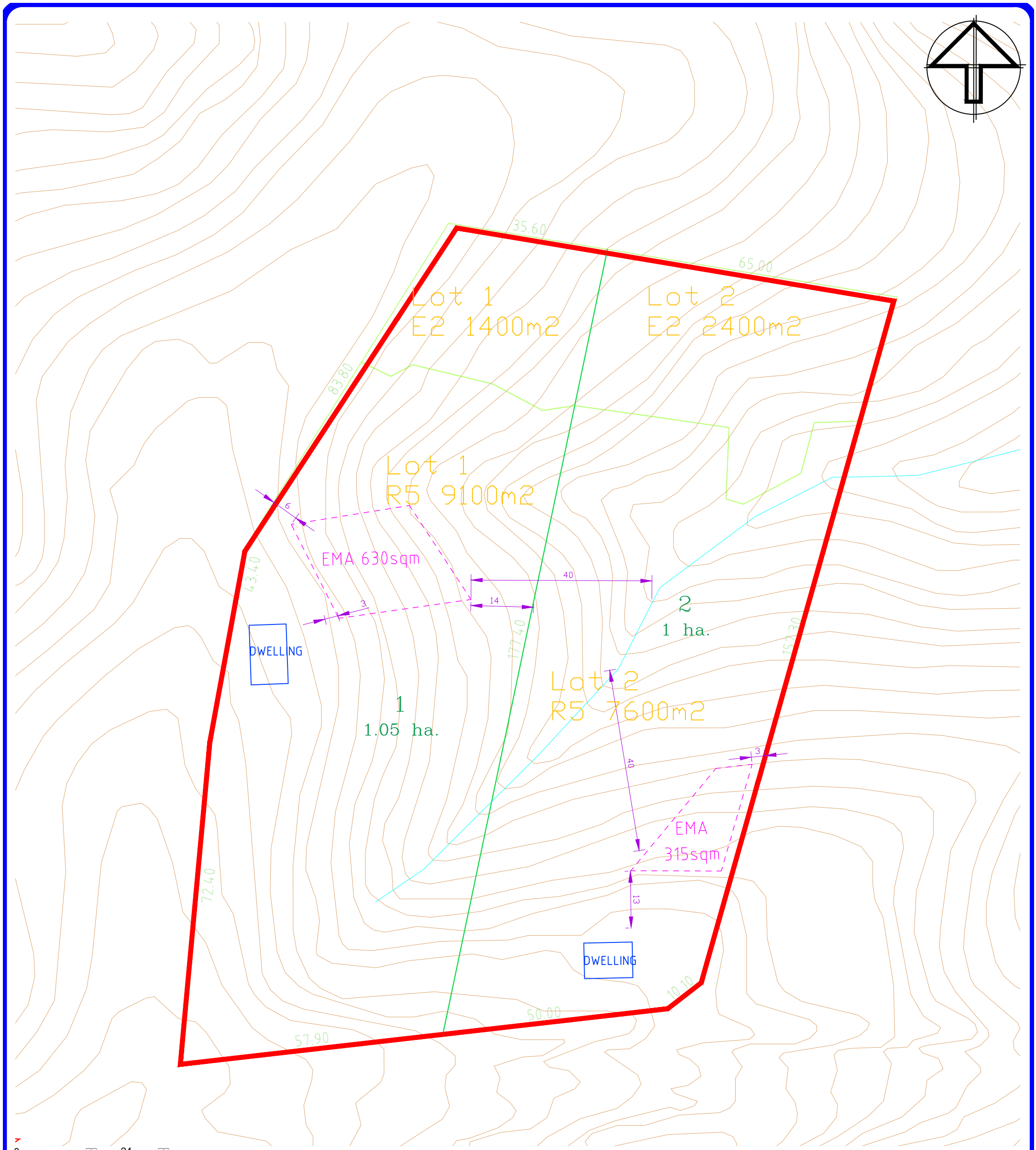
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			SHEET: 1 OF1 ISSUE: A
PROJECT: LCA for Proposed Subdivision of No. 9, 148 and 189 Gaudrons Road, Sapphire Beach			CLIENT: Bowen, Duce & Hunter
AUTHOR: SD	DATE: 15/6/21	SCALE: 1:1000	PROJECT: 2021-71

APPENDIX 11 - LAND CAPACITY ASSESSMENT



EARTH WATER CONSULTING

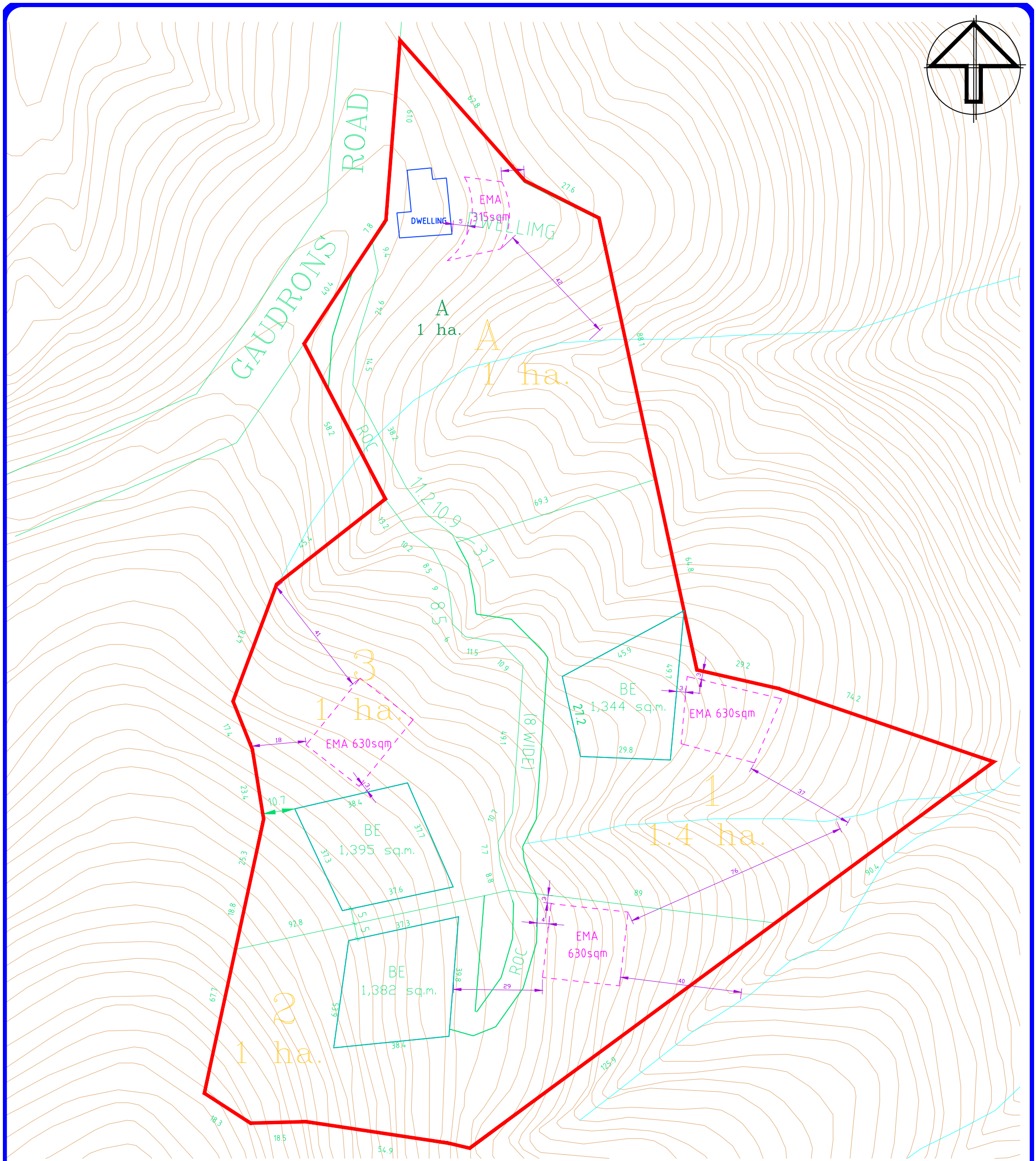
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			SHEET: 1 OF1 ISSUE: B
PROJECT: LCA for Proposed Subdivision of No. 9, 148 and 189 Gaudrons Road, Sapphire Beach			CLIENT: Bowen, Duce & Hunter
AUTHOR: SD	DATE: 15/6/21	SCALE: 1:1200	PROJECT: 2021-71



EARTH WATER CONSULTING

TITLE: No.148 Gaudrons Road Recommended Effluent Management Area			FIGURE: Figure 10
			SHEET: 1 OF1 ISSUE: A
PROJECT: LCA for Proposed Subdivision of No. 9, 148 and 189 Gaudrons Road, Sapphire Beach			CLIENT: Bowen, Duce & Hunter
AUTHOR: SD	DATE: 25/11/20	SCALE: 1:800	PROJECT: 2021-71

APPENDIX 11 - LAND CAPACITY ASSESSMENT



EARTH WATER CONSULTING

TITLE: No.189 Gaudrons Road Recommended Effluent Management Area			FIGURE: Figure 11
			SHEET: 1 OF1 ISSUE: B
PROJECT: LCA for Proposed Subdivision of No. 9, 148 and 189 Gaudrons Road, Sapphire Beach			CLIENT: Brown, Duce & Hunter
AUTHOR: SD	DATE: 15/6/21	SCALE: 1:1200	PROJECT: 2021-71

APPENDIX A

APPENDIX 11 - LAND CAPACITY ASSESSMENT

Soil Borelog

Borehole No:	**BH1**
Logged by:	SD
Drilling date:	2/11/2020
Drilling method:	Hand auger
Borehole location:	
Borehole coords:	513868, 6655678

Project ref:	2021-97
Client:	Bowen, Duce & Hunter
Address:	No. 9 Gaudrons Road

PROFILE DESCRIPTION

Depth (m)	Sampling depth/name	Graphic Log	Horizon	Texture	Structure	Colour	Mottles	Coarse Fragments	Moisture Condition	Comments
0.1			A1	Clay Loam	Strong	Dark Choc Brown	Nil	<10%	SM	Topsoil
0.2			A2	Clay Loam	Strong	Pale Brown	Slight OB	<10%	SM	Colluvium
0.3	S		B1	Light Clay	Strong	Pale Brown	OB	<10% qtz	SM	Residual
0.4										
0.5			B2	Light Clay	Strong	Orange Brown	Reddish Brown	<5%	SM	Residual
0.6										
0.7	S									
0.8										
0.9			B3	Medium Clay	Strong / Moderate	Pale Grey	Strong RB	<5%	SM	Residual
1.0										
1.1										
1.2										
1.3			Borehole terminated at 1.2m							
1.4										
1.5										

Moisture condition

D	Dry	M	Moist	W	Wet / saturated
SM	Slightly moist	VM	Very moist		

APPENDIX 11 - LAND CAPACITY ASSESSMENT

Soil Borelog

Borehole No:	**BH2**
Logged by:	SD
Drilling date:	2/11/2020
Drilling method:	Hand auger
Borehole location:	
Borehole coords:	514062, 6653710

Project ref:	2021-97
Client:	Bowen, Duce & Hunter
Address:	No. 9 Gaudrons Road

PROFILE DESCRIPTION

Depth (m)	Sampling depth/name	Graphic Log	Horizon	Texture	Structure	Colour	Mottles	Coarse Fragments	Moisture Condition	Comments
0.1			A1	Clay Loam	Strong	Dark Choc Brown	Nil	<10%	SM	Topsoil
0.2	S		B1	Light Clay	Strong	Orange Brown	Reddish Brown	<5%	SM	Residual
0.3										
0.4										
0.5										
0.6										
0.7										
0.8			B2	Medium Clay to Silty Clay	Strong / Moderate	Pale Grey	Strong RB	5-30% Phyllite	SM	Residual grading to XW Bedrock
0.9										
1.0	S									
1.1										
1.2										
1.3					Borehole terminated at 1.2m					
1.4										
1.5										

Moisture condition

D	Dry	M	Moist	W	Wet / saturated
SM	Slightly moist	VM	Very moist		

APPENDIX 11 - LAND CAPACITY ASSESSMENT

Soil Borelog

Borehole No:	**BH3**
Logged by:	SD
Drilling date:	2/11/2020
Drilling method:	Hand auger
Borehole location:	
Borehole coords:	514046, 6655837

Project ref:	2021-97
Client:	Bowen, Duce & Hunter
Address:	No. 9 Gaudrons Road

PROFILE DESCRIPTION

Depth (m)	Sampling depth/name	Graphic Log	Horizon	Texture	Structure	Colour	Mottles	Coarse Fragments	Moisture Condition	Comments
0.1			A1	Clay Loam	Strong	Dark Choc Brown	Nil	<10%	SM	Topsoil
0.2			B1	Light Clay	Strong	Orange Brown	Reddish Brown	<5%	SM	Residual
0.3										
0.4										
0.5										
0.6										
0.7										
0.8			B2	Medium Clay to Silty Clay	Strong / Moderate	Pale Grey	Strong RB	5-30% Phyllite	SM	Residual grading to XW Bedrock
0.9										
1.0										
1.1										
1.2										
1.3					Borehole terminated at 1.2m					
1.4										
1.5										

Moisture condition

D	Dry	M	Moist	W	Wet / saturated
SM	Slightly moist	VM	Very moist		

APPENDIX 11 - LAND CAPACITY ASSESSMENT

Soil Borelog

Borehole No:	**BH4**
Logged by:	SD
Drilling date:	2/11/2020
Drilling method:	Hand auger
Borehole location:	
Borehole coords:	512714, 6656125

Project ref:	2021-97
Client:	Bowen, Duce & Hunter
Address:	No.148 Gaudrons Road

PROFILE DESCRIPTION

Depth (m)	Sampling depth/name	Graphic Log	Horizon	Texture	Structure	Colour	Mottles	Coarse Fragments	Moisture Condition	Comments
0.1			A1	Sandy Clay Loam	Moderate	Dark Brown	Nil	5-20%	D	Topsoil
0.2			B1	Sandy Clay Loam	Strong	Brown	Nil	5-20%	SM	Colluvium
0.3	S									
0.4										
0.5										
0.6										
0.7			B2	Silty Clay	Moderate	Pale Yellow Brown	Pale Grey	5-30%	D	XW Bedrock
0.8										
0.9										
1.0										
1.1										
1.2										
1.3					Borehole terminated at 1.2m					
1.4										
1.5										

Moisture condition

D	Dry	M	Moist	W	Wet / saturated
SM	Slightly moist	VM	Very moist		

APPENDIX 11 - LAND CAPACITY ASSESSMENT

Soil Borelog

Borehole No:	**BH5**
Logged by:	SD
Drilling date:	2/11/2020
Drilling method:	Hand auger
Borehole location:	
Borehole coords:	512560, 6655625

Project ref:	2021-97
Client:	Bowen, Duce & Hunter
Address:	No.189 Gaudrons Road

PROFILE DESCRIPTION

Depth (m)	Sampling depth/name	Graphic Log	Horizon	Texture	Structure	Colour	Mottles	Coarse Fragments	Moisture Condition	Comments
0.1			A1	Clay Loam	Strong	Black	Nil	<10%	SM	Topsoil
0.2										
0.3			A2	Clay Loam	Strong	Pale Brown	Nil	5-40%	SM	Colluvium
0.4										
0.5			B1	Light Clay	Strong	Strong Orange Brown	Nil	5-40%	SM	Residual
0.6	S									
0.7										
0.8										
0.9										
1.0			B2	Light Clay / Silty Clay	Strong	Pale Orange Brown	Yellow	<5%	SM	Residual
1.1										
1.2										
1.3			Borehole terminated at 1.2m							
1.4										
1.5										

Moisture condition

D	Dry	M	Moist	W	Wet / saturated
SM	Slightly moist	VM	Very moist		

APPENDIX 11 - LAND CAPACITY ASSESSMENT

Soil Borelog

Borehole No:	**BH6**
Logged by:	SD
Drilling date:	2/11/2020
Drilling method:	Hand auger
Borehole location:	
Borehole coords:	512675, 6655655

Project ref:	2021-97
Client:	Bowen, Duce & Hunter
Address:	No.189 Gaudrons Road

PROFILE DESCRIPTION

Depth (m)	Sampling depth/name	Graphic Log	Horizon	Texture	Structure	Colour	Mottles	Coarse Fragments	Moisture Condition	Comments
0.1			A1	Clay Loam	Strong	Dark Brown	Nil	<10%	SM	Topsoil
0.2			B1	Sandy Clay	Strong	Pale Orange	Yellow Brown	<5%	SM	Residual
0.3										
0.4										
0.5										
0.6										
0.7										
0.8								5-25%		
0.9										
1.0									VM	
1.1					Borehole refusal at 1m on gravel					
1.2										
1.3										
1.4										
1.5										

Moisture condition

D	Dry	M	Moist	W	Wet / saturated
SM	Slightly moist	VM	Very moist		

APPENDIX B

APPENDIX 11 - LAND CAPACITY ASSESSMENT

WASTEWATER DISPOSAL SOIL ASSESSMENT

2 samples supplied by Earth Water Consulting Pty Limited on 11/11/2020 - Lab Job No. K0461
Analysis requested by Strider Duerinckx. - **Your Project: Ref: 2021-71**
PO Box 50 BELLINGEN NSW 2454

	SAMPLE 1 BH1 0.6-0.8	**SAMPLE 2 BH5 0.5-0.8**
Job No.	*K0461/1*	*K0461/2*
Description	Medium Clay	Medium Clay
Moisture Content (% moisture)	19	24
Emerson Aggregate Stability Test (SAR 5 Solution) note 12	EAST Class 3/6, Slake 3 see note 12	EAST Class 3/6, Slake 3 see note 12
Soil pH (1:5 $CaCl_2$)	4.36	4.33
Soil Conductivity (1:5 water dS/m)	0.069	0.047
Soil Conductivity (as EC_e dS/m) note 10	0.589	0.407
Native NaOH Phosphorus (mg/kg P)	6.62	8.13
Residual phosphorus remaining in solution from the initial phosphate phosphorus		
Initial Phosphorus concentration (ppm P)	**29.2**	**29.2**
72 hour - 3 Day (ppm P)	11.36	5.96
120 hour - 5 Day (ppm P)	10.96	5.21
168 hour - 7 Day (ppm P)	10.24	5.09
Equilibrium Phosphorus (ppm P)	9.64	4.34
EXCHANGEABLE CATIONS		
Calcium (cmol+/kg)	2.73	1.52
Magnesium (cmol+/kg)	0.87	1.75
Potassium (cmol+/kg)	0.23	0.31
Sodium (cmol+/kg)	0.10	0.12
Aluminium (cmol+/kg)	4.84	3.43
Hydrogen (cmol+/kg)	0.23	0.15
ECEC (effective cation exchange capacity)(cmol+/kg)	9.0	7.3
Exchangeable Calcium %	30.3	20.9
Exchangeable Magnesium %	9.7	24.1
Exchangeable Potassium %	2.5	4.2
Exchangeable Sodium % (ESP)	1.2	1.7
Exchangeable Aluminium %	53.7	47.2
Exchangeable Hydrogen %	2.6	2.0
Calcium/ Magnesium Ratio	3.13	0.87

Notes:

1: ECEC = Effective Cation Exchange Capacity = sum of the exchangeable Mg, Ca, Na, K, H and Al

2: Exchangeable bases determined using standard Ammonium Acetate extract (Method 15D3) with no pretreatment for soluble salts. When Conductivity ≥0.25 dS/m soluble salts are removed (Method 15E2).

3. ppm = mg/kg dried soil

4. Insitu P determined using 0.1M NaOH and shaking for 24 hrs before determining phosphate

5. Soils were crushed using a ceramic grinding head and mill; five 1g subsamples of each soil were used to which 40ml of 0.1M NaCl with Xppm phosphorus was added to each. The samples were shaken on an orbital shaker

6. Exchangeable sodium percentage (ESP) is calculated as sodium (cmol+/kg) divided by ECEC

7. All results as dry weight DW - soils were dried at 6OC for 48hrs prior to crushing and analysis.

8. Phosphorus Capacity method from Ryden and Pratt, 1980.

9. Aluminium detection limit is 0.05 cmol+/kg; Hydrogen detection limit is 0.1 cmol+/kg. However for calculation purposes a value of 0 is used.

10. For conductivity 1 dS/m = 1 mS/cm = 1000 µS/cm; EC_e conversions: sand loam 14, loam 9.5; clay loam 8.6; heavy clay 5.8

11. 1 cmol+/kg = 1 meq/100g

12. Emerson Aggregate Stability Test (EAST) for Wastewater applications (see Sheet 3 - Patterson, 2015). MEAT Class 1: Slaking, complete dispersion; Class 2: Slaking, some dispersion; Class 3-6: Slaking 1 slight to 3 complete, No dispersion; Class 7: No slaking, yes swelling; Class 8: No slaking, no swelling.

13. Analysis conducted between sample arrival date and reporting date.

14. .. Denotes not requested.

15. This report is not to be reproduced except in full.

16. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions (refer scu.edu.au/eal or on request).

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Checked:.....

PHOSPHORUS SORPTION TRIAL

2 samples supplied by Earth Water Consulting Pty Limited on 11/11/2020 - Lab Job No. K0461
Analysis requested by Strider Duerinckx. - Your Project: Ref: 2021-71

Calculations for Equilibrium Absorption Maximum for Soil provided

I.D.	JOB NO.	Equilibrium P mg P/L (in solution)	Added P mg P/L	P Sorb at Equil. mg P/kg	Native P mg P/kg	Equilibrium P Sorption Level µg P/g soil	Divide Ø (from Table)	Equilibrium Absorption Maximum (B) µg P/g soil
BH1 0.6-0.8	**K0461/1**	9.6	29.2	782	7	789	0.76	**1,032**
BH5 0.5-0.8	**K0461/2**	4.3	29.2	994	8	1002	0.65	**1,552**

Calculations for phosphorus sorption capacity

	JOB NO.	Equilibrium Absorption Maximum (B µg P/g soil	multiply by theta of wastewater to be applie (=X)	minus the native P (=Y)	**kg P sorption / hectare (to a depth of 15cm)** (1.95 is a correction factor for density, etc	**kg P sorption / hectare (to a depth of 100cm)** (1.95 is a correction factor for density, etc)
BH1 0.6-0.8	*K0461/1*	1032	(=B x theta)	(=X -native P)	(=Y x 1.95)	(=Y x 1.95 x 100/15)
BH5 0.5-0.8	*K0461/2*	1552	(=B x theta)	(=X - native P)	(=Y x 1.95)	(=Y x 1.95 x 100/15)

EXAMPLE 1 - Calculations for phosphorus sorption capacity using a wastewater phosphorus of 15mg/L P

	JOB NO.	Equilibrium Absorption Maximum (B µg P/g soil	multiply by theta of wastewater to be applie (ie. 0.84)	minus the native P (=Y)	**kg P sorption / hectare (to a depth of 15cm)** (1.95 is a correction factor for density, etc	**kg P sorption / hectare (to a depth of 100cm)** (1.95 is a correction factor for density, etc)
BH1 0.6-0.8	*K0461/1*	1032	867	860	**1,678**	**11,186**
BH5 0.5-0.8	*K0461/2*	1552	1304	1296	**2,526**	**16,842**



Checked:.....

APPENDIX C

APPENDIX 11 - LAND CAPACITY ASSESSMENT

Nominated Area Water Balance & Storage Calculations

Site Address: **9, 148 and 189 Gaudrons Road, Sapphire Beach** **Proj Ref:** 2021-71

Notes:

Flow Allowance		150	l/p/d
No. of bedrooms		4	bdr
Occupancy		1.5	p/room
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	0.85	untiless
Void Space Ratio	V	0.3	unitless
Nominated Land Application Area	N	85	sqm
Trench/Bed wetted thickness	Ww	0.15	m
Rainfall Data	Coffs Harbour Rainfall Data (monthly median)		
Evaporation Data	Coffs Harbour MO- Average		

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	151.2	179	205.1	135.9	117.4	90	54.3	40.7	35.4	74.7	130.4	114.1	1612.2
Average Evaporation	E	\	mm/month	192.2	156.8	148.8	117	86.8	69	77.5	105.4	135	161.2	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	0.70	0.80	0.80	
OUTPUTS																
Evapotranspiration	ET	ExC	mm/month	154	125	119	82	61	41	47	63	95	113	137	154	**1189.94**
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	441.9	432.8	401.4	418.5	435.2	454.5	484.8	496.8	525.8	**5569.9**
INPUTS																
Retained Rainfall	RR	R*RRc	mm/month	128.52	152.15	174.335	115.515	99.79	76.5	46.155	34.595	30.09	63.495	110.84	96.985	**1128.97**
Effluent Irrigation	W	(QxD)/L	mm/month	328.2	296.5	328.2	317.6	328.2	317.6	328.2	328.2	317.6	328.2	317.6	328.2	**3864.7**
Inputs		RR+W	mm/month	456.8	448.6	502.6	433.2	428.0	394.1	374.4	362.8	347.7	391.7	428.5	425.2	**4993.7**
STORAGE CALCULATION																
Storage remaining from previous month			mm/month		0.0	0.0	38.4	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Storage for the month	S	(RR+W)-(ET+B)	mm/month	-230.0	-42.7	38.4	-29.1	-15.8	-24.2	-147.0	-241.4	-355.9	-310.4	-227.7	-335.1	**-461.8**
Cumulative Storage	M		mm	0.0	0.0	38.4	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**47.7**
Maximum Bed Storage Depth for Area	BS		mm	**38.43**	Is the calculated storage acceptable?			Yes, storage is conservative								

Nominated trench width	1.2	
Total length based on nominated width	70.8	
No. of beds	4	
Individual bed lengths	17.7	
Individual Bed footprints	21.3	
Spacing between beds	1.5	
Total bed area	165	
Nutrient uptake zone	289	2m buffer nutrient uptake allowance

Nutrient Balance

Proj Ref: 2021-71

Site Address: 9, 148 and 189 Gaudrons Road, Sapphire Beach

Notes:

INPUT DATA

Hydraulic Load		900	L/Day	
Effluent N Concentration		30	mg/L	
% Lost to Soil Processes		0.2	Decimal	
Total N Loss to Soil		5400	mg/day	
Effluent P Concentration		12	mg/L	
Design Life of System		50	yrs	
Crop N Uptake	250	kg/ha/yr =	68	$mg/m^2/day$
Crop P Uptake	25	kg/ha/yr =	7	$mg/m^2/day$
P-sorption analytical result in soil		11500	kg/ha	
% of Predicted P-sorp		0.5	Decimal	

Nitrogen Balance

Nitrogen uptake ability in vegetation	68	$mg/m^2/day$
Nitrgen loading in wastewater	21600	mg/day
Area required for nitrogen	**315**	m^2

Phosphorus Balance

P adsorbed	0.575	kg/m^2
P uptake	0.125	kg/m^2
P generated	219	kg
Area required for Phosphorus	**313**	m^2



Environmental Site Assessment - 9 and 148 Gaudrons Road, Sapphire Beach

14 July 2023

For: Bowen & Hunter

Authored by: Strider Duerinckx

Ref	Ver	Date	Distribution
2021-71-05	A	14/07/23	Clients, Town Planner

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Figure 3 No.148 Gaudrons Road Proposed Development Layout
Figure 4 No.9 Gaudrons Road Former Banana Plantation
Figure 5 No.148 Gaudrons Road Former Banana Plantation
Figure 6 No.9 Gaudrons Road Existing Property Layout
Figure 7 No.148 Gaudrons Road Existing Property Layout
Figure 8 No.9 Gaudrons Road Sampling Locations

Figure 9 No.148 Gaudrons Road Sampling Locations

Appendices

Appendix A Historical Aerial Photographs

Appendix B Analytical Reports

1 Introduction

Earth Water Consulting Pty Limited (EWC) was engaged by parties Bowen & Hunter (the "Clients") to undertake additional site investigations as part of a Detailed Environmental Site Assessment (DESA) for 9 and 148 Gaudrons Road, Sapphire Beach) (the "Site") (Figure 1).

A DESA was prepared on 15 June 2021 by EWC (Ref: 2021-71-04) as part of a planning proposal. The gateway determination report (Ref: PP-2021-5514, dated May 23), Section 3.3 required additional soil testing of the properties.

4.4 Remediation of Contaminated Land	No – Unresolved	Part of the land is known known to be potentially contaminated from previous agricultural land uses, in particular banana cropping. The land is proposed to be rezoned to facilitate a change of use for residential purposes. Council has considered the results of a preliminary investigation of the land for potential contamination; however the preliminary investigation report was based upon very limited testing of the site and is considered inadequate to determine potential contamination and/or remediation requirements. The proposal is therefore considered to be inconsistent with this Direction, pending further site assessment.

The scope of the original DESA was based on Coffs Harbour City Council (CHCC) policy for former banana plantation lands of requiring only limited assessments of properties covering 1,500m^2 over any proposed building envelopes. The Gateway Report required the DESA to assess the entire properties to confirm suitability of them in entirety for residential landuse rather than part.

1.1 Objectives

The objectives of the additional DESA are to:

- Make a detailed assessment of potential contamination issues for residential development based on the Site history review; and
- Where a risk of contamination has been assessed to undertake detailed sampling and analysis of the affected area.

1.2 Suitability to Undertake Works

Strider Duerinckx has project managed and signs off on this investigation. 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

Based on plans provided, it is understood that it is proposed to subdivide the subject properties as follows in **Table 1** and shown in Figures 2-3.

Table 1: Property Details

Existing Property	Lot & DP	Existing Size (m^2)	Proposed No. of Lots	Proposed Building Envelopes (m^2)	Proposed Lot Size (m^2)
No. 9	L11, DP1141269	52,939	3	1 @ 1,500, 2 existing dwellings	6,700-25,000
No. 148	L7, DP555490	20,496	2	NIL additional, 2 existing dwellings	10,000-10,500

3 Scope of Work

This DESA has been undertaken in reference to the relevant sections in the *Consultants Reporting on Contaminated Land* (NSW EPA 2020), and Department of Urban Affairs and Planning *Managing Land Contamination – Planning Guidelines SEPP55 – Remediation of Land* (DUAP & EPA 1998).

The assessment included:

- A desktop review of the previous investigation and historical activities;
- A site walkover of the Site to assess current layouts, surface conditions, presence hazardous building materials that may result subsurface contamination, and the presence of any obvious previous contaminating activities (such as current or historical fuel storage);
- Preparation of a Conceptual Site Model (CSM);
- Undertaking detailed sampling and analysis of No.9 and 148 Gaudrons Road in accordance with NSW EPA (2022) Guideline requirements; and
- Presentation of the DESA report, including the historical review, analytical results, conclusions and recommendations on the contamination status of the property and suitability of the rezoning application and future subdivision.

4 Site Description

4.1 Site Identification

The Site details are provided in **Table 1**. The Site properties are zoned RU2, rural landscape. Existing Site layout features are shown on Figures 4-7.

4.2 Location and Features

4.2.1 No. 9 Gaudrons Road

No. 9 is located at about 30mAHD in the lower eastern portion of Gaudrons Road, on the southern side. The property straddles a ridgeline, with intermittent drainage present along the southern boundary draining east under the Pacific Highway, and along the northwestern boundary draining north. Both are First-order streams in accordance with the Strahler ordering system.

Surface slopes are relatively shallow, and the property is currently an operating mixed banana plantation and hothouse fig farm, containing two dwellings and several sheds. The sheds and hothouses will be removed where required for any subdivision works.

4.2.2 No. 148 Gaudrons Road

No. 148 is located at about 160mAHD on the northern side of Gaudrons Road and is bisected by an incised intermittent First-order intermittent gully. The property is steely sloping down to the east and north to this gully across rocky ground. An existing dwelling is located in the southeastern corner of the property and a second dwelling along the western boundary. The proposed subdivision will create a building entitlement to allow the approval of this existing second dwelling. The property is a former banana plantation farm that has a number of disused access tracks but is now only used for hobby goat rearing and rural residential habitation.

4.3 Surrounding Land Use

The surrounding land use is detailed in **Table 2**.

Table 2: Surrounding Landuse

Existing Property	North	South	East	West
No. 9	Gaudrons Road then rural res	Former banana plantation undeveloped	Pacific Highway	Rural res
No. 148	Rural res	Gaudrons Rd	Rural res	Rural res

5 Site Inspection

A site inspection was undertaken on 2/11/20 and 15/6/23 by Strider Duerinckx. During the inspections it was noted that:

Table 3: Site Inspection Observations

Existing Property	Observations
No. 9	Horticultural production is reducing on the property. Between 2020 and 2023 banana and fig cultivation in the southwestern corner of the Site had ceased. Fig cultivation in greenhouses is ongoing. 2 older houses are present along the northwestern area with a gravel access road. The northern house is being relocated offsite and a new dwelling is under DA for the centre of that area as shown by detailed sampling (Figure 8). Two Galvanised Iron (GI) farm sheds are present south of the dwellings, one is a packing shed and one is a maintenance shed. The maintenance shed had no significant chemical or drum storage within, with minor oil staining around benches. The concrete slabs looked to be in good condition.

Existing Property	Observations
	The southern greenhouse is located on a shallow fill platform. Undeveloped forest is present along the western edge.
No. 148	The existing southern dwelling is perched on a narrow crestline along the southern boundary. The groundsurface slopes steeply down to the north across a series of cut/fill terraces that is used for chicken and goats. A shed type dwelling is present along the western boundary. Given its age and construction, it may be constructed with Asbestos Containing Material (ACM) sheeting. Several former banana plantation tracks are present parallel to contours on the property, and the majority of the property is cleared of vegetation except thin weeds and grass. Undeveloped forest is present along the northern edge.

Typical Site details are shown the following photographs.

5.1.1 No. 9 Gaudrons Road Photographs



Photograph 1 – Looking east across cleared ridgeline crest.



Photograph 2 – Looking south across the former banana plantation and fig nursery.



Photograph 3 – Looking south across greenhouses.



Photograph 4 – Looking southwest at existing dwellings.

5.1.2 No. 148 Gaudrons Road Photographs



Photograph 5 – Looking northwest from gully to western dwelling.



Photograph 6 – Looking north from existing dwelling towards gully.

6 Geology, Hydrogeology and Topography

6.1 Topography

The properties are located variously on steeply sloping ridgelines and lower lying more gentle footslopes. The dominant topographical features of each property are summarised in **Table 4**.

Table 4: Topography

Existing Property	Topography
No. 9	Dominant north trending ridgeline through the middle of the property, located at about 32mAHD. Sloping down to the northwest and southeast towards two intermittent gullies. Lowest ground surface at 10AHD in the southeastern corner.
No. 148	Dominant intermittent gully that drains northeast through the centre of the property, with steeply sloping (>30%) groundsurface. Groundsurface highest in southwestern corner at ~150mAHD, and lowest in northeast at ~110mAHD.

6.2 Geology

The properties are all underlain by the Coramba beds. These are comprised of lithofeldspathic wacke, minor siltstone, mudstone, metabasalt, jasper and rare calcareous siltstone.

6.3 Soils

We reviewed the Soil Landscapes of the Coffs Harbour 1:100,000 Sheet (Milford, 1999) which indicates that No. 9 Gaudrons Road is underlain by the Megan Soil Landscape and No.148 by the Suicide Soil Landscape (**Table 5**).

Table 5: Soil Landscapes

Existing Property	Soil Landscape	Type	Typical Profile	Limitations
No. 9	Megan	Erosional	moderately deep to deep (>100 cm), well drained structured Red Earths, Brown Earths, Brown or Red Podzolic Soils	strongly acid, stony (localised) soils of high erodibility.
No. 148	Suicide	Colluvial	moderately deep to deep (>100 cm), well drained, stony structured Yellow Earths on crests and upper slopes, with stony Lithosols and structured Red Earths on mid-slopes and footslopes.	strongly acid stony soils with low wet bearing strength, strong subsoil acidity and low fertility. Steep slopes.

6.4 Hydrogeology

The mapped regional aquifer is located within fractured bedrock and is an aquifer of low to moderate productivity.

No licensed groundwater bores are located on the Sites. There are numerous registered groundwater bores within 2000m of the properties. These are registered for mainly household use and drilled to between 29-132m depth. Some irrigation bores are also present.



Photograph 7 – Licensed groundwater bores

7 Site History

In order to provide a detailed desktop review, a search was undertaken of the Lotsearch Pty Ltd environmental database. Aerial photo excerpts from this report are included in Appendix A.

7.1 Mapped BP Land

A review of the Coffs Harbour City Council LEP mapping indicates that the three properties and surrounds are mapped as having been under banana cultivation between 1943 and 1994 (Photograph 8 and Figures 4-5).



Photograph 8 – CHCC mapped former banana plantations

7.2 Aerial Photographs

7.2.1 No. 9 Gaudrons Road Aerials

A review of aerial photographs from 1943-2019 was undertaken, and summarised in Table 6. The aerials are included in Appendix A.

Table 6: No. 9 Aerial Photograph Review

Year	Site	Surrounding Land
1943	The Site is partially forested and cleared grazing (?) land.	The Pacific Highway is located about 150m to the east. Forested land is present to the north and west, with banana cultivation occurring about 200m to the south.
1956	Banana cultivation is occurring in the southwestern and northeastern portions.	A small farm shed is located just off the middle of the southern boundary. Extensive banana cultivation is occurring to the east, west and south. Possible market gardening is occurring directly south in the low lying area.
1964	Banana cultivation is occurring along the western portion just east of the forest strip. The remainder of the property is cleared and fallow.	As per 1956, except no banana plantation to the east. Fallow.
1974	Cleared and fallow.	East and west cleared and fallow. South banana plantation still present. No shed along southern boundary. Rural residential development north of Gaudrons Road.

Year	Site	Surrounding Land
1984	House and one shed has been constructed as well as farm dam in southeastern corner.	Dwelling constructed across gully to the west. Remainder of surrounding landuse as per 1974.
1994	Second house constructed. Banana plantation in southwestern corner as per current, and market gardening in the eastern portion. Banan plantation also in northwestern corner.	As per 1984.
2004	Banana plantation increased to encompass majority of eastern strip.	Banana plantation in lowlying area just south of southeastern corner. Former banana plantation now to southwest.
2010	Houses and sheds as per current. Banana plantation extents have increased to southeast and into the middle of the property.	
2013	Some removal of banana plantation in centre of the property to prepare for greenhouse construction	All banana plantations removed surrounding the property. Pacific Highway realignment works in progress and highway has moved west removing some of the bananas that were located on the eastern portion of the larger property.
2016	As per 2014. Greenhouse removed from 37 Wakelands Road.	As per 2014.
2019	Greenhouses present. All bananas removed except southwestern corner.	As per 2016.

7.2.2 No. 148 Gaudrons Road Aerials

A review of aerial photographs from 1943-2019 was undertaken, and summarised in Table 6. The aerials are included in Appendix A.

Table 7: **No. 148 Aerial Photograph Review**

Year	Site	Surrounding Land
1943	The property is forested except for a portion along the eastern edge that has been recently cleared (felled trees visible).	Remnant forest surrounding with cleared land east, and banana plantations to the southeast and northwest.
1956	Banana cultivation is occurring in the southern half.	Banana plantations to the east and west. Forest to south and north.
1964	Banana cultivation is occurring entirely except for a narrow forested northern strip.	Extensive banana plantations to the east, west and south. A farm shed is present along ridgeline near southwestern boundary.
1974	As per 1964, but cutting and filling occurred in the southeastern corner in preparation for a dwelling construction	As per 1964.
1984	House has been constructed.	Dwelling constructed to the east and northwest.
1994	Banana plantations have ceased onsite. House has been constructed along western portion of the property.	All banana plantations have ceased in the vicinity, and rural residential development is occurring.
2004	As per 1994.	As per 1994.
2010	As per 2004.	As per 2004.
2013	As per 2010.	As per 2010.
2019	As per 2016.	As per 2016.

7.3 NSW EPA Records

A search of the NSW EPA's contaminated land record revealed no investigation or remediation notices have been issued on the three properties or adjacent lots for contamination or 'significant risk of harm' under Section 58 of the Contaminated Land Management Act 1997.

A search of the public register under Section 308 of the Protection of the Environment Operations Act indicated that no current and recently surrendered licenses have been held for potentially contaminating activities on the three properties or adjacent lots.

7.4 Other Contaminating Sites

The properties are not listed as any Defence sites, former gasworks, PFAS contaminated, loose fill asbestos insulation registered, cattle tick dip, dry cleaners, fire rescue, gas terminals, liquid fuel depots, active mines or quarries, derelict mines, petrol stations, power stations, electrical substations, telephone exchanges, active or historical waste management facilities (landfills) or wastewater treatment facilities, nor are any located in the vicinity.

7.5 Adjacent Business Operations

A search of published business directories indicates no registered and advertising businesses operated from the properties or immediate surrounds from 1950 through 1991.

7.6 Historical ownership

A search of historical owners was undertaken of the properties in the previous DESA compiled by EWC in 2021. These are summarised in Tables 9-11.

Table 8: No.9 Gaudrons Historical Ownership

Date	Detail
	(Lot 11 DP 1141269)
08.08.1952 (1952 to 1973)	Ernest Rockley Goodenough (Banana Grower)
08.05.1973 (1973 to 1979)	Gerard Properties Pty Limited
22.03.1979 (1979 to 1988)	Christopher John Housego (Ophthalmologist) and Valerie Alice Housego (Married Woman)
04.10.1988 (1988 to 1992)	Fleurpark Pty Limited
16.12.1992 (1992 to date)	Christopher Eric Bowen and Christine Giovanna Bowen

Table 9: No.148 Gaudrons Historical Ownership

Date	Detail
	(Lot 7 DP 555490)
08.08.1952 (1952 to 1966)	Ernest Rockley Goodenough (Banana Grower)
13.08.1966 (1966 to 1970)	Lillian Joyce Holloway (Married Woman) and Arthur Gordon Goodenough (Farmer)
08.12.1970 (1970 to 1971)	Lloyd Kenneth Foster (Banana Grower)
16.02.1971 (1971 to 1974)	Raymond Allan Harrigan (Earth Moving Contractor) and Shirley Joy Harrigan (Married Woman)
15.01.1974 (1974 to 1976)	John Spence Blackburn (Chartered Accountant)
06.12.1976 (1976 to 2002)	David Blair Campbell (Director) (& his deceased estate)
12.12.2002 (2002 to 2012)	Kerrie Frances Snoek Now Kerrie Frances Hunter, Narelle Irene O'Connell and Jennifer Mary Herington
15.05.2012 (2012 to date)	Kerrie Frances Hunter

7.7 Summary of Site History

7.7.1 No. 9 Gaudrons Road

The historical review confirmed that since at least 1956 (but no earlier than 1943), the property has been used for banana plantation and other agricultural activities.

House and shed construction were undertaken between 1974-1984, the second shed and house then constructed between 1994 and 2004, and greenhouses between 2013-2019. The current owners purchased the property in 1992.

A shed likely used for some mixing of chemicals has been present on the property since 1974.

7.7.2 No.148 Gaudrons Road

The historical review confirmed that since at least 1956 (but no earlier than 1943), the property has been used for banana plantation and other agricultural activities. These ceased sometime between 1984-1994.

House construction was undertaken around 1984, and the second house then constructed between 1984 and 1994. The remainder of the property remains fallow.

The current owner purchased the property in 2002, and banana growers were listed on ownership records between 1952 and 1971.

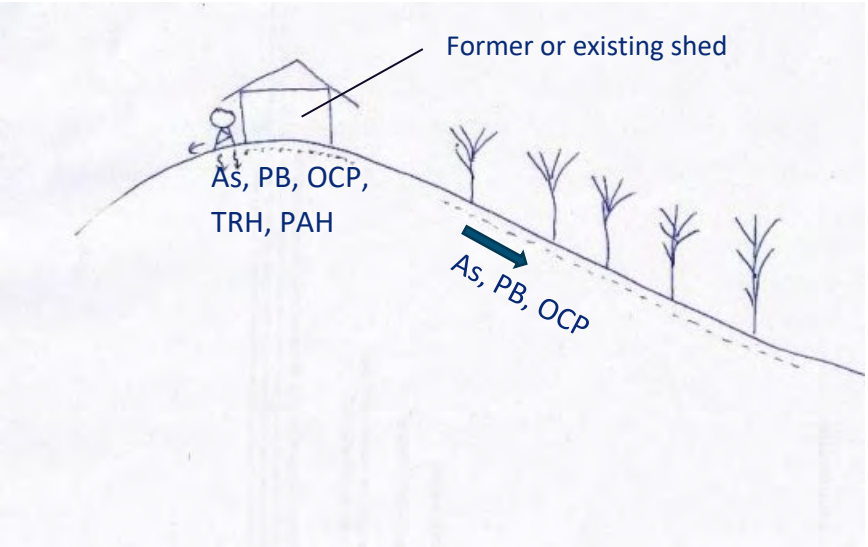
No chemical storage or packing shed appears to have been located on the property.

8 Conceptual Site Model

The Conceptual Site Model (CSM) for the proposed development areas are presented in Table 10.

Table 10: 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 areas.
Potentially Affected Media	Soil	Yes, if present and disturbed.
	Sediment	No agricultural activities have historically been located upslope in the vicinity of the farm dam, reducing the risk of contaminated sediment accumulation. The dam is proposed to be filled as part of the development.
	Groundwater	Groundwater is not expected until >15m depth. Groundwater impacts are not expected.
	Surface Water	An intermittent gully drains down No.148.
	Indoor	Volatile contamination is generally not expected at the Site.
	Ambient Air	Significant volatile contamination is generally not expected at the Site.
Receptors	Human	The primary human receptors are long term residents with soil contact and ingestion.
	Ecological	Minimal future ecological exposure pathways are expected on No.9 as no sensitive ecological environments. Conservation zoned forest land is present on the downslope margin of No.148 and could be impacted if contaminated surface soils are identified.
Exposure Pathways	Potential	Given proposed rural residential usage, future exposure routes are likely from landscape portions.
	Complete	Complete human or environmental exposure routes have not been identified at this time.



Photograph 14 – Conceptual Site Model

9 Potential Areas and Contaminants of Concern

Based on the site history and a walkover, a number of Areas of Environmental Concern (AECs) and associated Contaminants of Concern (CoC) were identified for the properties. These are summarised in **Table 11**. Given the widespread extents of former or current agricultural activities, the AECs cover the entire lots.

Table 11: Areas of Environmental Concern

Existing Property	AEC	CoC
No. 9	Banana plantations over the property Existing sheds	heavy metals (arsenic, lead), aldrin, dieldrin and DDT. TRH/BTEX/PAH hydrocarbons from vehicle maintenance.
No. 148	Banana plantation over the property	heavy metals (arsenic, lead), aldrin, dieldrin and DDT.

10 Investigation Criteria

The soil investigation levels for banana plantation contamination (OCP, arsenic and lead) were adopted from the NSW EPA (1997) 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".

Health Screening Levels (HSL) for vapour intrusion into dwellings for hydrocarbons have also been adopted as well as Management Limits (ML) to assess for risks of formation of LNAPLs in groundwater, fire and explosive hazards, and effects on buried infrastructure.

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-LR3.

11 Previous Investigations

A DESA was compiled for No.9 and 148 and 189 Gaudrons Road by EWC in 2021 (Ref: 2021-71-04 dated 15 June 2021). The DESA included a desktop historical review of the three properties, and detailed sampling of proposed 1,500m^2 Building Envelopes (BEs) on No.9 and 189 Gaudrons Road.

Given no additional dwellings were proposed for No.148, detailed sampling was not undertaken on that property.

No. 189 Gaudrons Road is part of a separate development application and is not discussed further here.

The desktop historical review of No.9 and 148 has been included in the appropriate sections of this report. In accordance with s2.1 of the NSW EPA (1997) Guidelines, the detailed sampling of the BE for proposed Lot 3 on No.9 Gaudrons Road included the collection of 16 samples from 0-75mm depth (Figure 8) and analysis of 4 composites for arsenic, lead, aldrin, dieldrin and DDT. The results are summarised in the attached Table LR1 and confirmed that concentrations of the CoCs were below the relevant investigation criteria.

A second DESA was prepared for a BE on proposed Lot 1 of No.9 Gaudrons Road (REF: EWC 2122-190-02, dated 15 January 2023). In accordance with s2.1 of the NSW EPA (1997) Guidelines, the detailed sampling of the BE for proposed Lot 3 on No.9 Gaudrons Road included the collection of 16 samples from 0-75mm depth (Figure 8) and analysis of 4 composites for arsenic, lead, aldrin, dieldrin and DDT. The results are summarised in the attached Table LR2 and confirmed an exceedance of lead in one composite sample adjacent to the driveway. Retesting of that composite (C-4) confirmed an exceedance of lead In one sample (S-13 of Table LR3) and the 95% UCL of lead was greater than the investigation criteria. The remainder of CoCs were below the relevant investigation criteria.

Remediation of a 76m^2 footprint was undertaken in accordance with a Remedial Action Plan (RAP) and validation samples collected of the stripped surface. The five validations samples were analysed for arsenic and lead. All concentrations were reported below the validation criteria (Table LR4), and the BE deemed to be suitable for residential landuse in the combined DESA, RAP and validation report (REF: EWC 2122-190-02, dated 15 January 2023).

12 Sampling Program

The additional sampling program was developed to meet the objectives of the investigation and was undertaken by a trained EWC environmental scientist. A systematic sampling program was undertaken.

12.1 No. 9 Gaudrons Road

The mapped former banana plantation land covers 23,537m^2, and current agricultural activities extend a further ~4,800m^2. Grid sampling has previously been undertaken for 2 x BEs on the property, totalling 3,000m^2 with a reduced untested footprint of 23,337m^2. Based on s2.1.1 and s2.2 of the NSW EPA (1997) Guidelines the sampling program included:

- In accordance with Table A of s2.1.1 (undisturbed broadacre) surface sampling in a 25m grid across the 20,000m^2 undisturbed area at a rate of 16 samples/ha. 30 surface samples were required to be collected, compositing into 8 samples for analysis;
- In accordance with s2.1.2 (disturbed areas) collection of 16 discrete samples in 2,000m^2 of track gravel, fill and natural soils from the existing greenhouse platforms and surrounds;
- In accordance with s2.2 (potential hotpots) collection of 13 samples in a 5m grid around the existing sheds;
- Given the lack of historical use of the 14,300m^2 southeastern portion of the property (proposed Lot 3), detailed sampling was not warranted. Eight (8) check samples were collected from the paddock area and compositing into 2 composite samples for analysis;
- Analysis of 40 composite and discrete samples for arsenic, lead, DDT, Aldrin and Dieldrin, 4 samples for OPP pesticides in greenhouses, and 4 samples for TRH/BTEX/PAH hydrocarbons around the; and
- Preparation of a revised ESA report to NSW EPA Guidelines for Consultants Reporting on Contaminated Sites. This report would detail the results of the desktop review and site walkover (completed), and assessment of contamination risks (completed), sampling program, presentation of analytical results with comparison to published guidelines, conclusions regarding the contamination status of the Site, and recommendations for remedial works required (if any).

12.2 No. 148 Gaudrons Road

The mapped former banana plantation area covers about 18,000m^2:

- In accordance with Table A of s2.1.1 of the NSW EPA (1997) Guidelines, surface sampling in a 25m grid across the property with the collection of 32 samples, compositing into 8 samples for analysis;
- Analysis for arsenic, lead, DDT, Aldrin and Dieldrin.

12.3 Combined Sampling Dataset

The combined sample dataset are provided in **Table 12**.

Table 12: Sampling Program

Round	Date	Property	Inv Footprint	Inv Area	Composite Sample ID	Discrete Sample ID
1	27 April 2021	No.9	Lot 3 BE	1,500m^2	2021-71 C-1 to C-4	2021-71 S-1 to S-16
2	29 November 2022	No.9	Lot 1 BE	1,500m^2	2122-190 C-1 to C-4	2122-190 S-1 to S-16
3	15 June 2023	No. 9	Entire Property Sheds, Track, Greenhouses	45,370m^2	C-1 to C-11	9 S-45 to 9 S-70
		No. 148	Entire Property	18,000m^2	C-14 to C-21	N/A

13 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 13.

Table 13. 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	Sampling in accordance with the sampling plan.

DQO	Description	Solution
	confirm contamination status.	
Study Boundaries	The boundary of investigation area is the cadastral boundary.	Figures 1-3.
Decision Rule	All analytical must be compared to the adopted investigation criteria	The investigation criteria are presented in this report.
	Appropriate field QA/QC techniques should be employed.	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. Field duplicates to be collected at 1in10 analysed samples for the current ESA. RPDs calculated for results X10 the LOR. RPD to be <50%
	Appropriate Laboratory QA/QC techniques and methods are employed	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 • 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

DQO	Description	Solution
	Field QA/QC should be within acceptable error limits. Laboratory QA/QC should be within acceptable error limits.	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 composite samples are considered reliable for the broadacre agricultural portion of the propertys.

14 Results

14.1 Sample Descriptions

The sampling locations are presented in Figures 8 and 9. Samples consisted of dark topsoil, clay, with clay or gravel fill on the track and greenhouses at No.9. Clay fill appeared to be sourced from onsite.

During sampling no odiferous or discoloured soils were noted, though some soil odour due to anaerobic decomposition in the fill was detected.

15 Analytical Results

Samples were forwarded under Chain of Custody conditions at Eurofins Laboratory for analysis. The laboratory reports are included in Appendix B.

15.1 Composite Analyses No.9

The soil analytical results are summarised in the attached Table LR5. Comparison of composite sample results C1 - C11 to the investigation criteria indicated that:

- Concentrations of OCP were reported below the laboratory Limit of Reporting (LOR) for all samples analysed; and
- Concentrations of arsenic and lead were reported below the investigation criteria for all samples analysed.

15.2 Composite Analyses No.148

The soil analytical results are summarised in the attached Table LR5. Comparison of composite sample results C14 - C21 to the investigation criteria indicated that:

- Concentrations of OCP were reported below the laboratory LOR for all samples analysed; and
- Concentrations of arsenic and lead were reported below the investigation criteria for all samples analysed.

15.3 Discrete Analyses No.9

The soil analytical results are summarised in the attached Table LR6. Comparison of discrete sample results to the investigation criteria indicated that:

- Concentrations of OCP were reported below the laboratory LOR for all samples except discrete sample 9 S-68, which returned a result of 0.06mg/kg for Endrin, which is above the 0.05mg/kg LOR, but well below the Health-based Investigation Level (HIL) threshold of 10mg/kg;
- Concentrations of arsenic and lead were reported below the investigation criteria for all samples analysed;
- Concentrations of OPP were reported below the LOR from the samples collected and analysed in the greenhouses; and
- Concentrations of TRH, BTEX and PAH were reported below the laboratory LOR for all samples collected and analysed form the shed margins.

15.4 95% Upper Confidence Limits

As all results except one sample containing Endrin were reported below the laboratory LOR and/or the investigation criteria, calculation of the 95% Upper Confidence Limits (UCLs) were not suitable or required to be calculated; that is the 95% UCL would be well below the investigation criteria.

15.5 Quality Assurance and Quality Control

15.5.1 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.

15.5.2 Relative Percentage Difference

As presented in the attached Table LR7, the Relative Percentage Difference (RPD) was calculated between primary and field duplicate samples. If both samples were reported below the laboratory LOR then the RPD was not able to be calculated.

All calculated RPDs were <50% except for one arsenic RPD from samples C2 and C13. At this sample a RPD of 72% was calculated. Both primary/field duplicate samples were reported with a low arsenic

concentration <10x the LOR, as such a higher RPD could be expected, and the 72% is not a quality assurance failure.

15.5.3 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 surrogates 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.

15.5.4 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.

16 Discussion of Results

Historical banana plantation cropping has been reported for No.9 and No. 148 Gaudrons Road.

The agricultural nature of the potential contamination is commonplace in the northern beaches area of Coffs Harbour, with strong local government environmental policies, assessment and remediation procedures in place. In addition the NSW EPA (1997) banana plantations assessment guidelines provides a stepped approach to assessing and remediating such properties.

The proposed building envelopes on No.9 Gaudrons Road are undisturbed from the cropping state. Both detailed sampling of the BEs plus further broadacre composite analyses on No.9 and No.148 Gaudrons Road confirmed that concentrations of arsenic, lead and OCP pesticides are below levels of reportable detection or well below the investigation criteria in soil across the properties.

A low concentration of Endrin was recorded in one sample from the active greenhouse on No. 9 Gaudrons Road (9 S- 68), but the concentration is <10x the investigation criteria and given the systematic sampling is not considered a hotspot.

No elevated metals, pesticides or hydrocarbons were identified from the margins of the shed on No.9 Gaudrons Road and the area like the remainder of the Site is neat and tidy showing good farming management practices.

17 Conclusions and Recommendations

The DESA has identified that the subject properties were developed between 1943-1956 as banana plantations, and have progressively ceased these activities since about 1994, with ongoing agricultural landuse activities occurring on No.9 Gaudrons Road up to this day. In addition, No.9 Gaudrons Road contains existing packing and maintenance sheds, which will be demolished to allow residential redevelopment.

Detailed systematic sampling has been undertaken across both No. 9 and 148 Gaudrons Road with no elevated arsenic, lead, OCP and OPP pesticides and TRH, BTEX and PAH hydrocarbons reported.

As such, in their current states, the two properties are considered suitable for the proposed subdivision and creation of additional residential building entitlements without further investigations.

18 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.

EWC. 2021. Environmental Site Assessment – 9, 148 & 189 Gaudrons Road Sapphire Beach. 2021-71-04 dated 15 June 2021.

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NSW EPA. 1997. Guidelines for Assessing Banana Plantation Sites.

NSW EPA. 2017. Guidelines for the NSW Site Auditor Scheme. NSW Environment Protection Authority. 3rd Edition

NSW EPA. 2020. Consultants Reporting on Contaminated Land. NSW Environment Protection Authority.

NSW EPA. 2022. Contaminated Land Guidelines sampling design part 1 – application. NSW Environment Protection Authority.

TABLES

Table LR1: Summary of Soil Composite Analytical Results for Proposed Lot 3 BE

Sample ID		LOR	Investigation Criteria			C-1	C-2	C-3	C-4
Location			NSW EPA	NEPM		BE Lot 3			
Date Collected						27/04/2021			
Depth Collected (mm)	Units	Eurofins	BP	HIL (A)	EIL	0 - 75	0 - 75	0 - 75	0 - 75
% Moisture	%	1	-	-	-	9.4	33	17	23
Heavy Metals									
Arsenic	mg/kg	2	100	100	100	10	53	67	33
Lead	mg/kg	5	300	300	1100	9.6	12	7.1	8.2
Organochlorine Pesticides									
4.4'-DDD	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDT	mg/kg	0.05	50	-	180	< 0.05	< 0.05	< 0.05	< 0.05
a-BHC	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin and Dieldrin (Total)*	mg/kg	0.05	10	6	-	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
Chlordanes - Total	mg/kg	0.1	-	50	-	< 0.1	< 0.1	< 0.1	< 0.1
d-BHC	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	mg/kg	0.05	-	240	-	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I	mg/kg	0.05	-	270	-	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	mg/kg	0.05	-		-	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	mg/kg	0.05	-	10	-	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	mg/kg	0.05	-	6	-	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene (HCB)	mg/kg	0.05	-	10	-	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	mg/kg	0.2	-	300	-	< 0.2	< 0.2	< 0.2	< 0.2
Toxaphene	mg/kg	0.1	-	20	-	< 0.1	< 0.1	< 0.1	< 0.1

Notes

Indicates sample concentration exceeds investigation criteria value

Indicates sample concentration exceeds investigation criteria value by >25%

Table LR2: Summary of Soil Composite Analytical Results for proposed Lot 1 BE

Sample ID		LOR	Investigation Criteria			C-1	C-2	C-3	C-4
Location			NSW EPA	NEPM		BE Lot 1			
Date Collected						29/11/2022			
Depth Collected (mm)	Units	Eurofins	BP	HIL (A)	EIL	0 - 75	0 - 75	0 - 75	0 - 75
% Moisture	%	1	-	-	-	16	15	20	15
Heavy Metals									
Arsenic	mg/kg	2	100	100	100	< 2	2.7	3.9	3.9
Lead	mg/kg	5	300	300	1100	8.8	14	89	480
Organochlorine Pesticides									
4.4'-DDD	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDT	mg/kg	0.05	50	-	180	< 0.05	< 0.05	< 0.05	< 0.05
a-BHC	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin and Dieldrin (Total)*	mg/kg	0.05	10	6	-	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
Chlordanes - Total	mg/kg	0.1	-	50	-	< 0.1	< 0.1	< 0.1	< 0.1
d-BHC	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	mg/kg	0.05	-	240	-	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I	mg/kg	0.05	-	270	-	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	mg/kg	0.05	-		-	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	mg/kg	0.05	-	10	-	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	mg/kg	0.05	-	6	-	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene (HCB)	mg/kg	0.05	-	10	-	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	mg/kg	0.05	-	300	-	< 0.05	< 0.05	< 0.05	< 0.05
Toxaphene	mg/kg	0.1	-	20	-	< 0.5	< 0.5	< 0.5	< 0.5

Notes

Indicates sample concentration exceeds investigation criteria value

Indicates sample concentration exceeds investigation criteria value by >25%

Table LR3: Summary of Soil Discrete Analytical Results for Proposed Lot 1 BE

Sample ID		LOR	Investigation Criteria			S-13	S-14	S-15	S-16	Count	Avg	SD	CV	Students t	95% UCL
Date Collected			NSW EPA	NEPM		29/11/2022									
Composite Sample						C-3	C-3	C-3	C-3						
Depth Collected (mm)	Units	Eurofins	BP	HIL (A)	EIL	0-75	0-75	0-75	0-75						
% Moisture	%	1	-	-	-	13	13	16	21	-	-	-	-	-	-
Heavy Metals															
Lead	mg/kg	5	300	300	1100	1000	23	16	21	4	265	490	1.8	1.86	**720.7**

Notes

Indicates sample concentration exceeds investigation criteria value

Indicates sample concentration exceeds investigation criteria value by >25%

Table LR4: Summary of Soil Validation Analytical Results for Propsed Lot 1 BE

Sample ID	Units	LOR	Validation Criteria		V-1	V-2	V-3	V-4	V-5	Count	Avg	SD	CV	Students t	95% UCL
Date Collected			NSW EPA	NEPM	16/12/2022										
Depth Collected (mm)		Eurofins	BP	HIL (A)	0-75	0-75	0-75	0-75	0-75						
% Moisture	%	1	-	-	21	20	20	19	20	-	-	-	-	-	-
Heavy Metals															
Arsenic	mg/kg	2	100	100	28	28	42	25	29	5	30	7	0.2	1.86	**35.9**
Lead	mg/kg	2	100	300	14	13	13	12	14	5	13	1	0.1	1.86	**13.9**

Notes

Indicates sample concentration exceeds investigation criteria value

Indicates sample concentration exceeds investigation criteria value by >250%

Table LR5: Summary of Soil Composite Analytical Results for No.9 and 148

Sample ID		LOR	Investigation Criteria			C 1	C 2	C 3	C 4	C 5	C 6	C 7	C 8	C 9	C 10	C 11	C 14	C 15	C 16	C 17	C 18	C 19	C 20	C 21
Location			NSW EPA	NEPM		No. 9											No.148							
Date Collected						15/06/2023																		
Depth Collected (mm)	Units	Eurofins	BP	HIL (A)	EIL	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75
% Moisture	%	1	-	-	-	18	25	20	22	28	19	26	24	21	23	23	9.4	17	18	23	21	18	19	21
Heavy Metals																								
Arsenic	mg/kg	2	100	100	100	3.3	6.1	2.9	< 2	13	5.9	51	26	79	38	18	9.4	29	14	22	< 2	25	30	20
Lead	mg/kg	5	300	300	1100	6.9	12	6.1	9.6	27	15	17	13	10	13	38	35	40	21	36	< 5	25	23	21
Organochlorine Pesticides																								
4.4'-DDD	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDT	mg/kg	0.05	50	-	180	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
a-BHC	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin and Dieldrin (Total)*	mg/kg	0.05	10	6	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chlordanes - Total	mg/kg	0.1	-	50	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
d-BHC	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	mg/kg	0.05	-	240	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I	mg/kg	0.05	-	270	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	mg/kg	0.05	-		-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	mg/kg	0.05	-	10	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	mg/kg	0.05	-	6	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	mg/kg	0.05	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene (HCB)	mg/kg	0.05	-	10	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	mg/kg	0.2	-	300	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Toxaphene	mg/kg	0.1	-	20	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Notes

Indicates sample concentration exceeds investigation criteria value

Indicates sample concentration exceeds investigation criteria value by >25%

Table LR6: Summary of Soil Discrete Analytical Results for No.9 and 148

Sample ID		LOR	Investigation Criteria					9 S-45	9 S-46	9 S-47	9 S-48	9 S-49	9 S-50	9 S-51	9 S-52	9 S-53	9 S-54	9 S-55	9 S-56	9 S-57	9 S-58 0-150	9 S-58 500-650	9 S-59 0-150	9 S-59 800-950	9 S-60 0-150	9 S-60 850-1000	9 S-61	9 S-62	9 S-63	9 S-64	9 S-65	9 S-66	9 S-67	9 S-68	9 S-69	9 S-70
Location			NSW EPA	NEPM				Shed													Greenhouse fill						Track	Greenhouse		Track	Greenhouse					
Date Collected								15/06/2023																											
Depth Collected (mm)	Units	Eurofins	BP	HIL (A)	EIL (A)	ESL(A)	HSL (A)	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-150	500-650	0-150	800-950	0-150	850-1000	0-150	0-150	0-150	0-150	0-150	0-150	0-150	0-150	0-75	0-75
% Moisture	%	1	-	-	-	-	-	16	15	20	12	15	11	17	11	16	4	21	16	15	23	26	22	25	20	21	7.6	5.2	18	20	19	8.3	15	17	12	5.2
Heavy Metals																																			
Arsenic	mg/kg	2	100	100	100	-	-	6.3	7.6	8.2	10	11	8.5	6.2	13	6.3	8	5.5	8.4	6.1	12	3.9	18	6	3.2	12	3.4	< 2	4.3	4.4	11	13	16	16	10	16
Lead	mg/kg	5	300	300	1100	-	-	22	25	22	26	22	19	9.8	15	15	27	16	34	75	17	14	22	13	9.8	14	14	5.5	12	13	33	23	24	25	23	25
Organochlorine Pesticides																																			
4.4'-DDD	mg/kg	0.05	-	-	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE	mg/kg	0.05	-	-	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDT	mg/kg	0.05	50	-	180	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
a-BHC	mg/kg	0.05	-	-	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin	mg/kg	0.05	-	-	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin and Dieldrin (Total)*	mg/kg	0.05	10	6	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC	mg/kg	0.05	-	-	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chlordanes - Total	mg/kg	0.1	-	50	-	-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
d-BHC	mg/kg	0.05	-	-	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	mg/kg	0.05	-	240	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	mg/kg	0.05	-	-	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I	mg/kg	0.05	-	270	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	mg/kg	0.05	-		-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	mg/kg	0.05	-	-	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	mg/kg	0.05	-	10	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06	< 0.05	< 0.05
Endrin aldehyde	mg/kg	0.05	-	-	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone	mg/kg	0.05	-	-	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)	mg/kg	0.05	-	-	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	mg/kg	0.05	-	6	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	mg/kg	0.05	-	-	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene (HCB)	mg/kg	0.05	-	10	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	mg/kg	0.2	-	300	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Toxaphene	mg/kg	0.1	-	20	-	-	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Organophosphorus Pesticides																																			
Azinphos-methyl	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Bolstar	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Chlorfenvinphos	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Chlorpyrifos	mg/kg	-	-	160	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Chlorpyrifos-methyl	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Coumaphos	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 2	< 2	-	-	-	-	< 2	-	< 2
Demeton-O	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Demeton-S	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Diazinon	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Dichlorvos	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Dimethoate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Disulfoton	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
EPN	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Ethion	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Ethoprop	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Ethyl parathion	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Fenitrothion	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Fensulfothion	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Fenthion	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Malathion	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Merphos	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Methyl parathion	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Mevinphos	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Monocrotophos	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 2	< 2	-	-	-	-	< 2	-	< 2
Naled	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Omethoate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 2	< 2	-	-	-	-	< 2	-	< 2
Phorate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Pirimiphos-methyl	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Pyrazophos	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Ronnel	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Terbufos	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Tetrachlorvinphos	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2

Table LR6: Summary of Soil Discrete Analytical Results for No.9 and 148

Sample ID		LOR	Investigation Criteria					9 S-45	9 S-46	9 S-47	9 S-48	9 S-49	9 S-50	9 S-51	9 S-52	9 S-53	9 S-54	9 S-55	9 S-56	9 S-57	9 S-58 0-150	9 S-58 500-650	9 S-59 0-150	9 S-59 800-950	9 S-60 0-150	9 S-60 850-1000	9 S-61	9 S-62	9 S-63	9 S-64	9 S-65	9 S-66	9 S-67	9 S-68	9 S-69	9 S-70
Location			NSW EPA	NEPM				Shed													Greenhouse fill						Track	Greenhouse		Track	Greenhouse					
Date Collected								15/06/2023																												
Depth Collected (mm)	Units	Eurofins	BP	HIL (A)	EIL (A)	ESL(A)	HSL (A)	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-75	0-150	500-650	0-150	800-950	0-150	850-1000	0-150	0-150	0-150	0-150	0-150	0-150	0-150	0-150	0-75	0-75
Tokuthion	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
Trichloronate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.2	< 0.2	-	-	-	-	< 0.2	-	< 0.2
BTEX																																				
Benzene	mg/kg	0.1	-	-	-	65	0.7	-	< 0.1	-	< 0.1	-	-	-	< 0.1	-	-	< 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	0.1	-	-	-	125	-	-	< 0.1	-	< 0.1	-	-	-	< 0.1	-	-	< 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	0.1	-	-	-	105	480	-	< 0.1	-	< 0.1	-	-	-	< 0.1	-	-	< 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes - Total*	mg/kg	0.3	-	-	-	45	110	-	< 0.3	-	< 0.3	-	-	-	< 0.3	-	-	< 0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Recoverable Hydrocarbons																																				
Naphthalene	mg/kg	0.5	-	-	170		5	-	< 0.5	-	< 0.5	-	-	-	< 0.5	-	-	< 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRH C6-C10 less BTEX (F1)	mg/kg	< 20	-	-	-	180	50	-	< 20	-	< 20	-	-	-	< 20	-	-	< 20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRH >C10-C16 less Naphthalene (F2)	mg/kg	< 50	-	-	-	-	280	-	< 50	-	< 50	-	-	-	< 50	-	-	< 50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRH >C10-C16	mg/kg	< 50	-	-	-	120	-	-	< 50	-	< 50	-	-	-	< 50	-	-	< 50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRH >C16-C34	mg/kg	< 100	-	-	-	1300	-	-	< 100	-	< 100	-	-	-	< 100	-	-	< 100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRH >C34-C40	mg/kg	< 100	-	-	-	5600	-	-	< 100	-	< 100	-	-	-	< 100	-	-	< 100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRH >C10-C40 (total)*	mg/kg	< 100	-	-	-	-	-	-	< 100	-	< 100	-	-	-	< 100	-	-	< 100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																																				
Acenaphthene	mg/kg	< 0.5	-	-	-	-	-	-	< 0.5	-	< 0.5	-	-	-	< 0.5	-	-	< 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthylene	mg/kg	< 0.5	-	-	-	-	-	-	< 0.5	-	< 0.5	-	-	-	< 0.5	-	-	< 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	mg/kg	< 0.5	-	-	-	-	-	-	< 0.5	-	< 0.5	-	-	-	< 0.5	-	-	< 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(a)anthracene	mg/kg	< 0.5	-	-	-	-	-	-	< 0.5	-	< 0.5	-	-	-	< 0.5	-	-	< 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene	mg/kg	< 0.5	-	-	-	1.4	-	-	< 0.5	-	< 0.5	-	-	-	< 0.5	-	-	< 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene TEQ (medium bound) *	mg/kg	0.6	-	3	-	-	-	-	0.6	-	0.6	-	-	-	0.6	-	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b&j)fluoranthene	mg/kg	< 0.5	-	-	-	-	-	-	< 0.5	-	< 0.5	-	-	-	< 0.5	-	-	< 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(g.h.i)perylene	mg/kg	< 0.5	-	-	-	-	-	-	< 0.5	-	< 0.5	-	-	-	< 0.5	-	-	< 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	< 0.5	-	-	-	-	-	-	< 0.5	-	< 0.5	-	-	-	< 0.5	-	-	< 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	mg/kg	< 0.5	-	-	-	-	-	-	< 0.5	-	< 0.5	-	-	-	< 0.5	-	-	< 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a.h)anthracene	mg/kg	< 0.5	-	-	-	-	-	-	< 0.5	-	< 0.5	-	-	-	< 0.5	-	-	< 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	mg/kg	< 0.5	-	-	-	-	-	-	< 0.5	-	< 0.5	-	-	-	< 0.5	-	-	< 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	mg/kg	< 0.5	-	-	-	-	-	-	< 0.5	-	< 0.5	-	-	-	< 0.5	-	-	< 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5	-	-	-	-	-	-	< 0.5	-	< 0.5	-	-	-	< 0.5	-	-	< 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/kg	< 0.5	-	-	170	-	-	-	< 0.5	-	< 0.5	-	-	-	< 0.5	-	-	< 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	mg/kg	< 0.5	-	-	-	-	-	-	< 0.5	-	< 0.5	-	-	-	< 0.5	-	-	< 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	mg/kg	< 0.5	-	-	-	-	-	-	< 0.5	-	< 0.5	-	-	-	< 0.5	-	-	< 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PAH*	mg/kg	< 0.5	-	300	-	-	-	-	< 0.5	-	< 0.5	-	-	-	< 0.5	-	-	< 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes

Indicates sample concentration exceeds investigation criteria value

Indicates sample concentration exceeds investigation criteria value by >25%

Table LR7: Summary of Soil QA/QC Analytical Results for No.9 and 148

Sample ID	Units	LOR	9 S-45	9 Q-45	RPD	9 S-46	9 Q-46	RPD	9 S-47	9 Q-47	RPD	C 1	C 12	RPD	C 2	C 13	RPD
Date Collected			15/06/2023														
Type			Prim	FD		Prim	FD		Prim	FD		Prim	FD		Prim	FD	
% Moisture			16	13	NA	15	15	NA	20	14	NA	18	22	NA	25	23	NA
Heavy Metals																	
Arsenic	mg/kg	<2	6.3	7.1	12	7.6	9	17	8.2	8.3	1	3.3	2.8	16	6.1	13	72
Lead	mg/kg	<5	22	19	15	25	26	4	22	23	4	6.9	7.3	6	12	14	15
Organochlorine Pesticides																	
4.4'-DDD	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
4.4'-DDE	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
4.4'-DDT	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
a-HCH	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
Aldrin	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
Aldrin and Dieldrin (Total)*	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
b-HCH	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
Chlordanes - Total	mg/kg	< 0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA
DDT + DDE + DDD (Total)*	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
d-HCH	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
Dieldrin	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
Endosulfan I	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
Endosulfan II	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
Endosulfan sulphate	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
Endrin	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
Endrin aldehyde	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
Endrin ketone	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
g-HCH (Lindane)	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
Heptachlor	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
Heptachlor epoxide	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
Hexachlorobenzene	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
Methoxychlor	mg/kg	< 0.05	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA	< 0.05	< 0.05	NA
Toxaphene	mg/kg	< 0.5	< 0.5	< 0.5	NA	< 0.5	< 0.5	NA	< 0.5	< 0.5	NA	< 0.5	< 0.5	NA	< 0.5	< 0.5	NA
BTEX																	
Benzene	mg/kg	< 0.1	-	-	-	< 0.1	< 0.1	NA	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	< 0.1	-	-	-	< 0.1	< 0.1	NA	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	< 0.1	-	-	-	< 0.1	< 0.1	NA	-	-	-	-	-	-	-	-	-
Xylenes - Total*	mg/kg	< 0.3	-	-	-	< 0.3	< 0.3	NA	-	-	-	-	-	-	-	-	-
Total Recoverable Hydrocarbons																	
TRH C6-C10 less BTEX (F1)	mg/kg	< 20	-	-	-	< 20	< 20	NA	-	-	-	-	-	-	-	-	-
TRH >C10-C16 less Naphthalene (F2)	mg/kg	< 50	-	-	-	< 50	< 50	NA	-	-	-	-	-	-	-	-	-
TRH >C16-C34	mg/kg	<100	-	-	-	< 100	< 100	NA	-	-	-	-	-	-	-	-	-
TRH >C34-C40	mg/kg	< 100	-	-	-	< 100	< 100	NA	-	-	-	-	-	-	-	-	-
TRH >C10-C40 (total)*	mg/kg	< 100	-	-	-	< 100	< 100	NA	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																	
Benzo(a)pyrene	mg/kg	<0.5	-	-	-	< 0.5	< 0.5	NA	-	-	-	-	-	-	-	-	-
Total PAH*	mg/kg	<0.5	-	-	-	< 0.5	< 0.5	NA	-	-	-	-	-	-	-	-	-

Notes

Indicates RPD exceeds 50%

FIGURES



0 100 200 300

Horizontal Scale (metres) 1:6000

LEGEND

Property Boundary

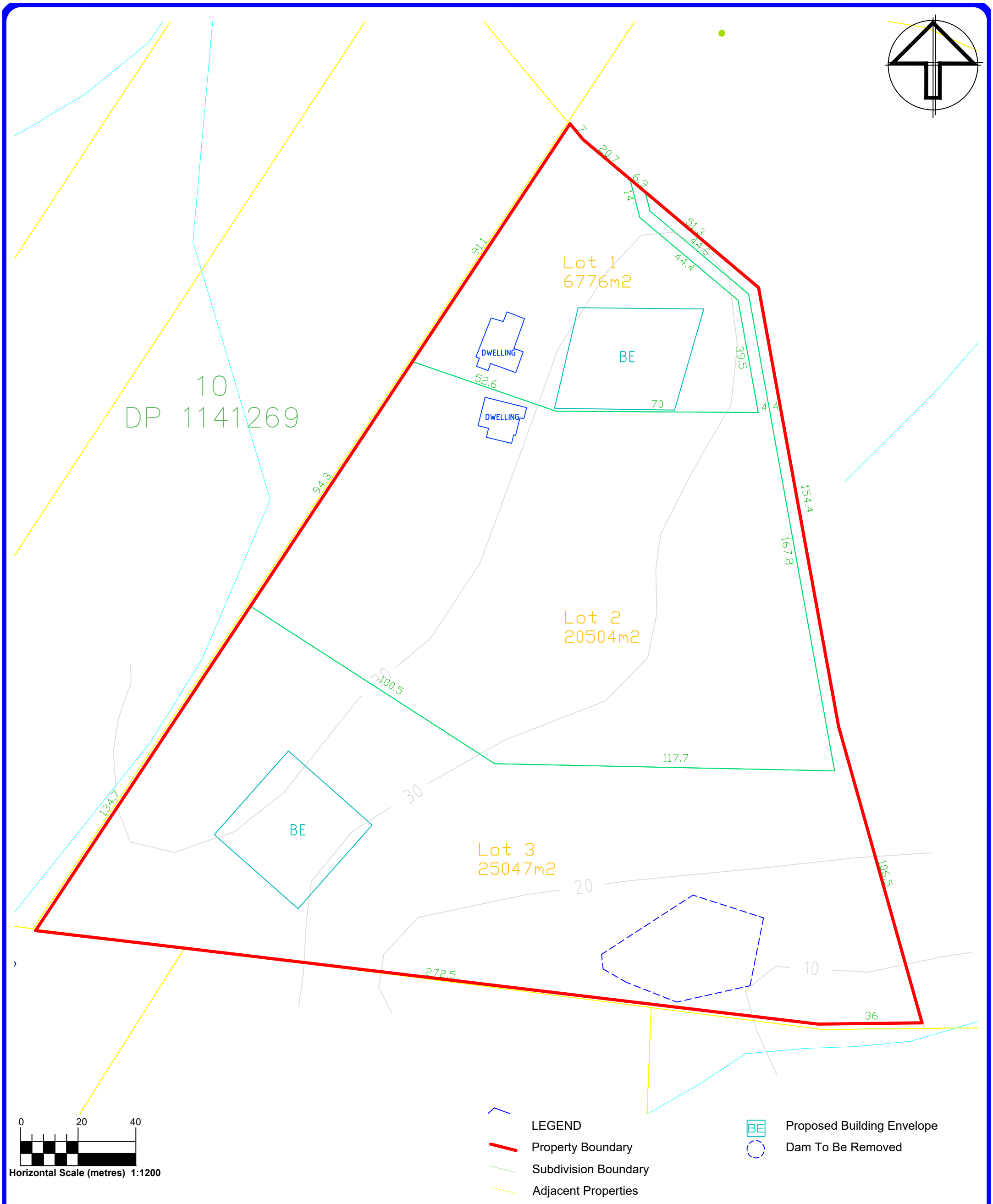
Adjacent Properties

Drainage Alignment

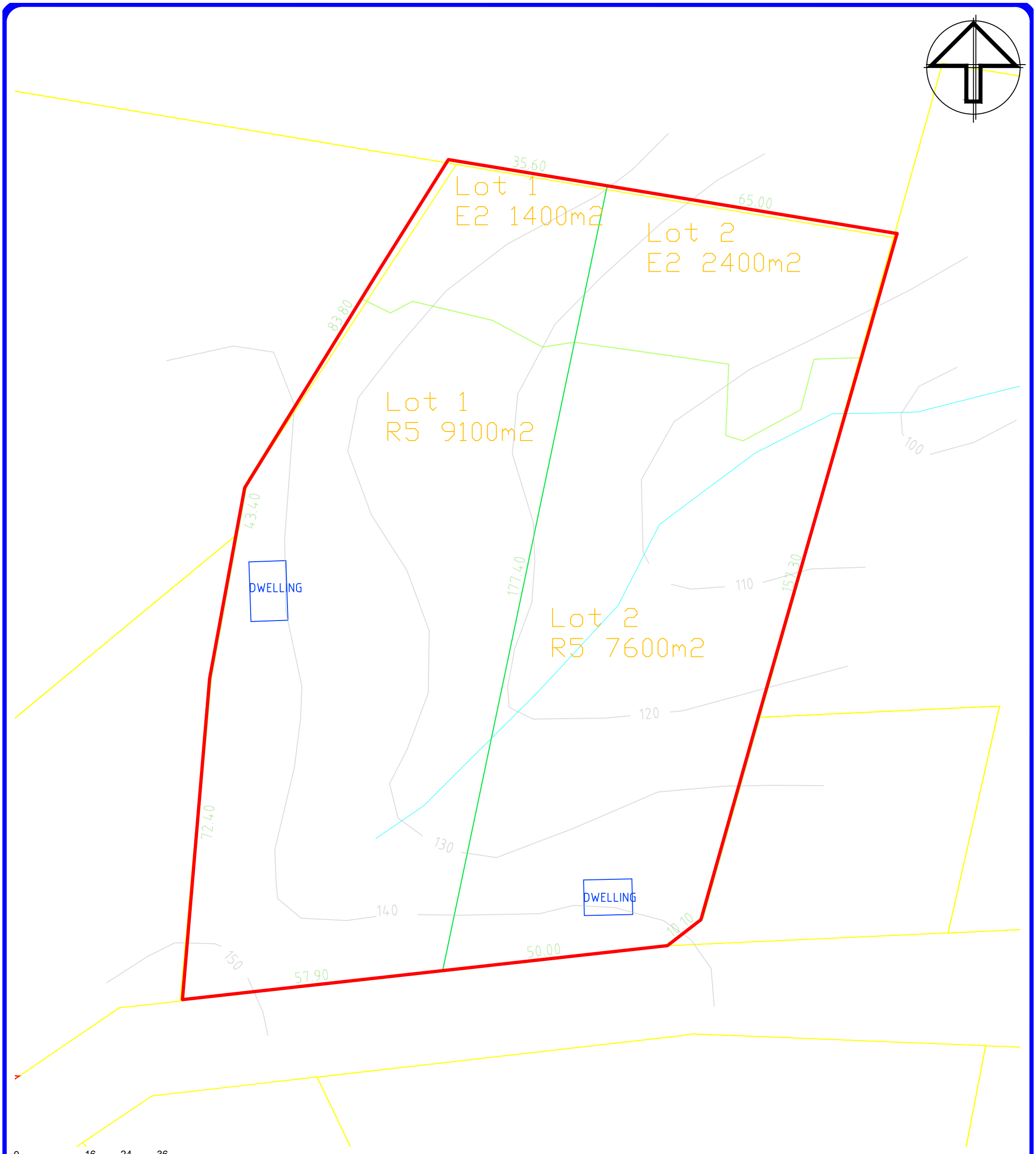
Dams

EARTH WATER CONSULTING

TITLE: Site Location			PROJECT: ESA for Proposed Subdivision of No. 9 & 148 Gaudrons Road, Sapphire Beach		CLIENT: Bowen & Hunter
FIGURE: Figure 1					
SHEET: 1 OF 1	ISSUE: A	AUTHOR: SD	DATE: 14/7/23	SCALE: 1:6000	PROJECT: 2021-71



TITLE: No.9 Gaudrons Road Proposed Development Layout			FIGURE: Figure 2
			SHEET: 1 OF1 ISSUE: B
PROJECT: ESA for Proposed Subdivision of No. 9 & 148 Gaudrons Road, Sapphire Beach			CLIENT: Bowen & Hunter
AUTHOR: SD	DATE: 29/06/23	SCALE: 1:1200	PROJECT: 2021-71



EARTH WATER CONSULTING

TITLE: No.148 Gaudrons Road Proposed Development Layout			FIGURE: Figure 3
			SHEET: 1 OF1 ISSUE: B
PROJECT: ESA for Proposed Subdivision of No. 9 & 148 Gaudrons Road, Sapphire Beach			CLIENT: Bowen & Hunter
AUTHOR: SD	DATE: 29/06/23	SCALE: 1:800	PROJECT: 2021-71



0 20 40

Horizontal Scale (metres) 1:1200

LEGEND

- Property Boundary
- Contour Line (10m)
- Drainage Alignment
- Dam to be removed
- Existing Dwelling
- BP Extent

EARTH WATER CONSULTING

TITLE: No.9 Gaudrons Road Former Banana PLantation			FIGURE: Figure 4
			SHEET: 1 OF1 ISSUE: B
PROJECT: ESA for Proposed Subdivision of No. 9 & 148 Gaudrons Road, Sapphire Beach			CLIENT: Bowen & Hunter
AUTHOR: SD	DATE: 29/06/23	SCALE: 1:1200	PROJECT: 2021-71



0 16 24 36

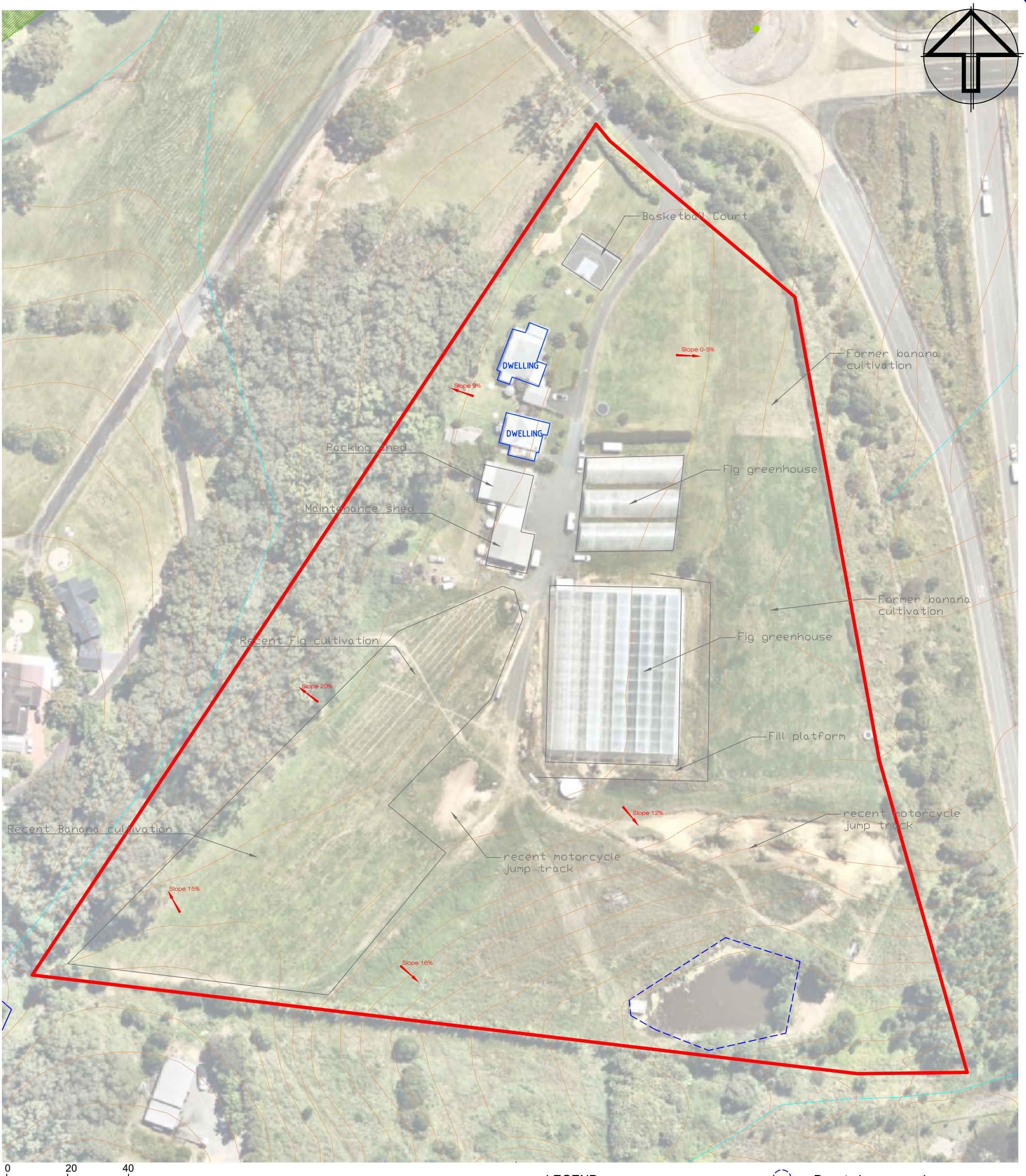
Horizontal Scale (metres) 1:800

LEGEND

- Property Boundary
- Contour Line (10m)
- Adjacent Properties
- D Existing Building
- BP Outline

EARTH WATER CONSULTING

TITLE: No.148 Gaudrons Road Former Banana Plantation			FIGURE: Figure 5
			SHEET: 1 OF1 ISSUE: B
PROJECT: ESA for Proposed Subdivision of No. 9 & 148 Gaudrons Road, Sapphire Beach			CLIENT: Bowen & Hunter
AUTHOR: SD	DATE: 14/7/23	SCALE: 1:800	PROJECT: 2021-71



0 20 40

Horizontal Scale (metres) 1:1200

LEGEND

- Property Boundary
- Contour Line (2m)
- Drainage Alignment
- Dam to be removed
- Existing Dwelling
- Slope % — Slope Direction

EARTH WATER CONSULTING

TITLE: No.9 Gaudrons Road Existing Property Layout			FIGURE: Figure 1
			SHEET: 1 OF1 ISSUE: B
PROJECT: ESA for Proposed Subdivision of No. 9 & 148 Gaudrons Road, Sapphire Beach			CLIENT: Bowen & Hunter
AUTHOR: SD	DATE: 14/7/23	SCALE: 1:1200	PROJECT: 2021-71



0 10 20

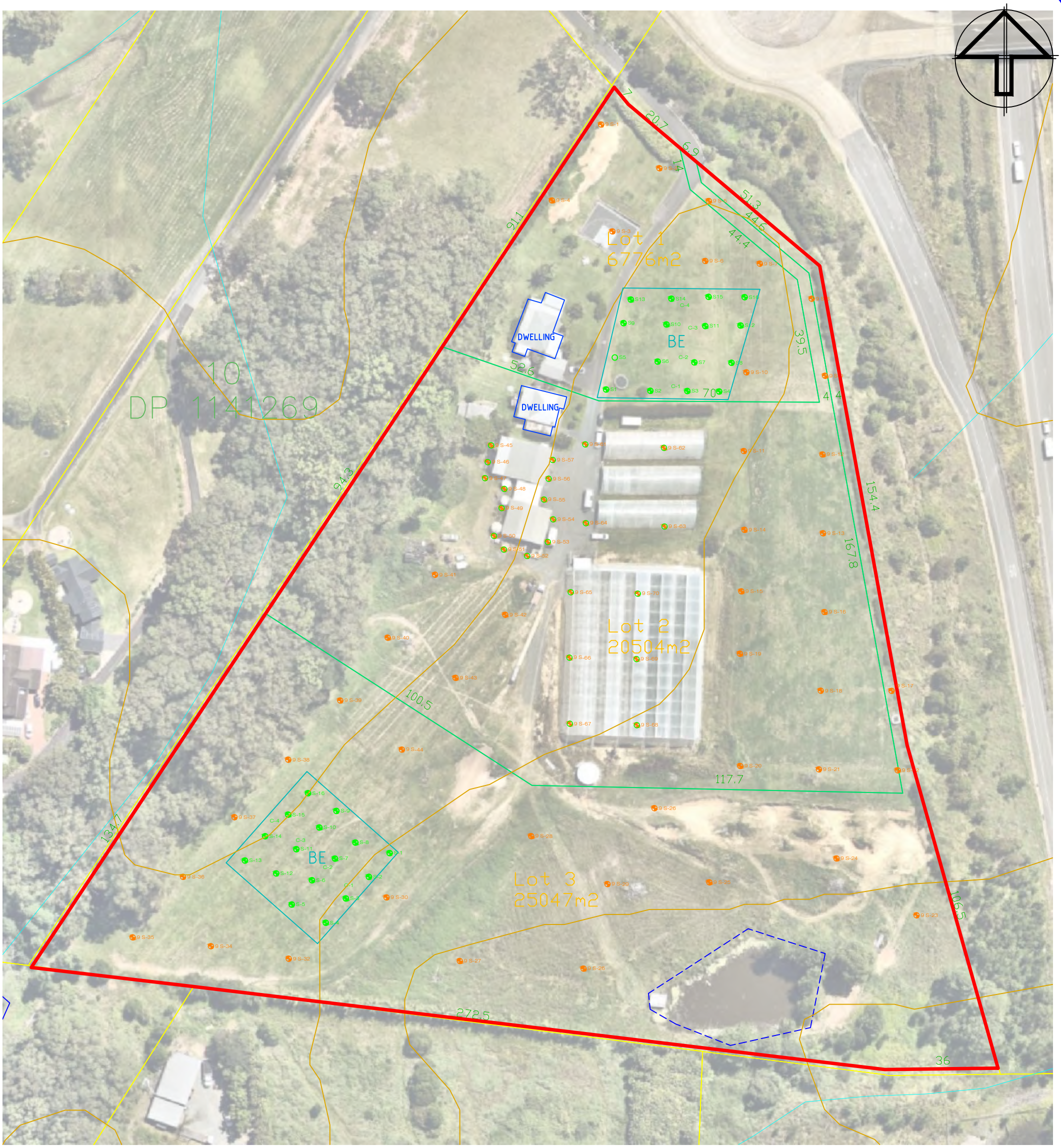
Horizontal Scale (metres) 1:600

LEGEND

- Property Boundary
- Contour Line (2m)
- Drainage Alignment
- Zoning Boundaries
- Existing Dwelling
- Slope % Slope Direction

EARTH WATER CONSULTING

TITLE: No.148 Gaudrons Existing Property Layout			FIGURE: Figure 6
			SHEET: 1 OF1 ISSUE: A
PROJECT: ESA for Proposed Subdivision of No. 9 & 148 Gaudrons Road, Sapphire Beach			CLIENT: Bowen & Hunter
AUTHOR: SD	DATE: 29/06/23	SCALE: 1:600	PROJECT: 2021-71



0 25 50 75

Horizontal Scale (metres) 1:1250

LEGEND

- Property Boundary
- Subdivision Boundary
- Adjacent Properties
- BE Proposed Building Envelope
- BE Targeted Sample Locations
- Discrete Sample Locations
- Composite Sample Locations

TITLE: No.9 Gaudrons Road Sampling Locations			FIGURE: Figure 8
			SHEET: 1 OF1 ISSUE: A
PROJECT: ESA for Proposed Subdivision of No. 9 and 148 Gaudrons Road, Sapphire Beach			CLIENT: Bowen & Hunter
AUTHOR: SD	DATE: 14/7/23	SCALE: 1:1250	PROJECT: 2021-71



0 16 24 36

Horizontal Scale (metres) 1:800

LEGEND

- Property Boundary
- Adjacent Properties
- Subdivision Boundary
- Drainage Alignment
- Existing Dwelling
- Composite Sample Locations

TITLE: No.148 Gaudrons Sampling Locations	FIGURE: Figure 9
	SHEET: 1 OF1 ISSUE: A
PROJECT: ESA for Proposed Subdivision of No. 9 and 148 Gaudrons Road, Sapphire Beach	CLIENT: Bowen & Hunter
AUTHOR: SD / DATE: 14/7/23 / SCALE: 1:800	PROJECT: 2021-71

APPENDIX A

Aerial Imagery 2019

9 Gaudrons Road, Sapphire Beach, NSW 2450



Aerial Imagery 2013

9 Gaudrons Road, Sapphire Beach, NSW 2450



Scale: 0 40 80 120 160 Meters

Data Source Aerial Imagery: © 2020 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.

Coordinate System: GDA 1994 MGA Zone 56

Date: 28 October 2020

Aerial Imagery 2010

9 Gaudrons Road, Sapphire Beach, NSW 2450



Scale: 0 40 80 120 160 Meters	Data Source Aerial Imagery: © 2020 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 56	Date: 28 October 2020

Aerial Imagery 2004

9 Gaudrons Road, Sapphire Beach, NSW 2450



Scale:	Data Source Aerial Imagery: © 2020 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 56	Date: 28 October 2020

0 40 80 120 160 Meters

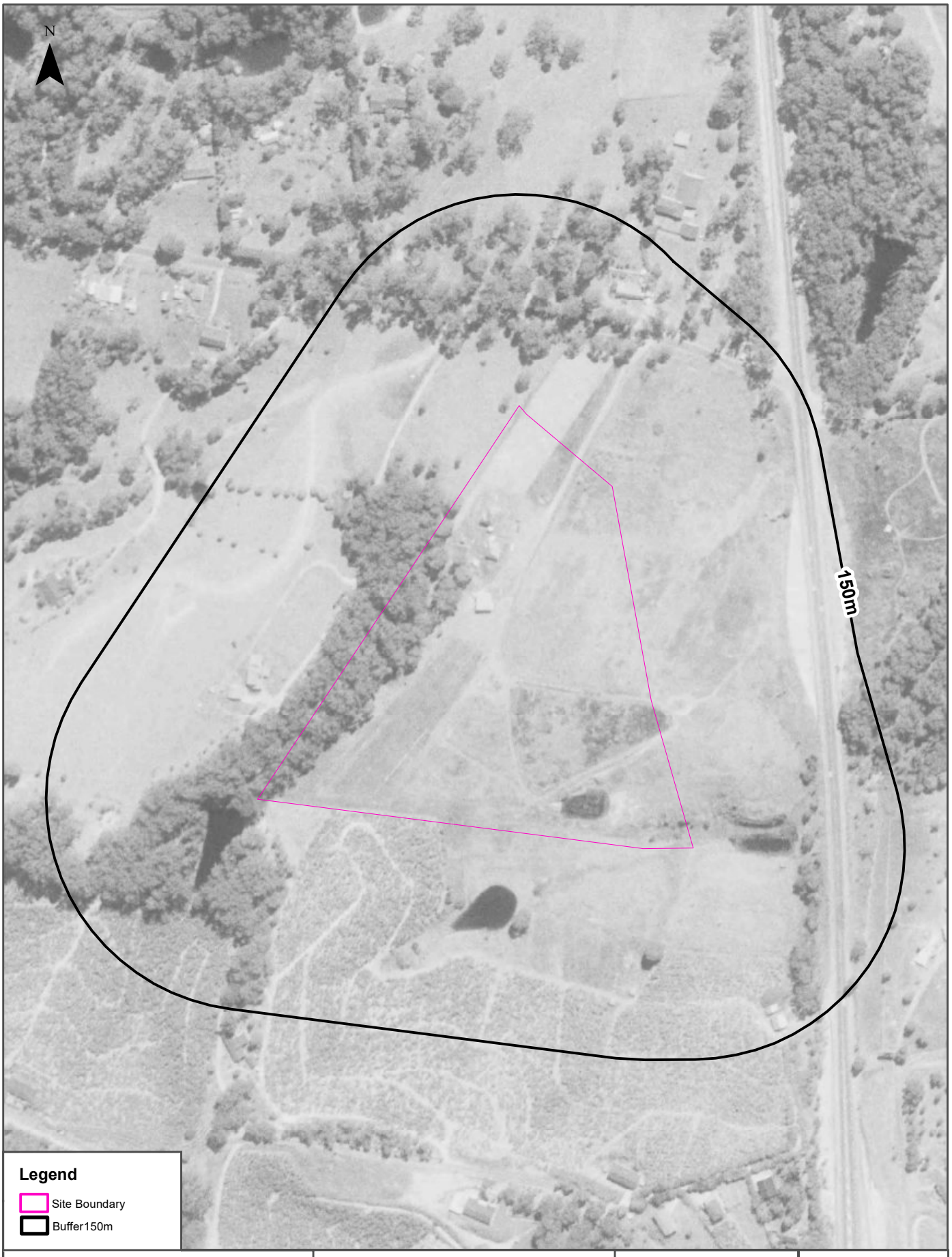
Aerial Imagery 1994

9 Gaudrons Road, Sapphire Beach, NSW 2450



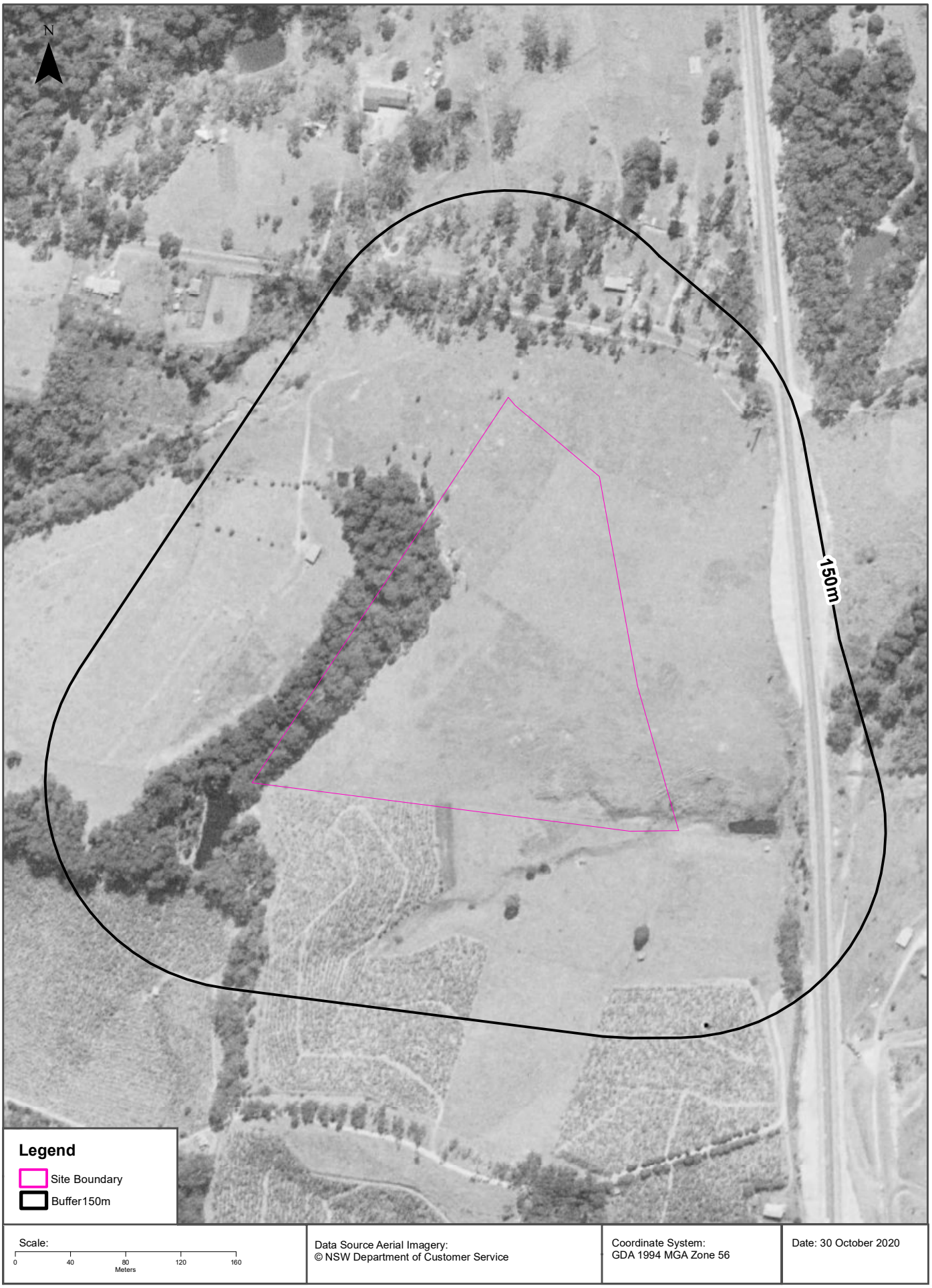
Aerial Imagery 1984

9 Gaudrons Road, Sapphire Beach, NSW 2450



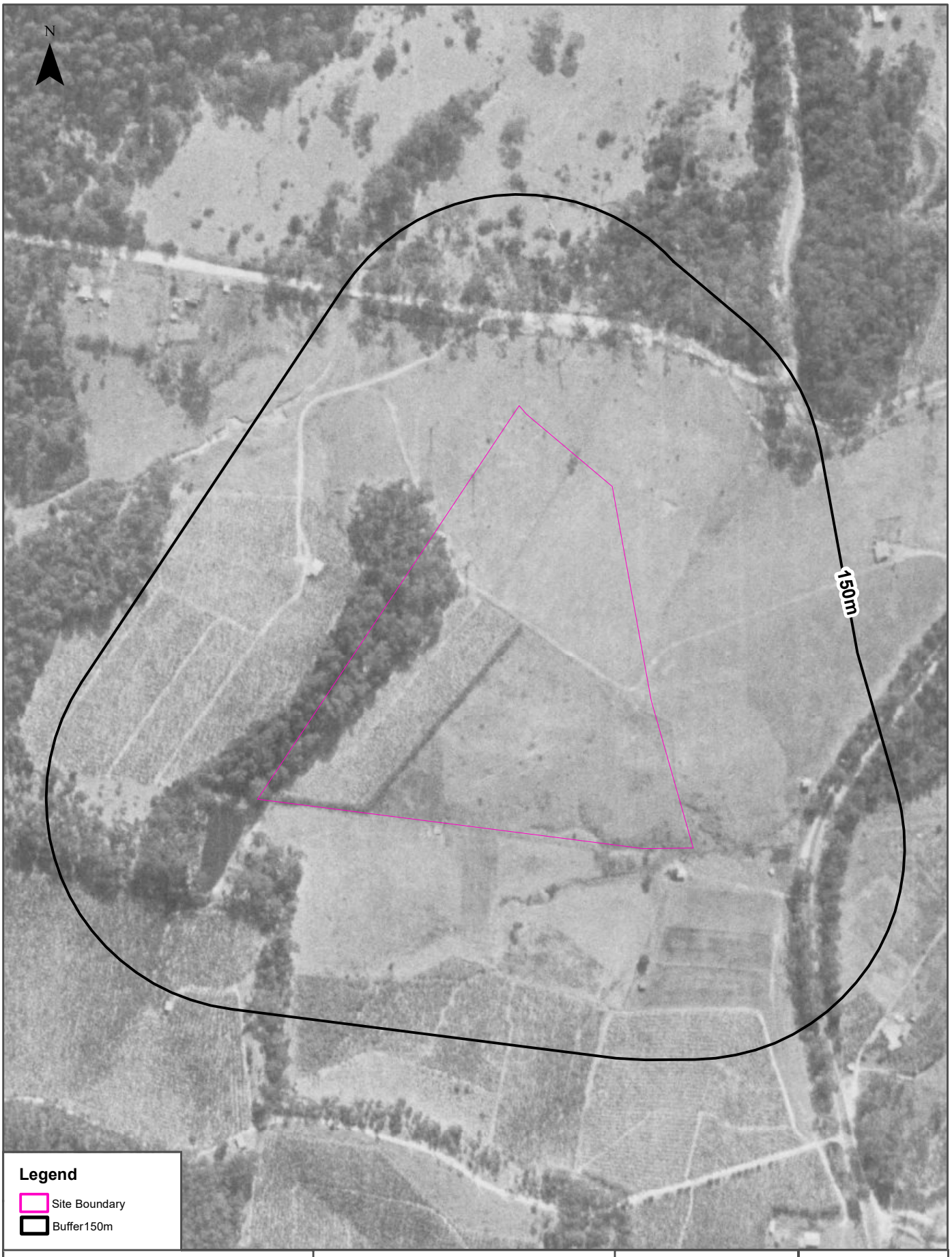
Aerial Imagery 1974

9 Gaudrons Road, Sapphire Beach, NSW 2450



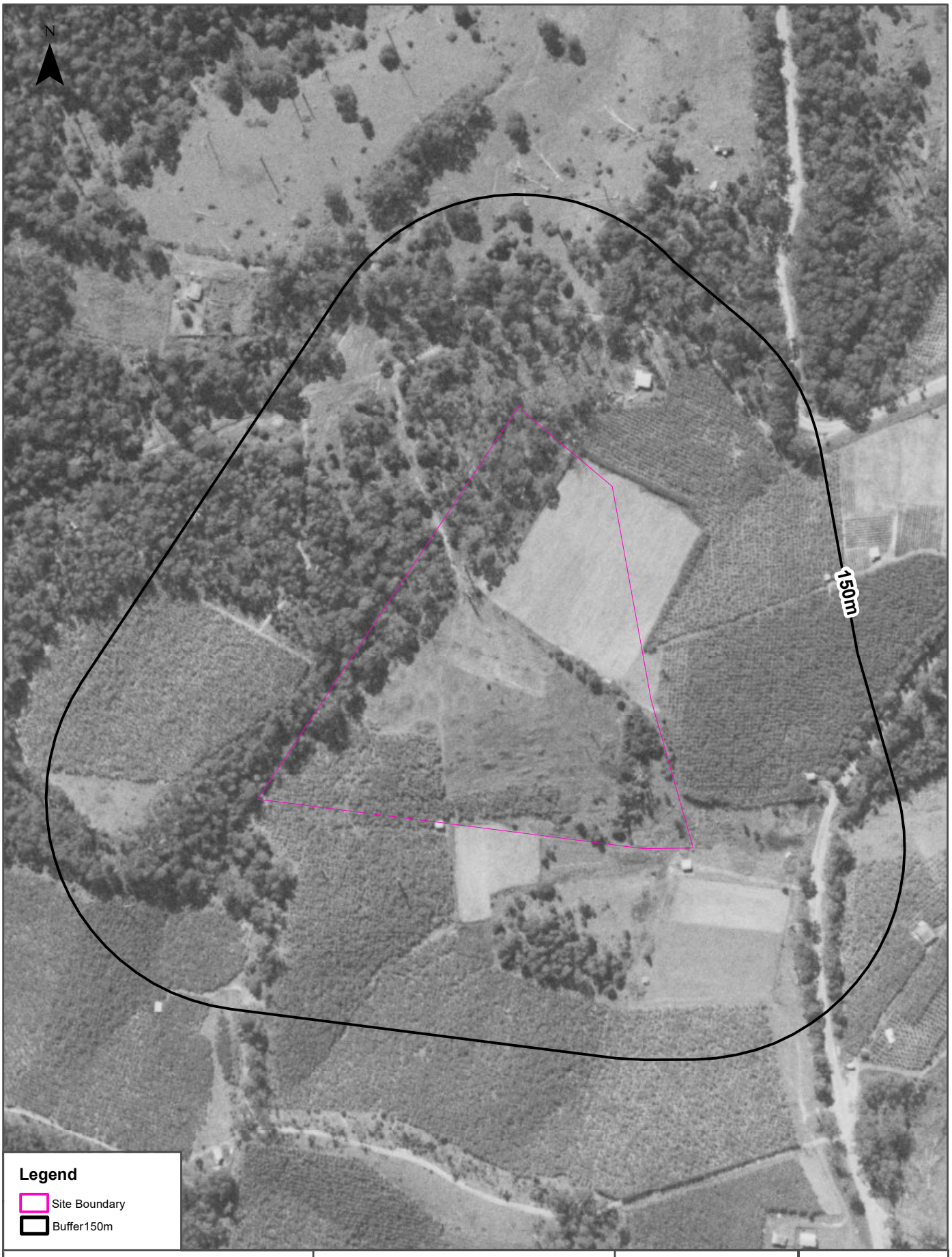
Aerial Imagery 1964

9 Gaudrons Road, Sapphire Beach, NSW 2450



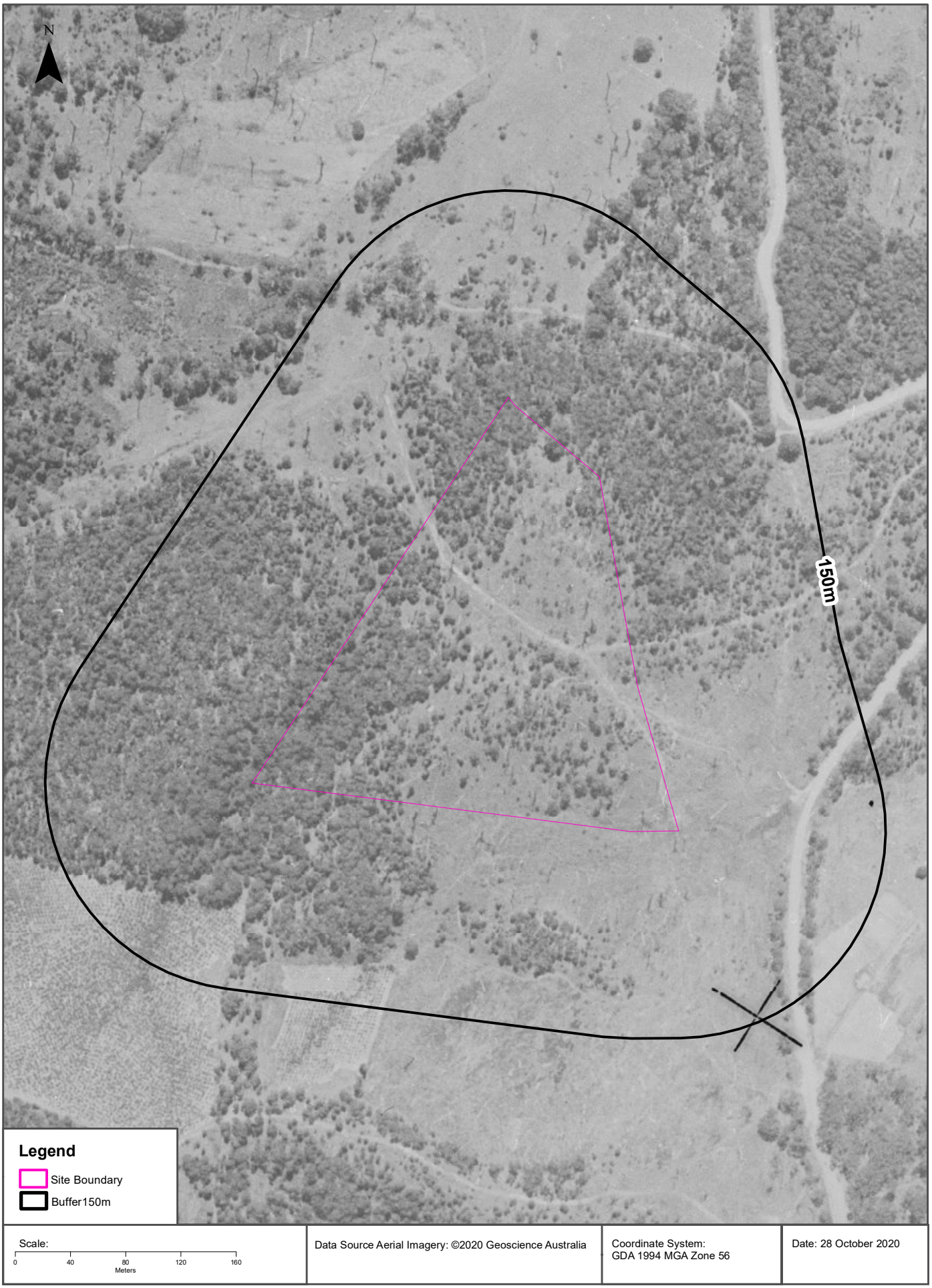
Aerial Imagery 1956

9 Gaudrons Road, Sapphire Beach, NSW 2450



Aerial Imagery 1943

9 Gaudrons Road, Sapphire Beach, NSW 2450



Aerial Imagery 2019

148 and 189 Gaudrons Road, Sapphire Beach, NSW 2450



Aerial Imagery 2013

148 and 189 Gaudrons Road, Sapphire Beach, NSW 2450



Scale: 0 50 100 150 200 Meters

Data Source Aerial Imagery: © 2020 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.

Coordinate System: GDA 1994 MGA Zone 56

Date: 28 October 2020

Aerial Imagery 2010

148 and 189 Gaudrons Road, Sapphire Beach, NSW 2450



Scale: 0 50 100 Meters 150 200	Data Source Aerial Imagery: © 2020 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 56	Date: 28 October 2020

Aerial Imagery 2004

148 and 189 Gaudrons Road, Sapphire Beach, NSW 2450



Scale: 0 50 100 150 200 Meters

Data Source Aerial Imagery: © 2020 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.

Coordinate System: GDA 1994 MGA Zone 56

Date: 28 October 2020

Aerial Imagery 1994

148 and 189 Gaudrons Road, Sapphire Beach, NSW 2450



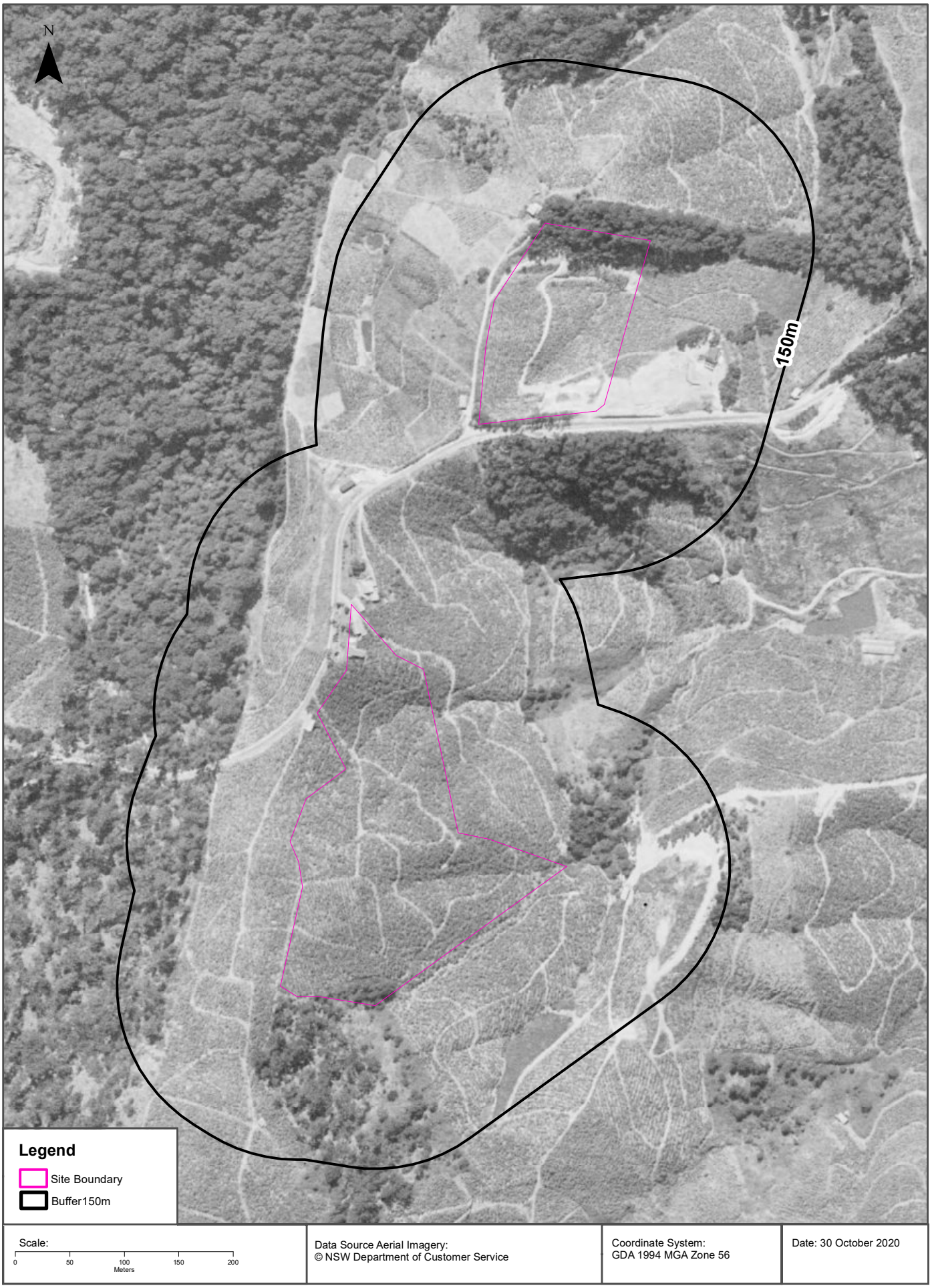
Aerial Imagery 1984

148 and 189 Gaudrons Road, Sapphire Beach, NSW 2450



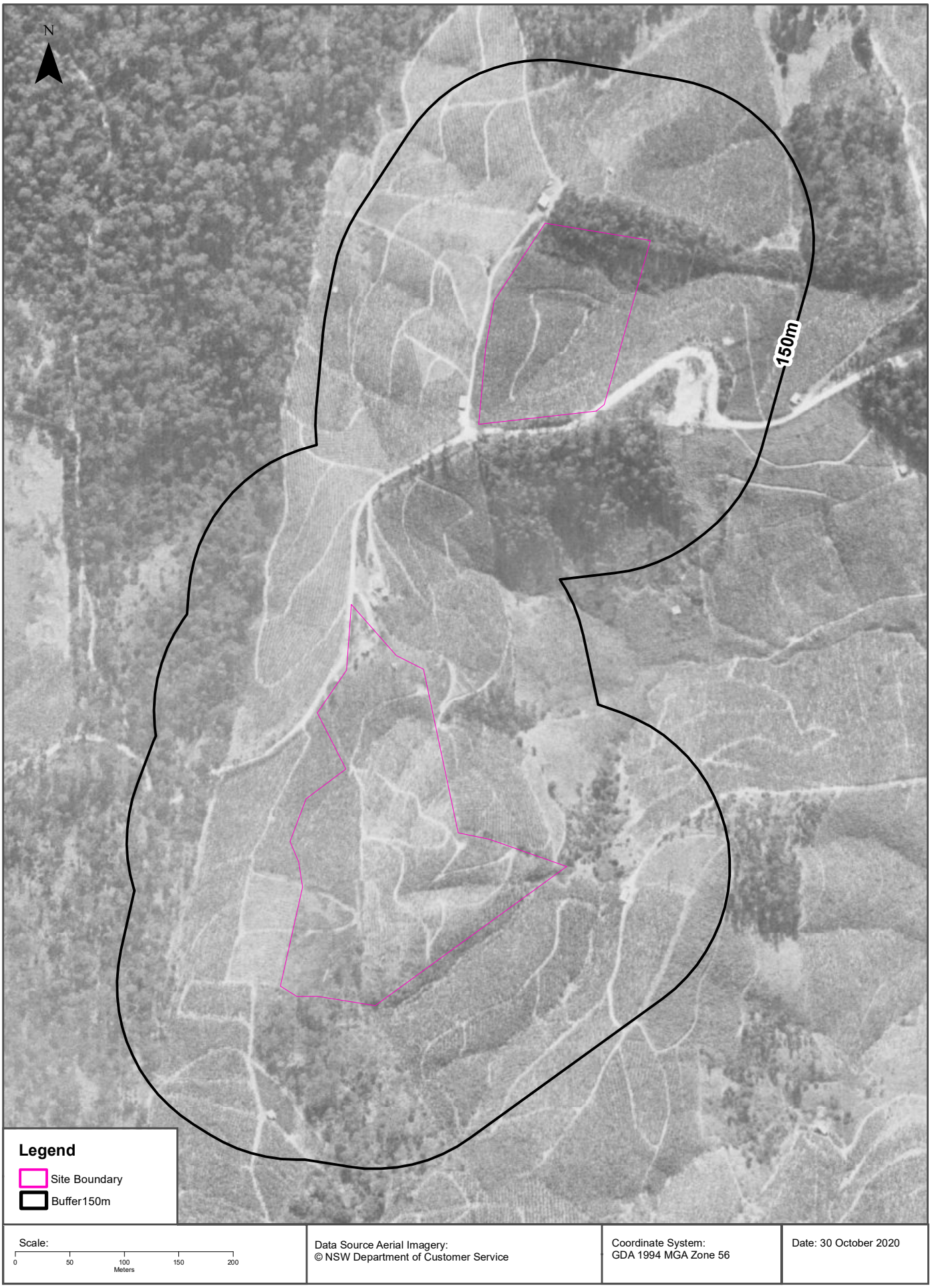
Aerial Imagery 1974

148 and 189 Gaudrons Road, Sapphire Beach, NSW 2450



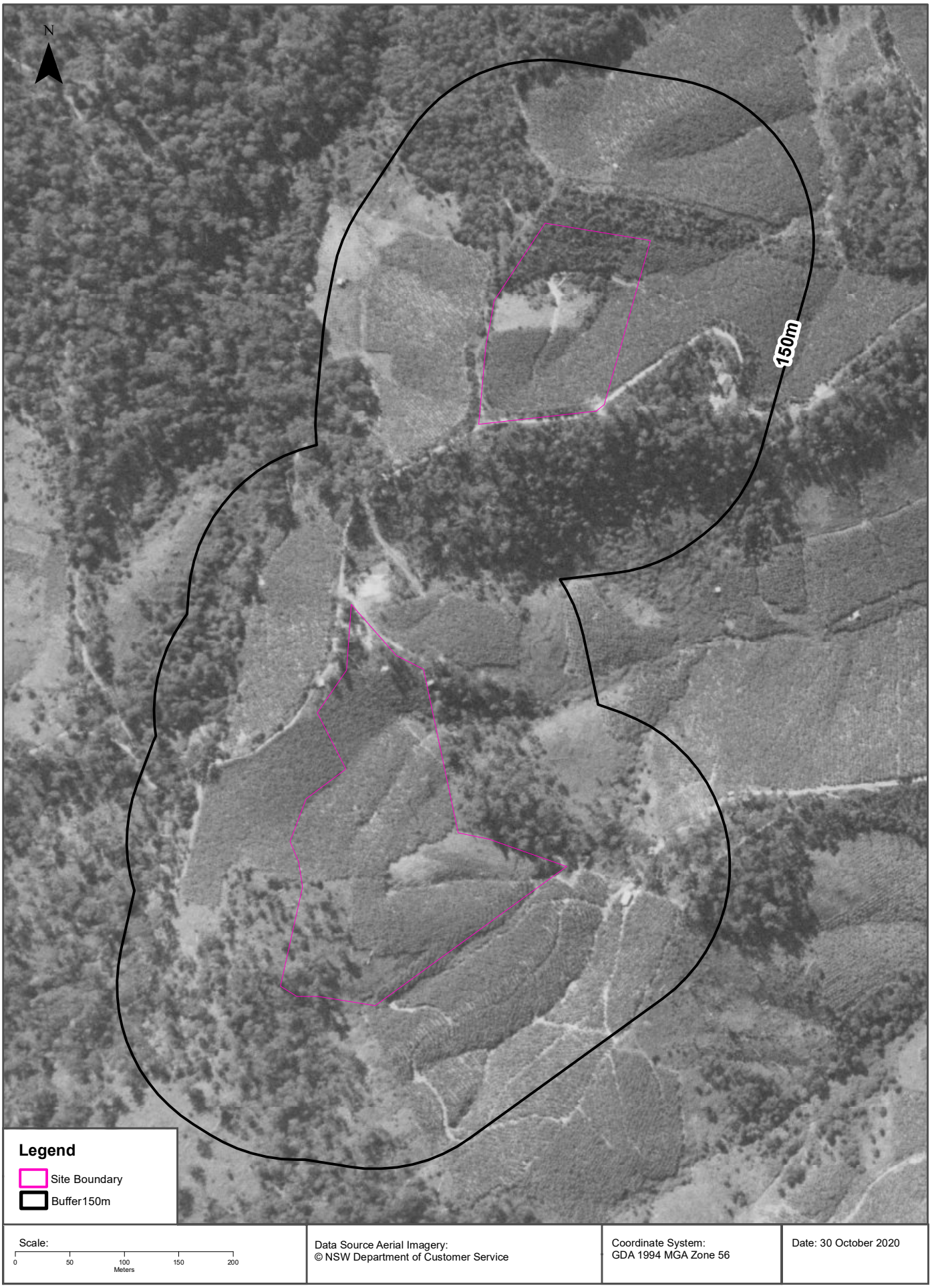
Aerial Imagery 1964

148 and 189 Gaudrons Road, Sapphire Beach, NSW 2450



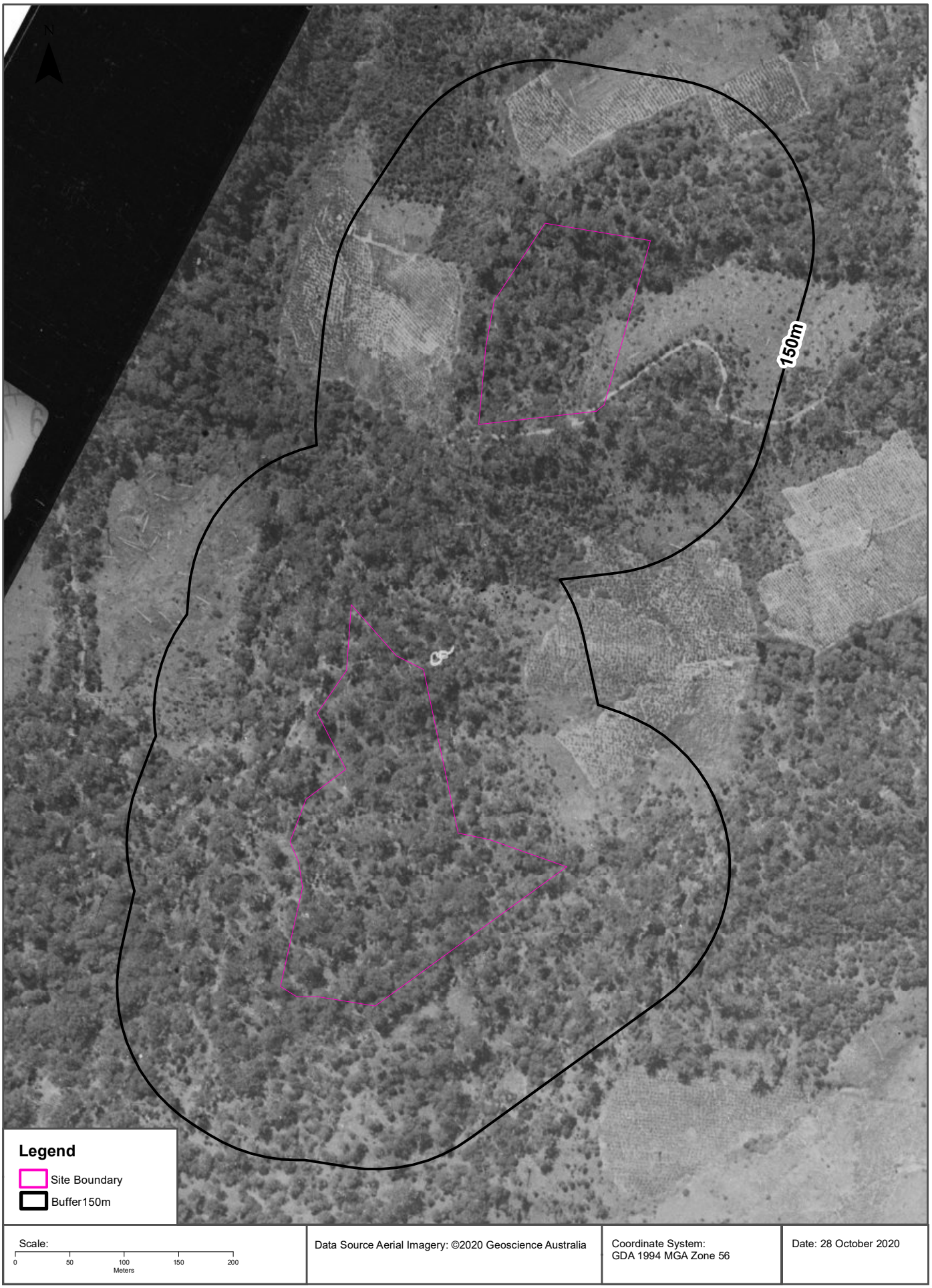
Aerial Imagery 1956

148 and 189 Gaudrons Road, Sapphire Beach, NSW 2450



Aerial Imagery 1943

148 and 189 Gaudrons Road, Sapphire Beach, NSW 2450



APPENDIX B

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000 NATA# 1261 Site# 1254	19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 NATA# 1261 Site# 25403	179 Magowar Road Girraween NSW 2145 Tel: +61 2 9900 8400 NATA# 1261 Site# 18217	Unit 1,2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091 NATA# 1261 Site# 25466	1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 20794	1/2 Frost Drive Mayfield West NSW 2304 Tel: +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Christchurch
35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 4551 IANZ# 1327	43 Detroit Drive Rolleston, Christchurch 7675 Tel: +64 3 343 5201 IANZ# 1290

Company Name: Earth Water Consulting Pty Limited
Address: 2-16 Lourdes Avenue
Urunga
NSW 2455

Project Name: 9 GAUDRONS RD
Project ID: 2021-71

Order No.: 2021-71
Report #: 1001245
Phone: 0402 6083 96
Fax:

Received: Jun 21, 2023 9:50 AM
Due: Jun 28, 2023
Priority: 5 Day
Contact Name: Strider Duerinckx

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	HOLD	Lead	Organochlorine Pesticides	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B4
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	9 S-1	Jun 15, 2023		Soil	M23-Jn0050065		X					
2	9 S-2	Jun 15, 2023		Soil	M23-Jn0050066		X					
3	9 S-3	Jun 15, 2023		Soil	M23-Jn0050067		X					
4	9 S-4	Jun 15, 2023		Soil	M23-Jn0050068		X					
5	C 1	Jun 15, 2023		Soil	M23-Jn0050069	X		X	X		X	
6	9 S-5	Jun 15, 2023		Soil	M23-Jn0050070		X					
7	9 S-6	Jun 15, 2023		Soil	M23-Jn0050071		X					
8	9 S-7	Jun 15, 2023		Soil	M23-Jn0050072		X					
9	9 S-8	Jun 15, 2023		Soil	M23-Jn0050073		X					
10	C 2	Jun 15, 2023		Soil	M23-Jn0050074	X		X	X		X	
11	9 S-9	Jun 15, 2023		Soil	M23-Jn0050075		X					
12	9 S-10	Jun 15, 2023		Soil	M23-Jn0050076		X					
13	9 S-11	Jun 15, 2023		Soil	M23-Jn0050077		X					

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000 NATA# 1261 Site# 1254	19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 NATA# 1261 Site# 25403	179 Magowar Road Girraween NSW 2145 Tel: +61 2 9900 8400 NATA# 1261 Site# 18217	Unit 1,2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091 NATA# 1261 Site# 25466	1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 20794	1/2 Frost Drive Mayfield West NSW 2304 Tel: +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Christchurch
35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 4551 IANZ# 1327	43 Detroit Drive Rolleston, Christchurch 7675 Tel: +64 3 343 5201 IANZ# 1290

Company Name: Earth Water Consulting Pty Limited
Address: 2-16 Lourdes Avenue
Urunga
NSW 2455

Project Name: 9 GAUDRONS RD
Project ID: 2021-71

Order No.: 2021-71
Report #: 1001245
Phone: 0402 6083 96
Fax:

Received: Jun 21, 2023 9:50 AM
Due: Jun 28, 2023
Priority: 5 Day
Contact Name: Strider Duerinckx

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	HOLD	Lead	Organochlorine Pesticides	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B4
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X
14	9 S-12	Jun 15, 2023		Soil	M23-Jn0050078		X					
15	C 3	Jun 15, 2023		Soil	M23-Jn0050079	X		X	X		X	
16	9 S-13	Jun 15, 2023		Soil	M23-Jn0050080		X					
17	9 S-14	Jun 15, 2023		Soil	M23-Jn0050081		X					
18	9 S-15	Jun 15, 2023		Soil	M23-Jn0050082		X					
19	9 S-16	Jun 15, 2023		Soil	M23-Jn0050083		X					
20	C 4	Jun 15, 2023		Soil	M23-Jn0050084	X		X	X		X	
21	9 S-17	Jun 15, 2023		Soil	M23-Jn0050085		X					
22	9 S-18	Jun 15, 2023		Soil	M23-Jn0050086		X					
23	9 S-19	Jun 15, 2023		Soil	M23-Jn0050087		X					
24	9 S-20	Jun 15, 2023		Soil	M23-Jn0050088		X					
25	C 5	Jun 15, 2023		Soil	M23-Jn0050089	X		X	X		X	
26	9 S-21	Jun 15, 2023		Soil	M23-Jn0050090		X					
27	9 S-22	Jun 15, 2023		Soil	M23-Jn0050091		X					
28	9 S-23	Jun 15, 2023		Soil	M23-Jn0050092		X					
29	9 S-24	Jun 15, 2023		Soil	M23-Jn0050093		X					

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NATA# 1261 Site# 1254	NATA# 1261 Site# 25403	NATA# 1261 Site# 18217	NATA# 1261 Site# 25466	NATA# 1261 Site# 20794	Site# 25079 & 25289

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IANZ# 1327	IANZ# 1290

Company Name: Earth Water Consulting Pty Limited
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NSW 2455

Project Name: 9 GAUDRONS RD
Project ID: 2021-71

Order No.: 2021-71
Report #: 1001245
Phone: 0402 6083 96
Fax:

Received: Jun 21, 2023 9:50 AM
Due: Jun 28, 2023
Priority: 5 Day
Contact Name: Strider Duerinckx

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	HOLD	Lead	Organochlorine Pesticides	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B4
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X
30	C 6	Jun 15, 2023		Soil	M23-Jn0050094	X		X	X		X	
31	9 S-25	Jun 15, 2023		Soil	M23-Jn0050095		X					
32	9 S-26	Jun 15, 2023		Soil	M23-Jn0050096		X					
33	9 S-27	Jun 15, 2023		Soil	M23-Jn0050097		X					
34	9 S-28	Jun 15, 2023		Soil	M23-Jn0050098		X					
35	C 7	Jun 15, 2023		Soil	M23-Jn0050099	X		X	X		X	
36	9 S-29	Jun 15, 2023		Soil	M23-Jn0050100		X					
37	9 S-30	Jun 15, 2023		Soil	M23-Jn0050101		X					
38	9 S-31	Jun 15, 2023		Soil	M23-Jn0050102		X					
39	9 S-32	Jun 15, 2023		Soil	M23-Jn0050103		X					
40	C 8	Jun 15, 2023		Soil	M23-Jn0050104	X		X	X		X	
41	9 S-33	Jun 15, 2023		Soil	M23-Jn0050105		X					
42	9 S-34	Jun 15, 2023		Soil	M23-Jn0050106		X					
43	9 S-35	Jun 15, 2023		Soil	M23-Jn0050107		X					
44	9 S-36	Jun 15, 2023		Soil	M23-Jn0050108		X					
45	C 9	Jun 15, 2023		Soil	M23-Jn0050109	X		X	X		X	

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Eurofins Analytical Services Manager : Andrew Black

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Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X
46	9 S-37	Jun 15, 2023		Soil	M23-Jn0050110		X					
47	9 S-38	Jun 15, 2023		Soil	M23-Jn0050111		X					
48	9 S-39	Jun 15, 2023		Soil	M23-Jn0050112		X					
49	9 S-40	Jun 15, 2023		Soil	M23-Jn0050113		X					
50	C 10	Jun 15, 2023		Soil	M23-Jn0050114	X		X	X		X	
51	9 S-41	Jun 15, 2023		Soil	M23-Jn0050115		X					
52	9 S-42	Jun 15, 2023		Soil	M23-Jn0050116		X					
53	9 S-43	Jun 15, 2023		Soil	M23-Jn0050117		X					
54	9 S-44	Jun 15, 2023		Soil	M23-Jn0050118		X					
55	C 11	Jun 15, 2023		Soil	M23-Jn0050119	X		X	X		X	
56	9 Q-1	Jun 15, 2023		Soil	M23-Jn0050120		X					
57	9 Q-2	Jun 15, 2023		Soil	M23-Jn0050121		X					
58	9 Q-3	Jun 15, 2023		Soil	M23-Jn0050122		X					
59	9 Q-4	Jun 15, 2023		Soil	M23-Jn0050123		X					
60	C 12	Jun 15, 2023		Soil	M23-Jn0050124	X		X	X		X	
61	9 Q-5	Jun 15, 2023		Soil	M23-Jn0050125		X					

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Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	HOLD	Lead	Organochlorine Pesticides	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B4
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X
62	9 Q-6	Jun 15, 2023		Soil	M23-Jn0050126		X					
63	9 Q-7	Jun 15, 2023		Soil	M23-Jn0050127		X					
64	9 Q-8	Jun 15, 2023		Soil	M23-Jn0050128		X					
65	C 13	Jun 15, 2023		Soil	M23-Jn0050129	X		X	X		X	
66	9 Q-45	Jun 15, 2023		Soil	M23-Jn0050130	X		X	X		X	
67	9 S-45	Jun 15, 2023		Soil	M23-Jn0050131	X		X	X		X	
68	9 Q-46	Jun 15, 2023		Soil	M23-Jn0050132	X		X	X		X	X
69	9 S-46	Jun 15, 2023		Soil	M23-Jn0050133	X		X	X		X	X
70	9 Q-47	Jun 15, 2023		Soil	M23-Jn0050134	X		X	X		X	
71	9 S-47	Jun 15, 2023		Soil	M23-Jn0050135	X		X	X		X	
72	9 S-48	Jun 15, 2023		Soil	M23-Jn0050136	X		X	X		X	X
73	9 S-49	Jun 15, 2023		Soil	M23-Jn0050137	X		X	X		X	
74	9 S-50	Jun 15, 2023		Soil	M23-Jn0050138	X		X	X		X	
75	9 S-51	Jun 15, 2023		Soil	M23-Jn0050139	X		X	X		X	
76	9 S-52	Jun 15, 2023		Soil	M23-Jn0050140	X		X	X		X	X
77	9 S-53	Jun 15, 2023		Soil	M23-Jn0050141	X		X	X		X	

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NATA# 1261 Site# 1254	NATA# 1261 Site# 25403	NATA# 1261 Site# 18217	NATA# 1261 Site# 25466	NATA# 1261 Site# 20794	Site# 25079 & 25289

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Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	HOLD	Lead	Organochlorine Pesticides	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B4
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X
78	9 S-54	Jun 15, 2023		Soil	M23-Jn0050142	X		X	X		X	
79	9 S-55	Jun 15, 2023		Soil	M23-Jn0050143	X		X	X		X	X
80	9 S-56	Jun 15, 2023		Soil	M23-Jn0050144	X		X	X		X	
81	9 S-57	Jun 15, 2023		Soil	M23-Jn0050145	X		X	X		X	
82	9 S-58 0-150	Jun 19, 2023		Soil	M23-Jn0050146	X		X	X		X	
83	9 S-58 500-650	Jun 19, 2023		Soil	M23-Jn0050147	X		X	X		X	
84	9 S-59 0-150	Jun 19, 2023		Soil	M23-Jn0050148	X		X	X		X	
85	9 S-59 800-950	Jun 19, 2023		Soil	M23-Jn0050149	X		X	X		X	
86	9 S-60 0-150	Jun 19, 2023		Soil	M23-Jn0050150	X		X	X		X	
87	9 S-60 850-1000	Jun 19, 2023		Soil	M23-Jn0050151	X		X	X		X	
88	9 S-61	Jun 19, 2023		Soil	M23-Jn0050152	X		X	X		X	
89	9 S-62	Jun 19, 2023		Soil	M23-Jn0050153	X		X		X	X	
90	9 S-63	Jun 19, 2023		Soil	M23-Jn0050154	X		X		X	X	
91	9 S-64	Jun 19, 2023		Soil	M23-Jn0050155	X		X	X		X	

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NATA# 1261 Site# 1254	NATA# 1261 Site# 25403	NATA# 1261 Site# 18217	NATA# 1261 Site# 25466	NATA# 1261 Site# 20794	Site# 25079 & 25289

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Sample Detail						Arsenic	HOLD	Lead	Organochlorine Pesticides	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B4
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X
92	9 S-65	Jun 19, 2023		Soil	M23-Jn0050156	X		X	X		X	
93	9 S-66	Jun 19, 2023		Soil	M23-Jn0050157	X		X	X		X	
94	9 S-67	Jun 19, 2023		Soil	M23-Jn0050158	X		X	X		X	
95	9 S-68	Jun 19, 2023		Soil	M23-Jn0050159	X		X		X	X	
96	9 S-69	Jun 19, 2023		Soil	M23-Jn0050160	X		X	X		X	
97	9 S-70	Jun 19, 2023		Soil	M23-Jn0050161	X		X		X	X	
98	148 S-1	Jun 19, 2023		Soil	M23-Jn0050162		X					
99	148 S-2	Jun 19, 2023		Soil	M23-Jn0050163		X					
100	148 S-3	Jun 19, 2023		Soil	M23-Jn0050164		X					
101	148 S-4	Jun 19, 2023		Soil	M23-Jn0050165		X					
102	C 14	Jun 19, 2023		Soil	M23-Jn0050166	X		X	X		X	
103	148 S-5	Jun 19, 2023		Soil	M23-Jn0050167		X					
104	148 S-6	Jun 19, 2023		Soil	M23-Jn0050168		X					
105	148 S-7	Jun 19, 2023		Soil	M23-Jn0050169		X					
106	148 S-8	Jun 19, 2023		Soil	M23-Jn0050170		X					
107	C 15	Jun 19, 2023		Soil	M23-Jn0050171	X		X	X		X	

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Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X
108	148 S-9	Jun 19, 2023		Soil	M23-Jn0050172		X					
109	148 S-10	Jun 19, 2023		Soil	M23-Jn0050173		X					
110	148 S-11	Jun 19, 2023		Soil	M23-Jn0050174		X					
111	148 S-12	Jun 19, 2023		Soil	M23-Jn0050175		X					
112	C 16	Jun 19, 2023		Soil	M23-Jn0050176	X		X	X		X	
113	148 S-13	Jun 19, 2023		Soil	M23-Jn0050177		X					
114	148 S-14	Jun 19, 2023		Soil	M23-Jn0050178		X					
115	148 S-15	Jun 19, 2023		Soil	M23-Jn0050179		X					
116	148 S-16	Jun 19, 2023		Soil	M23-Jn0050180		X					
117	C 17	Jun 19, 2023		Soil	M23-Jn0050181	X		X	X		X	
118	148 S-17	Jun 19, 2023		Soil	M23-Jn0050182		X					
119	148 S-18	Jun 19, 2023		Soil	M23-Jn0050183		X					
120	148 S-19	Jun 19, 2023		Soil	M23-Jn0050184		X					
121	148 S-20	Jun 19, 2023		Soil	M23-Jn0050185		X					
122	C 18	Jun 19, 2023		Soil	M23-Jn0050186	X		X	X		X	
123	148 S-21	Jun 19, 2023		Soil	M23-Jn0050187		X					

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NATA# 1261 Site# 1254	NATA# 1261 Site# 25403	NATA# 1261 Site# 18217	NATA# 1261 Site# 25466	NATA# 1261 Site# 20794	Site# 25079 & 25289

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Received: Jun 21, 2023 9:50 AM
Due: Jun 28, 2023
Priority: 5 Day
Contact Name: Strider Duerinckx

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	HOLD	Lead	Organochlorine Pesticides	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B4
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X
124	148 S-22	Jun 19, 2023		Soil	M23-Jn0050188		X					
125	148 S-23	Jun 19, 2023		Soil	M23-Jn0050189		X					
126	148 S-24	Jun 19, 2023		Soil	M23-Jn0050190		X					
127	C 19	Jun 19, 2023		Soil	M23-Jn0050191	X		X	X		X	
128	148 S-25	Jun 19, 2023		Soil	M23-Jn0050192		X					
129	148 S-26	Jun 19, 2023		Soil	M23-Jn0050193		X					
130	148 S-27	Jun 19, 2023		Soil	M23-Jn0050194		X					
131	148 S-28	Jun 19, 2023		Soil	M23-Jn0050195		X					
132	C 20	Jun 19, 2023		Soil	M23-Jn0050196	X		X	X		X	
133	148 S-29	Jun 19, 2023		Soil	M23-Jn0050197		X					
134	148 S-30	Jun 19, 2023		Soil	M23-Jn0050198		X					
135	148 S-31	Jun 19, 2023		Soil	M23-Jn0050199		X					
136	148 S-32	Jun 19, 2023		Soil	M23-Jn0050200		X					
137	C 21	Jun 19, 2023		Soil	M23-Jn0050201	X		X	X		X	
Test Counts						53	84	53	49	4	53	5

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Certificate of Analysis

Earth Water Consulting Pty Limited
2-16 Lourdes Avenue
Urunga
NSW 2455

NATA Accredited
Accreditation Number 1261
Site Number 1254

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 **1001245-S**
Project name 9 GAUDRONS RD
Project ID 2021-71
Received Date Jun 21, 2023

Client Sample ID			**C 1**	**C 2**	**C 3**	**C 4**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**M23-Jn0050069**	**M23-Jn0050074**	**M23-Jn0050079**	**M23-Jn0050084**
Date Sampled			**Jun 15, 2023**	**Jun 15, 2023**	**Jun 15, 2023**	**Jun 15, 2023**
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
Dibutylchlorendate (surr.)	1	%	85	83	97	98
Tetrachloro-m-xylene (surr.)	1	%	59	89	57	80
Heavy Metals						
Arsenic	2	mg/kg	3.3	6.1	2.9	< 2
Lead	5	mg/kg	6.9	12	6.1	9.6
Sample Properties						
% Moisture	1	%	18	25	20	22

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Client Sample ID			C 5	C 6	C 7	C 8
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050089	M23-Jn0050094	M23-Jn0050099	M23-Jn0050104
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
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
Dibutylchlorendate (surr.)	1	%	86	69	101	111
Tetrachloro-m-xylene (surr.)	1	%	126	109	79	59
Heavy Metals						
Arsenic	2	mg/kg	13	5.9	51	26
Lead	5	mg/kg	27	15	17	13
Sample Properties						
% Moisture	1	%	28	19	26	24

Client Sample ID			C 9	C 10	C 11	C 12
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050109	M23-Jn0050114	M23-Jn0050119	M23-Jn0050124
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
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

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Client Sample ID			C 9	C 10	C 11	C 12
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050109	M23-Jn0050114	M23-Jn0050119	M23-Jn0050124
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
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
Dibutylchlorendate (surr.)	1	%	80	99	88	100
Tetrachloro-m-xylene (surr.)	1	%	78	65	63	71
Heavy Metals						
Arsenic	2	mg/kg	79	38	18	2.8
Lead	5	mg/kg	10	13	38	7.3
Sample Properties						
% Moisture	1	%	21	23	23	22

Client Sample ID			C 13	9 Q-45	9 S-45	9 Q-46
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050129	M23-Jn0050130	M23-Jn0050131	M23-Jn0050132
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
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

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Client Sample ID			C 13	9 Q-45	9 S-45	9 Q-46
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050129	M23-Jn0050130	M23-Jn0050131	M23-Jn0050132
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
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
Dibutylchlorendate (surr.)	1	%	82	116	101	98
Tetrachloro-m-xylene (surr.)	1	%	123	63	69	55
Heavy Metals						
Arsenic	2	mg/kg	13	7.1	6.3	9.0
Lead	5	mg/kg	14	19	22	26
Sample Properties						
% Moisture	1	%	23	13	16	15
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	%	-	-	-	138
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

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Client Sample ID			C 13	9 Q-45	9 S-45	9 Q-46
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050129	M23-Jn0050130	M23-Jn0050131	M23-Jn0050132
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
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
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	%	-	-	-	98
p-Terphenyl-d14 (surr.)	1	%	-	-	-	61

Client Sample ID			9 S-46	9 Q-47	9 S-47	9 S-48
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050133	M23-Jn0050134	M23-Jn0050135	M23-Jn0050136
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
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
Dibutylchlorendate (surr.)	1	%	104	93	66	88
Tetrachloro-m-xylene (surr.)	1	%	58	57	52	69

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Client Sample ID			9 S-46	9 Q-47	9 S-47	9 S-48
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050133	M23-Jn0050134	M23-Jn0050135	M23-Jn0050136
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	7.6	8.3	8.2	10
Lead	5	mg/kg	25	23	22	26
Sample Properties						
% Moisture	1	%	15	14	20	12
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	< 20	-	-	< 20
TRH C10-C14	20	mg/kg	< 20	-	-	< 20
TRH C15-C28	50	mg/kg	< 50	-	-	< 50
TRH C29-C36	50	mg/kg	< 50	-	-	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	-	-	< 50
TRH C6-C10	20	mg/kg	< 20	-	-	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	-	-	< 20
TRH >C10-C16	50	mg/kg	< 50	-	-	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	-	-	< 50
TRH >C16-C34	100	mg/kg	< 100	-	-	< 100
TRH >C34-C40	100	mg/kg	< 100	-	-	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	-	-	< 100
BTEX						
Benzene	0.1	mg/kg	< 0.1	-	-	< 0.1
Toluene	0.1	mg/kg	< 0.1	-	-	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	-	-	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	-	-	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	-	-	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	-	-	< 0.3
4-Bromofluorobenzene (surr.)	1	%	81	-	-	112
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	-	-	< 0.5
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	-	-	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	-	-	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	-	-	1.2
Acenaphthene	0.5	mg/kg	< 0.5	-	-	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	-	-	< 0.5
Anthracene	0.5	mg/kg	< 0.5	-	-	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	-	-	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	-	-	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	-	-	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	-	-	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	-	-	< 0.5
Chrysene	0.5	mg/kg	< 0.5	-	-	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	-	-	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	-	-	< 0.5
Fluorene	0.5	mg/kg	< 0.5	-	-	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	-	-	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	-	-	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	-	-	< 0.5
Pyrene	0.5	mg/kg	< 0.5	-	-	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	-	-	< 0.5

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Client Sample ID			9 S-46	9 Q-47	9 S-47	9 S-48
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050133	M23-Jn0050134	M23-Jn0050135	M23-Jn0050136
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
2-Fluorobiphenyl (surr.)	1	%	98	-	-	66
p-Terphenyl-d14 (surr.)	1	%	60	-	-	79

Client Sample ID			9 S-49	9 S-50	9 S-51	9 S-52
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050137	M23-Jn0050138	M23-Jn0050139	M23-Jn0050140
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
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
Dibutylchlorendate (surr.)	1	%	108	65	133	64
Tetrachloro-m-xylene (surr.)	1	%	62	60	108	59
Heavy Metals						
Arsenic	2	mg/kg	11	8.5	6.2	13
Lead	5	mg/kg	22	19	9.8	15
Sample Properties						
% Moisture	1	%	15	11	17	11
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

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Client Sample ID			9 S-49	9 S-50	9 S-51	9 S-52
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050137	M23-Jn0050138	M23-Jn0050139	M23-Jn0050140
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
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	%	-	-	-	63
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
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	%	-	-	-	58
p-Terphenyl-d14 (surr.)	1	%	-	-	-	61

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Client Sample ID			9 S-53	9 S-54	9 S-55	9 S-56
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050141	M23-Jn0050142	M23-Jn0050143	M23-Jn0050144
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
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
Dibutylchlorendate (surr.)	1	%	61	62	72	70
Tetrachloro-m-xylene (surr.)	1	%	62	57	75	69
Heavy Metals						
Arsenic	2	mg/kg	6.3	8.0	5.5	8.4
Lead	5	mg/kg	15	27	16	34
Sample Properties						
% Moisture	1	%	16	4.0	21	16
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	-

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Client Sample ID			9 S-53	9 S-54	9 S-55	9 S-56
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050141	M23-Jn0050142	M23-Jn0050143	M23-Jn0050144
Date Sampled			Jun 15, 2023	Jun 15, 2023	Jun 15, 2023	Jun 15, 2023
Test/Reference	LOR	Unit				
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	%	-	-	81	-
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	-
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	%	-	-	65	-
p-Terphenyl-d14 (surr.)	1	%	-	-	63	-

Client Sample ID			9 S-57	9 S-58 0-150	9 S-58 500-650	9 S-59 0-150
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050145	M23-Jn0050146	M23-Jn0050147	M23-Jn0050148
Date Sampled			Jun 15, 2023	Jun 19, 2023	Jun 19, 2023	Jun 19, 2023
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

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Client Sample ID			9 S-57	9 S-58 0-150	9 S-58 500-650	9 S-59 0-150
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050145	M23-Jn0050146	M23-Jn0050147	M23-Jn0050148
Date Sampled			Jun 15, 2023	Jun 19, 2023	Jun 19, 2023	Jun 19, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
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
Dibutylchlorendate (surr.)	1	%	93	63	77	54
Tetrachloro-m-xylene (surr.)	1	%	69	55	63	51
Heavy Metals						
Arsenic	2	mg/kg	6.1	12	3.9	18
Lead	5	mg/kg	75	17	14	22
Sample Properties						
% Moisture	1	%	15	23	26	22

Client Sample ID			9 S-59 800-950	9 S-60 0-150	9 S-60 850-1000	9 S-61
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050149	M23-Jn0050150	M23-Jn0050151	M23-Jn0050152
Date Sampled			Jun 19, 2023	Jun 19, 2023	Jun 19, 2023	Jun 19, 2023
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

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Client Sample ID			9 S-59 800-950	9 S-60 0-150	9 S-60 850-1000	9 S-61
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050149	M23-Jn0050150	M23-Jn0050151	M23-Jn0050152
Date Sampled			Jun 19, 2023	Jun 19, 2023	Jun 19, 2023	Jun 19, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
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
Dibutylchlorendate (surr.)	1	%	57	65	65	67
Tetrachloro-m-xylene (surr.)	1	%	51	61	56	61
Heavy Metals						
Arsenic	2	mg/kg	6.0	3.2	12	3.4
Lead	5	mg/kg	13	9.8	14	14
Sample Properties						
% Moisture	1	%	25	20	21	7.6

Client Sample ID			9 S-62	9 S-63	9 S-64	9 S-65
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050153	M23-Jn0050154	M23-Jn0050155	M23-Jn0050156
Date Sampled			Jun 19, 2023	Jun 19, 2023	Jun 19, 2023	Jun 19, 2023
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

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Client Sample ID			9 S-62	9 S-63	9 S-64	9 S-65
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050153	M23-Jn0050154	M23-Jn0050155	M23-Jn0050156
Date Sampled			Jun 19, 2023	Jun 19, 2023	Jun 19, 2023	Jun 19, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
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
Dibutylchlorendate (surr.)	1	%	112	62	72	128
Tetrachloro-m-xylene (surr.)	1	%	56	92	93	74
Heavy Metals						
Arsenic	2	mg/kg	< 2	4.3	4.4	11
Lead	5	mg/kg	5.5	12	13	33
Sample Properties						
% Moisture	1	%	5.2	18	20	19
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	< 0.2	-	-
Bolstar	0.2	mg/kg	< 0.2	< 0.2	-	-
Chlorfenvinphos	0.2	mg/kg	< 0.2	< 0.2	-	-
Chlorpyrifos	0.2	mg/kg	< 0.2	< 0.2	-	-
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	< 0.2	-	-
Coumaphos	2	mg/kg	< 2	< 2	-	-
Demeton-S	0.2	mg/kg	< 0.2	< 0.2	-	-
Demeton-O	0.2	mg/kg	< 0.2	< 0.2	-	-
Diazinon	0.2	mg/kg	< 0.2	< 0.2	-	-
Dichlorvos	0.2	mg/kg	< 0.2	< 0.2	-	-
Dimethoate	0.2	mg/kg	< 0.2	< 0.2	-	-
Disulfoton	0.2	mg/kg	< 0.2	< 0.2	-	-
EPN	0.2	mg/kg	< 0.2	< 0.2	-	-
Ethion	0.2	mg/kg	< 0.2	< 0.2	-	-
Ethoprop	0.2	mg/kg	< 0.2	< 0.2	-	-
Ethyl parathion	0.2	mg/kg	< 0.2	< 0.2	-	-
Fenitrothion	0.2	mg/kg	< 0.2	< 0.2	-	-
Fensulfothion	0.2	mg/kg	< 0.2	< 0.2	-	-
Fenthion	0.2	mg/kg	< 0.2	< 0.2	-	-
Malathion	0.2	mg/kg	< 0.2	< 0.2	-	-
Merphos	0.2	mg/kg	< 0.2	< 0.2	-	-
Methyl parathion	0.2	mg/kg	< 0.2	< 0.2	-	-
Mevinphos	0.2	mg/kg	< 0.2	< 0.2	-	-
Monocrotophos	2	mg/kg	< 2	< 2	-	-
Naled	0.2	mg/kg	< 0.2	< 0.2	-	-
Omethoate	2	mg/kg	< 2	< 2	-	-
Phorate	0.2	mg/kg	< 0.2	< 0.2	-	-
Pirimiphos-methyl	0.2	mg/kg	< 0.2	< 0.2	-	-
Pyrazophos	0.2	mg/kg	< 0.2	< 0.2	-	-
Ronnel	0.2	mg/kg	< 0.2	< 0.2	-	-
Terbufos	0.2	mg/kg	< 0.2	< 0.2	-	-
Tetrachlorvinphos	0.2	mg/kg	< 0.2	< 0.2	-	-
Tokuthion	0.2	mg/kg	< 0.2	< 0.2	-	-
Trichloronate	0.2	mg/kg	< 0.2	< 0.2	-	-
Triphenylphosphate (surr.)	1	%	120	66	-	-

eurofins | Environment Testing

Client Sample ID			9 S-66	9 S-67	9 S-68	9 S-69
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050157	M23-Jn0050158	M23-Jn0050159	M23-Jn0050160
Date Sampled			Jun 19, 2023	Jun 19, 2023	Jun 19, 2023	Jun 19, 2023
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	0.06	< 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
Dibutylchlorendate (surr.)	1	%	95	116	256	81
Tetrachloro-m-xylene (surr.)	1	%	77	76	112	105
Heavy Metals						
Arsenic	2	mg/kg	13	16	16	10
Lead	5	mg/kg	23	24	25	23
Sample Properties						
% Moisture	1	%	8.3	15	17	12
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	-	-	< 0.2	-
Bolstar	0.2	mg/kg	-	-	< 0.2	-
Chlorfenvinphos	0.2	mg/kg	-	-	< 0.2	-
Chlorpyrifos	0.2	mg/kg	-	-	< 0.2	-
Chlorpyrifos-methyl	0.2	mg/kg	-	-	< 0.2	-
Coumaphos	2	mg/kg	-	-	< 2	-
Demeton-S	0.2	mg/kg	-	-	< 0.2	-
Demeton-O	0.2	mg/kg	-	-	< 0.2	-
Diazinon	0.2	mg/kg	-	-	< 0.2	-
Dichlorvos	0.2	mg/kg	-	-	< 0.2	-
Dimethoate	0.2	mg/kg	-	-	< 0.2	-
Disulfoton	0.2	mg/kg	-	-	< 0.2	-
EPN	0.2	mg/kg	-	-	< 0.2	-
Ethion	0.2	mg/kg	-	-	< 0.2	-
Ethoprop	0.2	mg/kg	-	-	< 0.2	-
Ethyl parathion	0.2	mg/kg	-	-	< 0.2	-

eurofins | Environment Testing

Client Sample ID			9 S-66	9 S-67	9 S-68	9 S-69
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050157	M23-Jn0050158	M23-Jn0050159	M23-Jn0050160
Date Sampled			Jun 19, 2023	Jun 19, 2023	Jun 19, 2023	Jun 19, 2023
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Fenitrothion	0.2	mg/kg	-	-	< 0.2	-
Fensulfothion	0.2	mg/kg	-	-	< 0.2	-
Fenthion	0.2	mg/kg	-	-	< 0.2	-
Malathion	0.2	mg/kg	-	-	< 0.2	-
Merphos	0.2	mg/kg	-	-	< 0.2	-
Methyl parathion	0.2	mg/kg	-	-	< 0.2	-
Mevinphos	0.2	mg/kg	-	-	< 0.2	-
Monocrotophos	2	mg/kg	-	-	< 2	-
Naled	0.2	mg/kg	-	-	< 0.2	-
Omethoate	2	mg/kg	-	-	< 2	-
Phorate	0.2	mg/kg	-	-	< 0.2	-
Pirimiphos-methyl	0.2	mg/kg	-	-	< 0.2	-
Pyrazophos	0.2	mg/kg	-	-	< 0.2	-
Ronnel	0.2	mg/kg	-	-	< 0.2	-
Terbufos	0.2	mg/kg	-	-	< 0.2	-
Tetrachlorvinphos	0.2	mg/kg	-	-	< 0.2	-
Tokuthion	0.2	mg/kg	-	-	< 0.2	-
Trichloronate	0.2	mg/kg	-	-	< 0.2	-
Triphenylphosphate (surr.)	1	%	-	-	195	-

Client Sample ID			9 S-70	C 14	C 15	C 16
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050161	M23-Jn0050166	M23-Jn0050171	M23-Jn0050176
Date Sampled			Jun 19, 2023	Jun 19, 2023	Jun 19, 2023	Jun 19, 2023
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

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Client Sample ID			9 S-70	C 14	C 15	C 16
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050161	M23-Jn0050166	M23-Jn0050171	M23-Jn0050176
Date Sampled			Jun 19, 2023	Jun 19, 2023	Jun 19, 2023	Jun 19, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
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
Dibutylchlorendate (surr.)	1	%	131	125	107	108
Tetrachloro-m-xylene (surr.)	1	%	63	131	93	83
Heavy Metals						
Arsenic	2	mg/kg	16	9.4	29	14
Lead	5	mg/kg	25	35	40	21
Sample Properties						
% Moisture	1	%	5.2	9.4	17	18
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	-	-	-
Bolstar	0.2	mg/kg	< 0.2	-	-	-
Chlorfenvinphos	0.2	mg/kg	< 0.2	-	-	-
Chlorpyrifos	0.2	mg/kg	< 0.2	-	-	-
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	-	-	-
Coumaphos	2	mg/kg	< 2	-	-	-
Demeton-S	0.2	mg/kg	< 0.2	-	-	-
Demeton-O	0.2	mg/kg	< 0.2	-	-	-
Diazinon	0.2	mg/kg	< 0.2	-	-	-
Dichlorvos	0.2	mg/kg	< 0.2	-	-	-
Dimethoate	0.2	mg/kg	< 0.2	-	-	-
Disulfoton	0.2	mg/kg	< 0.2	-	-	-
EPN	0.2	mg/kg	< 0.2	-	-	-
Ethion	0.2	mg/kg	< 0.2	-	-	-
Ethoprop	0.2	mg/kg	< 0.2	-	-	-
Ethyl parathion	0.2	mg/kg	< 0.2	-	-	-
Fenitrothion	0.2	mg/kg	< 0.2	-	-	-
Fensulfothion	0.2	mg/kg	< 0.2	-	-	-
Fenthion	0.2	mg/kg	< 0.2	-	-	-
Malathion	0.2	mg/kg	< 0.2	-	-	-
Merphos	0.2	mg/kg	< 0.2	-	-	-
Methyl parathion	0.2	mg/kg	< 0.2	-	-	-
Mevinphos	0.2	mg/kg	< 0.2	-	-	-
Monocrotophos	2	mg/kg	< 2	-	-	-
Naled	0.2	mg/kg	< 0.2	-	-	-
Omethoate	2	mg/kg	< 2	-	-	-
Phorate	0.2	mg/kg	< 0.2	-	-	-
Pirimiphos-methyl	0.2	mg/kg	< 0.2	-	-	-
Pyrazophos	0.2	mg/kg	< 0.2	-	-	-
Ronnel	0.2	mg/kg	< 0.2	-	-	-
Terbufos	0.2	mg/kg	< 0.2	-	-	-
Tetrachlorvinphos	0.2	mg/kg	< 0.2	-	-	-
Tokuthion	0.2	mg/kg	< 0.2	-	-	-
Trichloronate	0.2	mg/kg	< 0.2	-	-	-
Triphenylphosphate (surr.)	1	%	86	-	-	-

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Client Sample ID			C 17	C 18	C 19	C 20
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Jn0050181	M23-Jn0050186	M23-Jn0050191	M23-Jn0050196
Date Sampled			Jun 19, 2023	Jun 19, 2023	Jun 19, 2023	Jun 19, 2023
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
Dibutylchlorendate (surr.)	1	%	97	78	89	91
Tetrachloro-m-xylene (surr.)	1	%	61	59	73	64
Heavy Metals						
Arsenic	2	mg/kg	22	< 2	25	30
Lead	5	mg/kg	36	< 5	25	23
Sample Properties						
% Moisture	1	%	23	21	18	19

Client Sample ID			C 21
Sample Matrix			Soil
Eurofins Sample No.			M23-Jn0050201
Date Sampled			Jun 19, 2023
Test/Reference	LOR	Unit	
Organochlorine Pesticides			
Chlordanes - Total	0.1	mg/kg	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05
a-HCH	0.05	mg/kg	< 0.05
Aldrin	0.05	mg/kg	< 0.05
b-HCH	0.05	mg/kg	< 0.05
d-HCH	0.05	mg/kg	< 0.05

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Client Sample ID			C 21
Sample Matrix			Soil
Eurofins Sample No.			M23-Jn0050201
Date Sampled			Jun 19, 2023
Test/Reference	LOR	Unit	
Organochlorine Pesticides			
Dieldrin	0.05	mg/kg	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05
Endrin	0.05	mg/kg	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05
g-HCH (Lindane)	0.05	mg/kg	< 0.05
Heptachlor	0.05	mg/kg	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05
Toxaphene	0.5	mg/kg	< 0.5
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1
Dibutylchlorendate (surr.)	1	%	68
Tetrachloro-m-xylene (surr.)	1	%	61
Heavy Metals			
Arsenic	2	mg/kg	20
Lead	5	mg/kg	21
Sample Properties			
% Moisture	1	%	21

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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
Suite B14: OCP/OPP			
Organochlorine Pesticides	Melbourne	Jun 27, 2023	14 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8270)			
Organophosphorus Pesticides	Melbourne	Jun 27, 2023	14 Days
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS (USEPA 8270)			
Heavy Metals	Melbourne	Jun 27, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Melbourne	Jun 22, 2023	14 Days
- Method: LTM-GEN-7080 Moisture			
Eurofins Suite B4			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Jun 27, 2023	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Jun 27, 2023	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Jun 27, 2023	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Jun 27, 2023	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Polycyclic Aromatic Hydrocarbons	Melbourne	Jun 27, 2023	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			

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Company Name: Earth Water Consulting Pty Limited
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NSW 2455

Project Name: 9 GAUDRONS RD
Project ID: 2021-71

Order No.: 2021-71
Report #: 1001245
Phone: 0402 6083 96
Fax:

Received: Jun 21, 2023 9:50 AM
Due: Jun 28, 2023
Priority: 5 Day
Contact Name: Strider Duerinckx

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	HOLD	Lead	Organochlorine Pesticides	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B4
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	9 S-1	Jun 15, 2023		Soil	M23-Jn0050065		X					
2	9 S-2	Jun 15, 2023		Soil	M23-Jn0050066		X					
3	9 S-3	Jun 15, 2023		Soil	M23-Jn0050067		X					
4	9 S-4	Jun 15, 2023		Soil	M23-Jn0050068		X					
5	C 1	Jun 15, 2023		Soil	M23-Jn0050069	X		X	X		X	
6	9 S-5	Jun 15, 2023		Soil	M23-Jn0050070		X					
7	9 S-6	Jun 15, 2023		Soil	M23-Jn0050071		X					
8	9 S-7	Jun 15, 2023		Soil	M23-Jn0050072		X					
9	9 S-8	Jun 15, 2023		Soil	M23-Jn0050073		X					
10	C 2	Jun 15, 2023		Soil	M23-Jn0050074	X		X	X		X	
11	9 S-9	Jun 15, 2023		Soil	M23-Jn0050075		X					
12	9 S-10	Jun 15, 2023		Soil	M23-Jn0050076		X					
13	9 S-11	Jun 15, 2023		Soil	M23-Jn0050077		X					

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Project Name: 9 GAUDRONS RD
Project ID: 2021-71

Order No.: 2021-71
Report #: 1001245
Phone: 0402 6083 96
Fax:

Received: Jun 21, 2023 9:50 AM
Due: Jun 28, 2023
Priority: 5 Day
Contact Name: Strider Duerinckx

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	HOLD	Lead	Organochlorine Pesticides	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B4
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X
14	9 S-12	Jun 15, 2023		Soil	M23-Jn0050078		X					
15	C 3	Jun 15, 2023		Soil	M23-Jn0050079	X		X	X		X	
16	9 S-13	Jun 15, 2023		Soil	M23-Jn0050080		X					
17	9 S-14	Jun 15, 2023		Soil	M23-Jn0050081		X					
18	9 S-15	Jun 15, 2023		Soil	M23-Jn0050082		X					
19	9 S-16	Jun 15, 2023		Soil	M23-Jn0050083		X					
20	C 4	Jun 15, 2023		Soil	M23-Jn0050084	X		X	X		X	
21	9 S-17	Jun 15, 2023		Soil	M23-Jn0050085		X					
22	9 S-18	Jun 15, 2023		Soil	M23-Jn0050086		X					
23	9 S-19	Jun 15, 2023		Soil	M23-Jn0050087		X					
24	9 S-20	Jun 15, 2023		Soil	M23-Jn0050088		X					
25	C 5	Jun 15, 2023		Soil	M23-Jn0050089	X		X	X		X	
26	9 S-21	Jun 15, 2023		Soil	M23-Jn0050090		X					
27	9 S-22	Jun 15, 2023		Soil	M23-Jn0050091		X					
28	9 S-23	Jun 15, 2023		Soil	M23-Jn0050092		X					
29	9 S-24	Jun 15, 2023		Soil	M23-Jn0050093		X					

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NATA# 1261 Site# 1254	NATA# 1261 Site# 25403	NATA# 1261 Site# 18217	NATA# 1261 Site# 25466	NATA# 1261 Site# 20794	Site# 25079 & 25289

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Project Name: 9 GAUDRONS RD
Project ID: 2021-71

Order No.: 2021-71
Report #: 1001245
Phone: 0402 6083 96
Fax:

Received: Jun 21, 2023 9:50 AM
Due: Jun 28, 2023
Priority: 5 Day
Contact Name: Strider Duerinckx

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	HOLD	Lead	Organochlorine Pesticides	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B4
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X
30	C 6	Jun 15, 2023		Soil	M23-Jn0050094	X		X	X		X	
31	9 S-25	Jun 15, 2023		Soil	M23-Jn0050095		X					
32	9 S-26	Jun 15, 2023		Soil	M23-Jn0050096		X					
33	9 S-27	Jun 15, 2023		Soil	M23-Jn0050097		X					
34	9 S-28	Jun 15, 2023		Soil	M23-Jn0050098		X					
35	C 7	Jun 15, 2023		Soil	M23-Jn0050099	X		X	X		X	
36	9 S-29	Jun 15, 2023		Soil	M23-Jn0050100		X					
37	9 S-30	Jun 15, 2023		Soil	M23-Jn0050101		X					
38	9 S-31	Jun 15, 2023		Soil	M23-Jn0050102		X					
39	9 S-32	Jun 15, 2023		Soil	M23-Jn0050103		X					
40	C 8	Jun 15, 2023		Soil	M23-Jn0050104	X		X	X		X	
41	9 S-33	Jun 15, 2023		Soil	M23-Jn0050105		X					
42	9 S-34	Jun 15, 2023		Soil	M23-Jn0050106		X					
43	9 S-35	Jun 15, 2023		Soil	M23-Jn0050107		X					
44	9 S-36	Jun 15, 2023		Soil	M23-Jn0050108		X					
45	C 9	Jun 15, 2023		Soil	M23-Jn0050109	X		X	X		X	

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NATA# 1261 Site# 1254	NATA# 1261 Site# 25403	NATA# 1261 Site# 18217	NATA# 1261 Site# 25466	NATA# 1261 Site# 20794	Site# 25079 & 25289

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Project ID: 2021-71

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Phone: 0402 6083 96
Fax:

Received: Jun 21, 2023 9:50 AM
Due: Jun 28, 2023
Priority: 5 Day
Contact Name: Strider Duerinckx

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	HOLD	Lead	Organochlorine Pesticides	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B4
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X
46	9 S-37	Jun 15, 2023		Soil	M23-Jn0050110		X					
47	9 S-38	Jun 15, 2023		Soil	M23-Jn0050111		X					
48	9 S-39	Jun 15, 2023		Soil	M23-Jn0050112		X					
49	9 S-40	Jun 15, 2023		Soil	M23-Jn0050113		X					
50	C 10	Jun 15, 2023		Soil	M23-Jn0050114	X		X	X		X	
51	9 S-41	Jun 15, 2023		Soil	M23-Jn0050115		X					
52	9 S-42	Jun 15, 2023		Soil	M23-Jn0050116		X					
53	9 S-43	Jun 15, 2023		Soil	M23-Jn0050117		X					
54	9 S-44	Jun 15, 2023		Soil	M23-Jn0050118		X					
55	C 11	Jun 15, 2023		Soil	M23-Jn0050119	X		X	X		X	
56	9 Q-1	Jun 15, 2023		Soil	M23-Jn0050120		X					
57	9 Q-2	Jun 15, 2023		Soil	M23-Jn0050121		X					
58	9 Q-3	Jun 15, 2023		Soil	M23-Jn0050122		X					
59	9 Q-4	Jun 15, 2023		Soil	M23-Jn0050123		X					
60	C 12	Jun 15, 2023		Soil	M23-Jn0050124	X		X	X		X	
61	9 Q-5	Jun 15, 2023		Soil	M23-Jn0050125		X					

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Received: Jun 21, 2023 9:50 AM
Due: Jun 28, 2023
Priority: 5 Day
Contact Name: Strider Duerinckx

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	HOLD	Lead	Organochlorine Pesticides	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B4
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X
62	9 Q-6	Jun 15, 2023		Soil	M23-Jn0050126		X					
63	9 Q-7	Jun 15, 2023		Soil	M23-Jn0050127		X					
64	9 Q-8	Jun 15, 2023		Soil	M23-Jn0050128		X					
65	C 13	Jun 15, 2023		Soil	M23-Jn0050129	X		X	X		X	
66	9 Q-45	Jun 15, 2023		Soil	M23-Jn0050130	X		X	X		X	
67	9 S-45	Jun 15, 2023		Soil	M23-Jn0050131	X		X	X		X	
68	9 Q-46	Jun 15, 2023		Soil	M23-Jn0050132	X		X	X		X	X
69	9 S-46	Jun 15, 2023		Soil	M23-Jn0050133	X		X	X		X	X
70	9 Q-47	Jun 15, 2023		Soil	M23-Jn0050134	X		X	X		X	
71	9 S-47	Jun 15, 2023		Soil	M23-Jn0050135	X		X	X		X	
72	9 S-48	Jun 15, 2023		Soil	M23-Jn0050136	X		X	X		X	X
73	9 S-49	Jun 15, 2023		Soil	M23-Jn0050137	X		X	X		X	
74	9 S-50	Jun 15, 2023		Soil	M23-Jn0050138	X		X	X		X	
75	9 S-51	Jun 15, 2023		Soil	M23-Jn0050139	X		X	X		X	
76	9 S-52	Jun 15, 2023		Soil	M23-Jn0050140	X		X	X		X	X
77	9 S-53	Jun 15, 2023		Soil	M23-Jn0050141	X		X	X		X	

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Company Name: Earth Water Consulting Pty Limited
Address: 2-16 Lourdes Avenue
Urunga
NSW 2455

Project Name: 9 GAUDRONS RD
Project ID: 2021-71

Order No.: 2021-71
Report #: 1001245
Phone: 0402 6083 96
Fax:

Received: Jun 21, 2023 9:50 AM
Due: Jun 28, 2023
Priority: 5 Day
Contact Name: Strider Duerinckx

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	HOLD	Lead	Organochlorine Pesticides	Suite B14: OCP/OPP	Moisture Set	Eurofins Suite B4
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X
78	9 S-54	Jun 15, 2023		Soil	M23-Jn0050142	X		X	X		X	
79	9 S-55	Jun 15, 2023		Soil	M23-Jn0050143	X		X	X		X	X
80	9 S-56	Jun 15, 2023		Soil	M23-Jn0050144	X		X	X		X	
81	9 S-57	Jun 15, 2023		Soil	M23-Jn0050145	X		X	X		X	
82	9 S-58 0-150	Jun 19, 2023		Soil	M23-Jn0050146	X		X	X		X	
83	9 S-58 500-650	Jun 19, 2023		Soil	M23-Jn0050147	X		X	X		X	
84	9 S-59 0-150	Jun 19, 2023		Soil	M23-Jn0050148	X		X	X		X	
85	9 S-59 800-950	Jun 19, 2023		Soil	M23-Jn0050149	X		X	X		X	
86	9 S-60 0-150	Jun 19, 2023		Soil	M23-Jn0050150	X		X	X		X	
87	9 S-60 850-1000	Jun 19, 2023		Soil	M23-Jn0050151	X		X	X		X	
88	9 S-61	Jun 19, 2023		Soil	M23-Jn0050152	X		X	X		X	
89	9 S-62	Jun 19, 2023		Soil	M23-Jn0050153	X		X		X	X	
90	9 S-63	Jun 19, 2023		Soil	M23-Jn0050154	X		X		X	X	
91	9 S-64	Jun 19, 2023		Soil	M23-Jn0050155	X		X	X		X	

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Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X
92	9 S-65	Jun 19, 2023		Soil	M23-Jn0050156	X		X	X		X	
93	9 S-66	Jun 19, 2023		Soil	M23-Jn0050157	X		X	X		X	
94	9 S-67	Jun 19, 2023		Soil	M23-Jn0050158	X		X	X		X	
95	9 S-68	Jun 19, 2023		Soil	M23-Jn0050159	X		X		X	X	
96	9 S-69	Jun 19, 2023		Soil	M23-Jn0050160	X		X	X		X	
97	9 S-70	Jun 19, 2023		Soil	M23-Jn0050161	X		X		X	X	
98	148 S-1	Jun 19, 2023		Soil	M23-Jn0050162		X					
99	148 S-2	Jun 19, 2023		Soil	M23-Jn0050163		X					
100	148 S-3	Jun 19, 2023		Soil	M23-Jn0050164		X					
101	148 S-4	Jun 19, 2023		Soil	M23-Jn0050165		X					
102	C 14	Jun 19, 2023		Soil	M23-Jn0050166	X		X	X		X	
103	148 S-5	Jun 19, 2023		Soil	M23-Jn0050167		X					
104	148 S-6	Jun 19, 2023		Soil	M23-Jn0050168		X					
105	148 S-7	Jun 19, 2023		Soil	M23-Jn0050169		X					
106	148 S-8	Jun 19, 2023		Soil	M23-Jn0050170		X					
107	C 15	Jun 19, 2023		Soil	M23-Jn0050171	X		X	X		X	

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Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X
108	148 S-9	Jun 19, 2023		Soil	M23-Jn0050172		X					
109	148 S-10	Jun 19, 2023		Soil	M23-Jn0050173		X					
110	148 S-11	Jun 19, 2023		Soil	M23-Jn0050174		X					
111	148 S-12	Jun 19, 2023		Soil	M23-Jn0050175		X					
112	C 16	Jun 19, 2023		Soil	M23-Jn0050176	X		X	X		X	
113	148 S-13	Jun 19, 2023		Soil	M23-Jn0050177		X					
114	148 S-14	Jun 19, 2023		Soil	M23-Jn0050178		X					
115	148 S-15	Jun 19, 2023		Soil	M23-Jn0050179		X					
116	148 S-16	Jun 19, 2023		Soil	M23-Jn0050180		X					
117	C 17	Jun 19, 2023		Soil	M23-Jn0050181	X		X	X		X	
118	148 S-17	Jun 19, 2023		Soil	M23-Jn0050182		X					
119	148 S-18	Jun 19, 2023		Soil	M23-Jn0050183		X					
120	148 S-19	Jun 19, 2023		Soil	M23-Jn0050184		X					
121	148 S-20	Jun 19, 2023		Soil	M23-Jn0050185		X					
122	C 18	Jun 19, 2023		Soil	M23-Jn0050186	X		X	X		X	
123	148 S-21	Jun 19, 2023		Soil	M23-Jn0050187		X					

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Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X
124	148 S-22	Jun 19, 2023		Soil	M23-Jn0050188		X					
125	148 S-23	Jun 19, 2023		Soil	M23-Jn0050189		X					
126	148 S-24	Jun 19, 2023		Soil	M23-Jn0050190		X					
127	C 19	Jun 19, 2023		Soil	M23-Jn0050191	X		X	X		X	
128	148 S-25	Jun 19, 2023		Soil	M23-Jn0050192		X					
129	148 S-26	Jun 19, 2023		Soil	M23-Jn0050193		X					
130	148 S-27	Jun 19, 2023		Soil	M23-Jn0050194		X					
131	148 S-28	Jun 19, 2023		Soil	M23-Jn0050195		X					
132	C 20	Jun 19, 2023		Soil	M23-Jn0050196	X		X	X		X	
133	148 S-29	Jun 19, 2023		Soil	M23-Jn0050197		X					
134	148 S-30	Jun 19, 2023		Soil	M23-Jn0050198		X					
135	148 S-31	Jun 19, 2023		Soil	M23-Jn0050199		X					
136	148 S-32	Jun 19, 2023		Soil	M23-Jn0050200		X					
137	C 21	Jun 19, 2023		Soil	M23-Jn0050201	X		X	X		X	
Test Counts						53	84	53	49	4	53	5

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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to '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 prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
µg/L: micrograms per litre
ppm: parts per million
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

Terms

APHA	American Public Health Association
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 a moisture has been determined on a solid sample the result is expressed on a dry 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 is representative of 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 like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-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 5.4
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 be used as a guide only 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%

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a 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 is 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.

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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							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Lead	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	

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Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
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							
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	
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	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	96			70-130	Pass	
4.4'-DDD	%	93			70-130	Pass	

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Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
4.4'-DDE	%	104			70-130	Pass	
4.4'-DDT	%	96			70-130	Pass	
a-HCH	%	122			70-130	Pass	
Aldrin	%	127			70-130	Pass	
b-HCH	%	88			70-130	Pass	
d-HCH	%	106			70-130	Pass	
Dieldrin	%	95			70-130	Pass	
Endosulfan I	%	98			70-130	Pass	
Endosulfan II	%	122			70-130	Pass	
Endosulfan sulphate	%	94			70-130	Pass	
Endrin	%	90			70-130	Pass	
Endrin aldehyde	%	95			70-130	Pass	
Endrin ketone	%	125			70-130	Pass	
g-HCH (Lindane)	%	105			70-130	Pass	
Heptachlor	%	105			70-130	Pass	
Heptachlor epoxide	%	108			70-130	Pass	
Hexachlorobenzene	%	110			70-130	Pass	
Methoxychlor	%	95			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	111			80-120	Pass	
Lead	%	120			80-120	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	105			70-130	Pass	
TRH C10-C14	%	87			70-130	Pass	
TRH C6-C10	%	100			70-130	Pass	
TRH >C10-C16	%	93			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	119			70-130	Pass	
Toluene	%	113			70-130	Pass	
Ethylbenzene	%	122			70-130	Pass	
m&p-Xylenes	%	97			70-130	Pass	
Xylenes - Total*	%	98			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	116			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	85			70-130	Pass	
Acenaphthylene	%	82			70-130	Pass	
Anthracene	%	90			70-130	Pass	
Benz(a)anthracene	%	102			70-130	Pass	
Benzo(a)pyrene	%	84			70-130	Pass	
Benzo(b&j)fluoranthene	%	73			70-130	Pass	
Benzo(g.h.i)perylene	%	90			70-130	Pass	
Benzo(k)fluoranthene	%	105			70-130	Pass	
Chrysene	%	96			70-130	Pass	
Dibenz(a.h)anthracene	%	86			70-130	Pass	
Fluoranthene	%	85			70-130	Pass	
Fluorene	%	80			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	92			70-130	Pass	
Naphthalene	%	94			70-130	Pass	

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Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Phenanthrene			%	89			70-130	Pass	
Pyrene			%	88			70-130	Pass	
LCS - % Recovery									
Organophosphorus Pesticides									
Diazinon			%	104			70-130	Pass	
Dimethoate			%	101			70-130	Pass	
Ethion			%	89			70-130	Pass	
Fenitrothion			%	109			70-130	Pass	
Methyl parathion			%	102			70-130	Pass	
Mevinphos			%	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	M23-Jn0050131	CP	%	117			75-125	Pass	
Lead	M23-Jn0050131	CP	%	128			75-125	Fail	Q08
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C6-C9	M23-Jn0055072	NCP	%	93			70-130	Pass	
TRH C10-C14	M23-Jn0049927	NCP	%	82			70-130	Pass	
TRH C6-C10	M23-Jn0055072	NCP	%	89			70-130	Pass	
TRH >C10-C16	M23-Jn0049927	NCP	%	78			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	M23-Jn0055072	NCP	%	77			70-130	Pass	
Toluene	M23-Jn0055072	NCP	%	78			70-130	Pass	
Ethylbenzene	M23-Jn0055072	NCP	%	88			70-130	Pass	
m&p-Xylenes	M23-Jn0055072	NCP	%	91			70-130	Pass	
o-Xylene	M23-Jn0055072	NCP	%	91			70-130	Pass	
Xylenes - Total*	M23-Jn0055072	NCP	%	91			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	M23-Jn0055072	NCP	%	89			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	M23-Jn0051928	NCP	%	99			70-130	Pass	
Acenaphthylene	M23-Jn0051928	NCP	%	92			70-130	Pass	
Anthracene	M23-Jn0051928	NCP	%	108			70-130	Pass	
Benz(a)anthracene	M23-Jn0051928	NCP	%	81			70-130	Pass	
Benzo(a)pyrene	M23-Jn0051928	NCP	%	112			70-130	Pass	
Benzo(b&j)fluoranthene	M23-Jn0051928	NCP	%	77			70-130	Pass	
Benzo(g.h.i)perylene	M23-Jn0051928	NCP	%	125			70-130	Pass	
Benzo(k)fluoranthene	M23-Jn0051928	NCP	%	123			70-130	Pass	
Chrysene	M23-Jn0051928	NCP	%	128			70-130	Pass	
Dibenz(a.h)anthracene	M23-Jn0051928	NCP	%	90			70-130	Pass	
Fluoranthene	M23-Jn0051928	NCP	%	97			70-130	Pass	
Fluorene	M23-Jn0051928	NCP	%	91			70-130	Pass	
Indeno(1.2.3-cd)pyrene	M23-Jn0051928	NCP	%	103			70-130	Pass	
Naphthalene	M23-Jn0051928	NCP	%	109			70-130	Pass	
Phenanthrene	M23-Jn0051928	NCP	%	123			70-130	Pass	
Pyrene	M23-Jn0051928	NCP	%	103			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	M23-Jn0050138	CP	%	97			75-125	Pass	
Lead	M23-Jn0050138	CP	%	106			75-125	Pass	

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Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Organophosphorus Pesticides				Result 1					
Diazinon	M23-Jn0050154	CP	%	115			70-130	Pass	
Dimethoate	M23-Jn0050154	CP	%	78			70-130	Pass	
Ethion	M23-Jn0050154	CP	%	115			70-130	Pass	
Fenitrothion	M23-Jn0050154	CP	%	90			70-130	Pass	
Methyl parathion	M23-Jn0050154	CP	%	86			70-130	Pass	
Mevinphos	M23-Jn0050154	CP	%	73			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
Chlordanes - Total	M23-Jn0050158	CP	%	114			70-130	Pass	
4.4'-DDD	M23-Jn0050158	CP	%	112			70-130	Pass	
4.4'-DDE	M23-Jn0050158	CP	%	112			70-130	Pass	
4.4'-DDT	M23-Jn0050158	CP	%	111			70-130	Pass	
a-HCH	M23-Jn0050158	CP	%	109			70-130	Pass	
Aldrin	M23-Jn0050158	CP	%	105			70-130	Pass	
b-HCH	M23-Jn0050158	CP	%	107			70-130	Pass	
d-HCH	M23-Jn0050158	CP	%	72			70-130	Pass	
Dieldrin	M23-Jn0050158	CP	%	116			70-130	Pass	
Endosulfan I	M23-Jn0050158	CP	%	79			70-130	Pass	
Endosulfan II	M23-Jn0050158	CP	%	91			70-130	Pass	
Endosulfan sulphate	M23-Jn0050158	CP	%	94			70-130	Pass	
Endrin	M23-Jn0050158	CP	%	102			70-130	Pass	
Endrin aldehyde	M23-Jn0050158	CP	%	122			70-130	Pass	
Endrin ketone	M23-Jn0050158	CP	%	114			70-130	Pass	
g-HCH (Lindane)	M23-Jn0050158	CP	%	114			70-130	Pass	
Heptachlor	M23-Jn0050158	CP	%	72			70-130	Pass	
Heptachlor epoxide	M23-Jn0050158	CP	%	117			70-130	Pass	
Hexachlorobenzene	M23-Jn0050158	CP	%	127			70-130	Pass	
Methoxychlor	M23-Jn0050158	CP	%	96			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	M23-Jn0050158	CP	%	108			75-125	Pass	
Lead	M23-Jn0050158	CP	%	102			75-125	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
Chlordanes - Total	M23-Jn0050196	CP	%	90			70-130	Pass	
4.4'-DDD	M23-Jn0050196	CP	%	101			70-130	Pass	
4.4'-DDE	M23-Jn0050196	CP	%	84			70-130	Pass	
4.4'-DDT	M23-Jn0050196	CP	%	87			70-130	Pass	
a-HCH	M23-Jn0050196	CP	%	80			70-130	Pass	
Aldrin	M23-Jn0050196	CP	%	77			70-130	Pass	
b-HCH	M23-Jn0050196	CP	%	87			70-130	Pass	
d-HCH	M23-Jn0050196	CP	%	89			70-130	Pass	
Dieldrin	M23-Jn0050196	CP	%	85			70-130	Pass	
Endosulfan I	M23-Jn0050196	CP	%	86			70-130	Pass	
Endosulfan II	M23-Jn0050196	CP	%	77			70-130	Pass	
Endosulfan sulphate	M23-Jn0050196	CP	%	88			70-130	Pass	
Endrin	M23-Jn0050196	CP	%	89			70-130	Pass	
Endrin aldehyde	M23-Jn0050196	CP	%	114			70-130	Pass	
Endrin ketone	M23-Jn0050196	CP	%	113			70-130	Pass	
g-HCH (Lindane)	M23-Jn0050196	CP	%	92			70-130	Pass	
Heptachlor	M23-Jn0050196	CP	%	116			70-130	Pass	
Heptachlor epoxide	M23-Jn0050196	CP	%	100			70-130	Pass	

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Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Hexachlorobenzene	M23-Jn0050196	CP	%	82			70-130	Pass	
Methoxychlor	M23-Jn0050196	CP	%	109			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	M23-Jn0050069	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	M23-Jn0050069	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	M23-Jn0050069	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	M23-Jn0050069	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-HCH	M23-Jn0050069	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	M23-Jn0050069	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-HCH	M23-Jn0050069	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-HCH	M23-Jn0050069	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	M23-Jn0050069	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	M23-Jn0050069	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	M23-Jn0050069	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	M23-Jn0050069	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	M23-Jn0050069	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	M23-Jn0050069	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	M23-Jn0050069	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-HCH (Lindane)	M23-Jn0050069	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	M23-Jn0050069	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	M23-Jn0050069	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	M23-Jn0050069	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	M23-Jn0050069	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Toxaphene	M23-Jn0050069	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	M23-Jn0050069	CP	%	18	15	18	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M23-Jn0050069	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	M23-Jn0050069	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	M23-Jn0050069	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	M23-Jn0050069	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	M23-Jn0050069	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	M23-Jn0050069	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	M23-Jn0050069	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	M23-Jn0050069	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	M23-Jn0050069	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	M23-Jn0050069	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	M23-Jn0050069	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	M23-Jn0050069	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M23-Jn0050069	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	M23-Jn0050069	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	M23-Jn0050069	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	M23-Jn0050069	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	M23-Jn0050119	CP	%	23	23	1.4	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M23-Jn0050131	CP	mg/kg	6.3	6.3	<1	30%	Pass	
Lead	M23-Jn0050131	CP	mg/kg	22	22	2.4	30%	Pass	

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Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	M23-Jn0046614	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	M23-Jn0048205	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	M23-Jn0048205	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	M23-Jn0048205	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C6-C10	M23-Jn0046614	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	M23-Jn0048205	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	M23-Jn0048205	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	M23-Jn0048205	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M23-Jn0046614	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	M23-Jn0046614	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	M23-Jn0046614	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	M23-Jn0046614	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	M23-Jn0046614	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	M23-Jn0046614	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	M23-Jn0046614	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	M23-Jn0050137	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	M23-Jn0050137	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	M23-Jn0050137	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	M23-Jn0050137	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-HCH	M23-Jn0050137	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	M23-Jn0050137	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-HCH	M23-Jn0050137	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-HCH	M23-Jn0050137	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	M23-Jn0050137	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	M23-Jn0050137	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	M23-Jn0050137	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	M23-Jn0050137	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	M23-Jn0050137	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	M23-Jn0050137	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	M23-Jn0050137	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-HCH (Lindane)	M23-Jn0050137	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	M23-Jn0050137	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	M23-Jn0050137	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	M23-Jn0050137	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	M23-Jn0050137	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Toxaphene	M23-Jn0050137	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	M23-Jn0050137	CP	%	15	14	11	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M23-Jn0050137	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	M23-Jn0050137	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	M23-Jn0050137	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	M23-Jn0050137	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	M23-Jn0050137	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	M23-Jn0050137	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	M23-Jn0050137	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

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Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Benzo(k)fluoranthene	M23-Jn0050137	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	M23-Jn0050137	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	M23-Jn0050137	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	M23-Jn0050137	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	M23-Jn0050137	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M23-Jn0050137	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	M23-Jn0050137	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	M23-Jn0050137	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	M23-Jn0050137	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	M23-Jn0050137	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	M23-Jn0050137	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	M23-Jn0050137	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	M23-Jn0050137	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M23-Jn0050138	CP	mg/kg	8.5	8.5	<1	30%	Pass	
Lead	M23-Jn0050138	CP	mg/kg	19	19	<1	30%	Pass	

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Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	M23-Jn0050147	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	M23-Jn0050147	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	M23-Jn0050147	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	M23-Jn0050147	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-HCH	M23-Jn0050147	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	M23-Jn0050147	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-HCH	M23-Jn0050147	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-HCH	M23-Jn0050147	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	M23-Jn0050147	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	M23-Jn0050147	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	M23-Jn0050147	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	M23-Jn0050147	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	M23-Jn0050147	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	M23-Jn0050147	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	M23-Jn0050147	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-HCH (Lindane)	M23-Jn0050147	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	M23-Jn0050147	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	M23-Jn0050147	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	M23-Jn0050147	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	M23-Jn0050147	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Toxaphene	M23-Jn0050147	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	M23-Jn0050147	CP	%	26	27	1.5	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M23-Jn0050147	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	M23-Jn0050147	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	M23-Jn0050147	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	M23-Jn0050147	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	M23-Jn0050147	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	M23-Jn0050147	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	M23-Jn0050147	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	M23-Jn0050147	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	M23-Jn0050147	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	M23-Jn0050147	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	M23-Jn0050147	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	M23-Jn0050147	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M23-Jn0050147	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	M23-Jn0050147	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	M23-Jn0050147	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	M23-Jn0050147	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	M23-Jn0050147	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	

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Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Dimethoate	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	M23-Jn0050147	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	M23-Jn0050147	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	M23-Jn0050147	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M23-Jn0050157	CP	mg/kg	13	11	10	30%	Pass	
Lead	M23-Jn0050157	CP	mg/kg	23	22	4.6	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	M23-Jn0050157	CP	%	8.3	6.8	19	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M23-Jn0050158	CP	mg/kg	16	16	3.1	30%	Pass	
Lead	M23-Jn0050158	CP	mg/kg	24	24	2.8	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	M23-Jn0050166	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	M23-Jn0050166	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	M23-Jn0050166	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	M23-Jn0050166	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-HCH	M23-Jn0050166	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	M23-Jn0050166	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-HCH	M23-Jn0050166	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-HCH	M23-Jn0050166	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	M23-Jn0050166	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	M23-Jn0050166	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	M23-Jn0050166	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	M23-Jn0050166	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	M23-Jn0050166	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	M23-Jn0050166	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	M23-Jn0050166	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-HCH (Lindane)	M23-Jn0050166	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	M23-Jn0050166	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	

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Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Heptachlor epoxide	M23-Jn0050166	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	M23-Jn0050166	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	M23-Jn0050166	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Toxaphene	M23-Jn0050166	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M23-Jn0050166	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	M23-Jn0050166	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	M23-Jn0050166	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	M23-Jn0050166	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	M23-Jn0050166	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	M23-Jn0050166	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	M23-Jn0050166	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	M23-Jn0050166	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	M23-Jn0050166	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	M23-Jn0050166	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	M23-Jn0050166	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	M23-Jn0050166	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M23-Jn0050166	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	M23-Jn0050166	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	M23-Jn0050166	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	M23-Jn0050166	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	M23-Jn0050166	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	M23-Jn0050166	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	M23-Jn0050166	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	

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Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Terbufos	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	M23-Jn0050166	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	M23-Jn0050191	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	M23-Jn0050191	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	M23-Jn0050191	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	M23-Jn0050191	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-HCH	M23-Jn0050191	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	M23-Jn0050191	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-HCH	M23-Jn0050191	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-HCH	M23-Jn0050191	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	M23-Jn0050191	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	M23-Jn0050191	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	M23-Jn0050191	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	M23-Jn0050191	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	M23-Jn0050191	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	M23-Jn0050191	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	M23-Jn0050191	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-HCH (Lindane)	M23-Jn0050191	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	M23-Jn0050191	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	M23-Jn0050191	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	M23-Jn0050191	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	M23-Jn0050191	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Toxaphene	M23-Jn0050191	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	M23-Jn0050191	CP	mg/kg	25	32	25	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	M23-Jn0050191	CP	%	18	20	15	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M23-Jn0050191	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	M23-Jn0050191	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	M23-Jn0050191	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	M23-Jn0050191	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	M23-Jn0050191	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	M23-Jn0050191	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	M23-Jn0050191	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	M23-Jn0050191	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	M23-Jn0050191	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	M23-Jn0050191	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	M23-Jn0050191	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	M23-Jn0050191	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M23-Jn0050191	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	M23-Jn0050191	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	M23-Jn0050191	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	M23-Jn0050191	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

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Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	M23-Jn0050191	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	M23-Jn0050191	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	M23-Jn0050191	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	M23-Jn0050191	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	

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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
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
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference.

Authorised by:

Adam Bateup	Analytical Services Manager
Edward Lee	Senior Analyst-Organic
Emily Rosenberg	Senior Analyst-Metal
Joseph Edouard	Senior Analyst-Organic
Joseph Edouard	Senior Analyst-Volatile
Mary Makarios	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Sample Properties
Mele Singh	Senior Analyst-Organic
Mele Singh	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.

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CHAIN OF CUSTODY RECORD

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☑ Sydney Laboratory
Unit F3 Bld F 16 Mars Road Lane Cove West NSW 2066
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
1/21 Smallwood Place Murarrie QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
Unit 2 91 Leach Highway Kewdale WA 6105
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close Oakleigh VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Earth Water Consulting Pty Limited	Project No	2024-71
Address	Unit 6 / 1A Marina Crescent, Urunga NSW 2455	Project Name	9 GAUDRONS RD
Contact Name	Strider Duerinckx	Project Manager	STRIDER DUERINCKX
Phone No	0402608396	EDD Format (Excel, EDD, Esdat)	
Special Directions		Sampler(s)	RL
Purchase Order	2024-71	Handed over by	
Quote ID No	Earth Water Consulting	Email for Invoice	strider@ewcon.com.au
		Email for Results	strider@ewcon.com.au

Analysis (Where multiple are required, please specify "and" or "to" e.g. TP to be used if metals to be added to NATA plating.)

No	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Soil, Water, Waste)	COMPOSITE	COMP ID	AS, Pb	OCP
1	9 S-1	15.6.23	S				
2	9 S-2				C1	/	/
3	9 S-3						
4	9 S-4						
5	9 S-5						
6	9 S-6				C2	/	/
7	9 S-7						
8	9 S-8						
9	9 S-9						
10	9 S-10	↓	↓		C3	/	/
	Total Counts						

Containers (Change container type & size if necessary)

500mL Plastic	250mL Plastic	125mL Plastic	250mL Amber Glass	40mL Vial	500mL PFAS FEET	Jar (Glass or HDPE)
						✓
						✓
						✓
						✓
						✓
						✓
						✓
						✓
						✓
						✓

Required Turnaround Time (Default will be 5 days if not ticked)

*Surcharge will apply

☐ Overnight (reporting by 9am)*
☐ Same day* ☐ 1 day*
☐ 2 days* ☐ 3 days*
☑ 5 days (Standard)
☐ Other( )

Sample Comments / Dangerous Goods Hazard Warning

SOIL

Method of Shipment	☑ Courier #)	☐ Hand Delivered	☐ Postal	Name: ROB LAIRD	Signature:
Date:		Time:		Temperature:	

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Received By	Brentwood	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	11/6	Time 9:50
Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date		Time

Report No

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07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
Unit 2 91 Leach Highway Kwinana WA 6105
08 9251 9600 EnviroSamplePA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close Oakleigh VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Earth Water Consulting Pty Limited
Address	Unit 6 / 1A MArina Crescent, Urunga NSW 2455
Contact Name	Strider Duerinckx
Phone No	0402608398
Special Directions	
Purchase Order	2223-2021-71
Quote ID No	Earth Water Consulting

Project No	2223-2021-71
Project Name	9 GAUDRONS RD
Project Manager	STRIDER
EDD Format	

Sampler(s)	RL
Handed over by	
Email for Invoice	strider@ewcon.com.au
Email for Results	strider@ewcon.com.au

Analyses (Where multiple analytes apply, specify in "Change" or "Comments" if additional space is required. Surcharges may apply)

Containers (Change & comment type & size if necessary)

Required Turnaround Time (Default will be 5 days if not ticked)

*Surcharge will apply
☐ Overnight (reporting by 8am)*
☐ Same day* ☐ 1 day*
☐ 2 days* ☐ 3 days*
☑ 5 days (Standard)
☐ Other( )

No	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix Soil (S) Water (W)	COMPOSITE	COMP ID	4's PB	OCP	500mL Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL Vial	500mL 4WAS PET	Jar (Glass or HDPE)	Sample Comments / Dangerous Goods Hazard Warning
1	9 S-11	15.6.23	S	⎫	C3	/	/							✓	
2	9 S-12			⎪										✓	
3	9 S-13			⎪										✓	
4	9 S-14			⎪	C4	/	/							✓	
5	9 S-15			⎪										✓	
6	9 S-16			⎪										✓	
7	9 S-17			⎪										✓	
8	9 S-18			⎪	C5	/	/							✓	
9	9 S-19			⎪										✓	
10	9 S-20			⎭										✓	
	Total Counts														

Method of Shipment: ☐ Courier (if) ☐ Hand Delivered ☐ Postal

Name: ROB LAIRD Signature: Date: Time: Temperature:

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Received By: SYD | BNE | MEL | PER | ADL | NTL | DRW Signature Date Time

Received By: SYD | BNE | MEL | PER | ADL | NTL | DRW Signature Date Time

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02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
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07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
Unit 2 27 Leach Highway Kwinana WA 6966
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
2 Kingsgrove Town Close Oakleigh VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Earth Water Consulting Pty Limited	Project No	~~2223~~ 2021-71
Address	Unit 6 / 1A Marina Crescent, Orange NSW 2455	Project Name	9 GANDRONS RD
Contact Name	Strider Duerinckx	Project Manager	STRIDER
Phone No	0402606396	EDD Format (Excel, ESDAT, etc)	
Special Directions		Sampler(s)	LL
Purchase Order	~~2223~~ 2021-71	Handed over by	
Quote ID No	Earth Water Consulting	Email for Invoice	strider@ewcon.com.au
		Email for Results	strider@ewcon.com.au

Analytes (Where multiple analytes are required, please specify 'Total' or 'Filtered'. SUITE codes should be used to simplify the ordering process.)

Containers (Change containers if & from if necessary.)

Required Turnaround Time (Default will be 5 days if not ticked)

♦Surcharge will apply
☐ Overnight (reporting by 9am)♦
☐ Same day♦ ☐ 1 day♦
☐ 2 days♦ ☐ 3 days♦
☑ 5 days (Standard)
☐ Other( )

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix Soil (S) Water (W)	Composite	Comp ID	AS, PB	OCP	500mL Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL Vial	500mL PFAS PET	Jar (Glass or HDPE)	Sample Comments / Dangerous Goods Hazard Warning
1	9-S-21	15-6-23	S											✓	
2	9 S-22				C6	✓	✓							✓	
3	9 S-23													✓	
4	9 S-24													✓	
5	9 S-25													✓	
6	9 S-26				C7	✓	✓							✓	
7	9 S-27													✓	
8	9 S-28													✓	
9	9 S-29				C8	✓	✓							✓	
10	9 S-30	↓	↓											✓	
	Total Counts														

Method of Shipment	☑ Courier (#)	☐ Hand Delivered	☐ Postal	Name	ROB LAIRD	Signature
					Date	Time

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	Received By	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature	Date	Time	Temperature
	Received By	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature	Date	Time	Report №

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02 8900 8400 EnviroSamplesNSW@eurofins.com

☐ Brisbane Laboratory
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07 3902 4600 EnviroSamplesQLD@eurofins.com

☐ Perth Laboratory
Unit 2, 91 Leach Highway Kewdale WA 6105
08 9251 9631 EnviroSamplesWA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close Oakleigh VIC 3166
03 8564 5000 EnviroSamplesVic@eurofins.com

Company	Earth Water Consulting Pty Limited	Project №	~~2223~~ 2021 - 71
Address	Unit 6 / 1A MArina Crescent, Urunga NSW 2455	Project Name	9 GARDENS (b)
Contact Name	Strider Duarinckx	Project Manager	STRIDER
Phone №	0402608396	EDD Format (Excel, EQuIS etc)	
Special Directions		Sampler's:	CJ
Purchase Order	~~2223~~ 2021 - 71	Handed over by	
Quote ID №	Earth Water Consulting	Email for Invoice	strider@ewcon.com.au
		Email for Results	strider@ewcon.com.au

Analyses (Where metals are requested, please specify Total or "Filtered". NOTE: Dissolved metals must be filtered in the field.)

Containers (Change container type & size if necessary)

Required Turnaround Time (Default will be 5 days if not ticked.)

*Surcharge will apply
☐ Overnight (reporting by 9am)*
☐ Same day* ☐ 1 day*
☐ 2 days* ☐ 3 days*
☑ 5 days (Standard)
☐ Other( )

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Soil (S), Water (W))	Comp ID	Comp / Grab	AS, Pb	OCP	500mL Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL Vial	500mL PFAS PET	Jar (Glass or HDPE)	Sample Comments / Dangerous Goods Hazard Warning
1	9 S-31	15.6.23	S	C8	/	/								✓	
2	9 S-32													✓	
3	9 S-33													✓	
4	9 S-34			C9	/	/								✓	
5	9 S-35													✓	
6	9 S-36													✓	
7	9 S-37													✓	
8	9 S-38			C10	/	/								✓	
9	9 S-39													✓	
10	9 S-40													✓	
	Total Counts														

Method of Shipment: ☐ Courier (#) ☐ Hand Delivered ☐ Postal

	Name	Signature	Date	Time
	ROB LAIRD			

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Received By	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	Time	Temperature
Received By	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	Time	Report №

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Page No: 283339 68 Reviewed By: S Kajna Approved By: J J Flint Approved On: 12 Jun 2018

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☐ **Brisbane Laboratory** Unit 1 21 Smallwood Place Murarrie QLD 4172 07 3902 4600 EnviroSampleQLD@eurofins.com

☐ **Perth Laboratory** Unit 2 91 Leach Highway Kewdale WA 6105 08 9251 9600 EnviroSampleWA@eurofins.com

☐ **Melbourne Laboratory** 2 Kingston Town Close Oakleigh VIC 3166 03 8564 5000 EnviroSampleVic@eurofins.com

Company	Earth Water Consulting Pty Limited	Project №	2223-2021-71
Address	Unit 6 / 1A MArina Crescent, Urunga NSW 2455	Project Name	9 SANDRONS RD
Contact Name	Strider Duerinckx	Project Manager	STRIDER
Phone №	0402608396	COD Format	
Special Directions		Sampler(s)	U.
Purchase Order	2223-2021-71	Handed over by	
Quote ID №	Earth Water Consulting	Email for Invoice	strider@ewcon.com.au
		Email for Results	strider@ewcon.com.au

Analyses (Please indicate below any additional analytes required, including SUITE codes or modifications to standard testing)

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Soil S, Water W)	COMPOSITE	COMP ID	A+, PB	OCP
1	9 S-41	15.6.25	S				
2	9 S-42			C11	/	/	
3	9 S-43						
4	9 S-44						
5	9 Q-1						
6	9 Q-2			C12	/	/	
7	9 Q-3						
8	9 Q-4						
9	9 Q-5			C13	/	/	
10	9 Q-6						
	Total Counts						

Containers (Change container type & size if necessary)

500mL Plastic	250mL Plastic	125mL Plastic	250mL Amber Glass	40mL Vial	250mL (Glass or HDPE)	Jar (Glass or HDPE)	
						/	
						/	
						/	
						/	
						/	
						/	
						/	
						/	
						/	
						/	

Required Turnaround Time (Default will be 5 days if not ticked)

*Surcharge will apply

- ☐ Overnight (reporting by 9am)*
- ☐ Same day*
- ☐ 1 day*
- ☐ 2 days*
- ☐ 3 days*
- ☑ 5 days (Standard)
- ☐ Other ( )

Sample Comments / Dangerous Goods Hazard Warning

Method of Shipment	☑ Courier (#)	☐ Hand Delivered	☐ Postal	Name	ROB LAIRD	Signature		Date / Time / Temperature
Eurofins | mgt Laboratory Use Only	Received By		STD | RNE | MEL | PER | ADL | NTL | DRW	Signature		Date	Time	Report №
	Received By		STD | RNE | MEL | PER | ADL | NTL | DRW	Signature		Date	Time	

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CHAIN OF CUSTODY RECORD

Eurofins | mgt ABN 50 005 085 521

☑ **Sydney Laboratory** Unit F3 Bld F 16 Mars Road Lane Cove West NSW 2066 02 9900 8400 EnviroSampleNSW@eurofins.com

☐ **Brisbane Laboratory** Unit 1 21 Smallwood Place Murarrie QLD 4172 07 3902 4600 EnviroSampleQLD@eurofins.com

☐ **Perth Laboratory** Unit 2 91 Leach Highway Kewdale WA 6105 08 9251 9600 EnviroSampleWA@eurofins.com

☐ **Melbourne Laboratory** 2 Kingston Town Close Oakleigh VIC 3166 03 8564 5000 EnviroSampleVic@eurofins.com

Company	Earth Water Consulting Pty Limited	Project No	~~2223~~ 2021-71
Address	Unit 6 / 1A MArina Crescent, Urunga NSW 2455	Project Name	9 GAUDRONS RD
Contact Name	**Strider Duerinckx**	Project Manager	STRIDER
Phone No	0402608396	EDD Format (Excel, EDD etc.)	
Special Directions		Sampler(s)	U
Purchase Order	~~2223~~ 2021-71	Handed over by	
Quote ID No	Earth Water Consulting	Email to (Invoice)	strider@ewcon.com.au
		Email to (Results)	strider@ewcon.com.au

Analyses (Please mark or circle the analyses required. If box not ticked, it will be assumed that analysis is not required)

Containers (Please refer to container guide for sizes and preservation)

Required Turnaround Time (Default will be 5 days if not received)

*Surcharges will apply

☐ Overnight (reporting by 9am)* ☐ Same day* ☐ 1 day* ☐ 2 days* ☐ 3 days* ☑ 5 days (Standard) ☐ Other

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid / Water / Oil)	COMPOSITE	COMP ID	AS, Pb	OCP	TRH/BTEX/PAH (64)	500mL Plastic	250mL Plastic	125mL Plastic	40mL Vial	Jar (Glass or HDPE)	Sample Comments / Dangerous Goods Hazard Warning
1	9 Q-7	15.6.23	S		C15	✓	✓						✓	
2	9 Q8												✓	
3	9 Q-45					✓	✓						✓	
4	9 S-45					✓	✓						✓	
5	9 Q-46					✓	✓	✓					✓	
6	9 S-46					✓	✓	✓					✓	
7	9 Q-47					✓	✓						✓	
8	9 S-47					✓	✓						✓	
9	9 S-48					✓	✓	✓					✓	
10	9 S-49	↓	↓			✓	✓						✓	
	Total Counts													

Method of Shipment: ☑ Courier (#) ☐ Hand Delivered ☐ Posta | Name: Ros LAIRD | Signature | Date | Time

Eurofins | mgt Laboratory Use Only: Received By | STD | EXC | MEL | PER | ADE | NTL | DRW | Signature | Date | Time | Temperature

Received By | STD | EXC | MEL | PER | ADE | NTL | DRW | Signature | Date | Time | Report №

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☑ **Sydney Laboratory** Unit F3 Building F 16 Mars Road Lane Cove West NSW 2066 02 9900 8400 EnviroSampleNSW@eurofins.com

☐ **Brisbane Laboratory** Unit 1 21 Smallwood Place Murarrie QLD 4172 07 3902 4600 EnviroSampleQLD@eurofins.com

☐ **Perth Laboratory** Unit 2 91 Leach Highway Kewdale WA 6105 08 9251 9600 EnviroSampleWA@eurofins.com

☐ **Melbourne Laboratory** 2 Kingston Town Close Oakleigh VIC 3166 03 8564 5000 EnviroSampleVic@eurofins.com

Company	Earth Water Consulting Pty Limited	Project No	~~2223~~ 2021-71
Address	Unit 6 / 1A Marina Crescent, Urunga NSW 2455	Project Name	9 GAUDRONS LD
Contact Name	Strider Duerinckx	Project Manager	STRIDER
Phone No	0402608396	EDD Format (Excel, Equis, ...)	
Special Directions		Sampler's	ML
Purchase Order	~~2223~~ 2021-71	Handed over by	
Quote ID No	Earth Water Consulting	Email for Invoice	strider@ewcon.com.au
		Email for Results	strider@ewcon.com.au

Analyses (Please tick the analyses required for each sample in the matrix below. Specify Preservative, Container Type, and Sample Volume where applicable.): AS, PB; OCP; TRH / BTEX / PAH (BA)

Containers (Please advise on any special handling, container type & size requirements): 500mL Plastic; 250mL Polyethylene; 125mL Plastic; 250mL Amber Glass; 40mL Vial; 500mL Poly (Na2S2O3); Jar (Glass or HDPE)

Required Turnaround Time (Select within 5 days if not urgent)

*Surcharge will apply
- ☐ Overnight (reporting by 9am)*
- ☐ Same day* ☐ 1 day*
- ☐ 2 days* ☐ 3 days*
- ☑ 5 days (Standard)
- ☐ Other ( )

№	Client Sample ID	Sampled Date/Time	Matrix (Soil, Water, ...)
1	9 S-50	15.6.23	S
2	9 S-51		
3	9 S-52		
4	9 S-53		
5	9 S-54		
6	9 S-55		
7	9 S-56		
8	9 S-57		
9	9 S-58 0-150	19.6.23	
10	9 S-58 500-650	19.6.23	

Sample Comments / Dangerous Goods Hazard Warning

Total Counts

Method of Shipment: ☑ Courier (#) ☐ Hand Delivered ☐ Postal

Name: ROD LAIRD Signature: Date: Time:

Eurofins | mgt Laboratory Use Only: Received By: Date: Time: Temperature: Received By: Date: Time: Report №

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☐ Brisbane Laboratory — Unit 1 21 Smallwood Place Murarrie QLD 4172 — 07 3902 4600 — EnviroSampleQLD@eurofins.com

☐ Perth Laboratory — Unit 2 91 Leach Highway Kewdale WA 6105 — 08 9251 9600 — EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory — 2 Kingston Town Close Oakleigh VIC 3166 — 03 8564 5000 — EnviroSampleVic@eurofins.com

Company	Earth Water Consulting Pty Limited	Project No	~~2223~~ 2021-71
Address	Unit 6 / 1A Matra Crescent, Uranga NSW 2455	Project Name	9 GANDRONS RD
Contact Name	Strider Duerinckx	Project Manager	STRIDER
Phone No	0402606396	EDD Format (default: EDD Form)	
Special Directions		Sampler(s)	SL
Purchase Order	~~2225~~ 2021-71	Handed over by	
Quote ID No	Earth Water Consulting	Email for Invoice	strider@ewccn.com.au
		Email for Results	strider@ewccn.com.au

Analyses (Please tick which analyses are required, and indicate any Suspected Concentration (if known) or Trade Waste requirements in the Sample Comments section below)

Containers (Please specify container type & size if necessary)

Required Turnaround Time (Please write in days if not listed)

*Surcharges will apply

☐ Overnight (reporting by 9am)* ☐ Same day* ☐ 1 day* ☐ 2 days* ☐ 3 days* ☑ 5 days (Standard) ☐ Other( )

№	Client Sample ID	Sampled Date/Time	Matrix (Soil/S, Water/W)	As, Pb	OCP	OCP/OPP (B14)	500mL Plastic	250mL Plastic	125mL Plastic	40mL Vial	Jar (Glass or HDPE)
1	9 S-59 0-150	19.6.23	S	✓	✓						✓
2	9 S-59 800-950			✓	✓						✓
3	9 S-60 0-150			✓	✓						✓
4	9 S-60 850-1000			✓	✓						✓
5	9 S-61			✓	✓						✓
6	9 S-62			✓		✓					✓
7	9 S-63			✓		✓					✓
8	9 S-64			✓	✓						✓
9	9 S-65			✓	✓						✓
10	9 S-66			✓	✓						✓
	Total Counts										

Sample Comments / Dangerous Goods Hazard Warning

Method of Shipment: ☑ Courier (#) ☐ Hand Delivered ☐ Postal — Name: ROB LAIRD — Signature: — Date: — Time:

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Page 10 of 12 — QSCCR_48 — Issued by: S. Norris — Approved by: D. Foss — Approved on: 12 June 2018

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☐ Brisbane Laboratory — Unit 12 Smallwood Place Murarrie QLD 4172 — 07 3902 4600 — EnviroSampleQLD@eurofins.com

☐ Perth Laboratory — Unit 2 91 Leach Highway Kewdale WA 6105 — 08 9251 9600 — EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory — 2 Kingston Town Close Oakleigh VIC 3166 — 03 8564 5000 — EnviroSampleVic@eurofins.com

Company	Earth Water Consulting Pty Limited	Project №	2223-2021-71
Address	Unit 6 / 1A MArina Crescent, Urunga NSW 2455	Project Name	9 CANDLONS RD
Contact Name	Strider Duerinckx	Project Manager	STRIDER
Phone №	0432606396	EDD Format (Excel, CSV, Other)	
Special Directions		Sampler(s)	RL
Purchase Order	2223-2021-71	Handed over by	
Quote ID №	Earth Water Consulting	Email for Invoice	strider@ewcon.com.au
		Email for Results	strider@ewcon.com.au

Analyses (Please indicate below the analytes required for each sample or sample group. Circle or tick should not be used to indicate requested analytes)

Containers (Please refer to Sample Container Guide for container types & sizes)

Required Turnaround Time (Default will be 5 days if not specified)

*Surcharges will apply
☐ Overnight (reporting by 9am)*
☐ Same day* ☐ 1 day*
☐ 2 days* ☐ 3 days*
☑ 5 days (Standard)
☐ Other( )

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Soil: S, Water: W)	COMPOSITE	COMP ID	4 x PB	OCP	OCP/OPP (BTEX)	500mL Plastic	250mL Plastic	125mL Plastic	40mL Vial (Amber, Acid or Clear)	40mL Vial	Jar (Glass or HDPE)	Sample Comments / Dangerous Goods Hazard Warning
1	9 S-67	19.6.23	S			/	/							✓	
2	9 S-68	11	S			/		/						✓	
3	9 S-69	11	S			/	/							✓	
4	9 S-70	11	S			/		/						✓	
5	148 S-1	11	S	}										✓	
6	148 S-2	11	S	}	C14	/	/							✓	
7	148 S-3	11	S	}										✓	
8	148 S-4	11	S	}										✓	
9	148 S-5	11	S	}	C15	/	/							✓	
10	148 S-6	11	S	3										✓	
	Total Counts														

Method of Shipment	☑ Courier (#)	☐ Hand Delivered	☐ Post	Name	ROB CAIRD	Signature	Date / Time / Temperature
Eurofins | mgt Laboratory Use Only	Received By:	VOC | SVOC | PAH | PCB | OPP | TRH | BTEX | HM | ASB | NTL | DRY		Signature		Date / Time	Temperature
	Received By:	VOC | SVOC | PAH | PCB | OPP | TRH | BTEX | HM | ASB | NTL | DRY		Signature		Date / Time	Temperature / Report #

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Unit F3 Bld F 16 Mars Road Lane Cove West NSW 2066
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1 21 Smallwood Place Murarrie QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
Unit 2 91 Leach Highway Kewdale WA 6105
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
3 Kingston Town Close Oakleigh VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Earth Water Consulting Pty Limited	Project №	~~2223~~ 2021-71
Address	Unit 8 / 1A Marina Crescent, Urunga NSW 2455	Project Name	9 GAUDRONS RD
Contact Name	Strider Doerincks	Project Manager	STRIDER
Phone №	0402608396	EDD Format (Excel, CSV, etc.)	
Special Directions		Sampler(s)	U
Purchase Order	~~2223~~ 2021-71	Handed over by	
Quote ID №	Earth Water Consulting	Email for Invoice	strider@ewcon.com.au
		Email for Results	strider@ewcon.com.au

Analyses (Please tick which analyses are required. Attach list if more space is needed. Specify filtered or preserved bottle.)

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Soil / Water / Oil)	COMPOSITE	Comp ID	As, Pb	OCP
1	148 S-7	19-623	S	≀	C15	/	/
2	148 S-8	↓	↓	≀			
3	148 S-9			≀			
4	148 S-10			≀	C16	/	/
5	148 S-11			≀			
6	148 S-12			≀			
7	148 S-13			≀			
8	148 S-14			≀	C17	/	/
9	148 S-15			≀			
10	148 S-16	↓	↓	≀			
	Total Counts						

Containers (Change container type & size if necessary)

№	500mL Plastic	250mL Plastic	125mL Plastic	250mL Amber Glass	40mL Vial	500mL Brown Poly	Jar (Glass or HDPE)
1							/
2							/
3							/
4							/
5							/
6							/
7							/
8							/
9							/
10							/

Required Turnaround Time (Prior storage by Eurofins | mgt may apply)

*Surcharge will apply
☐ Overnight (reporting by 9am)*
☐ Same day* ☐ 1 day*
☐ 2 days* ☐ 3 days*
☑ 5 days (Standard)
☐ Other( )

Sample Comments (Dangerous Goods Hazard Warning)

Method of Shipment	☑ Courier (#)	☐ Hand Delivered	☐ Postal	Name	ROB LAIRD	Signature
Date		Time				

Eurofins | mgt Laboratory Use Only — Received By / Received By — STD | SHE | MEL | PER | ADL | NTL | DRW — Signature — Date — Time — Temperature — Report №

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CHAIN OF CUSTODY RECORD

Eurofins | mgt ABN 50 005 085 521

☑ Sydney Laboratory — Unit F3 Bld F 16 Mars Road Lane Cove West NSW 2066 — 02 9900 8400 — EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory — Unit 1 21 Smallwood Place Murarrie QLD 4172 — 07 3902 4600 — EnviroSampleQLD@eurofins.com

☐ Perth Laboratory — Unit 2 91 Leach Highway Kewdale WA 6105 — 08 9251 9600 — EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory — 6 Monterey Road Dandenong South VIC 3175 — 03 8564 5000 — EnviroSampleVic@eurofins.com

Company	Earth Water Consulting Pty Limited	Project №	~~2223-~~ 2021-71
Address	Unit 6 / 1A MArina Crescent, Urunga NSW 2455	Project Name	9 GAWLONS RD
Contact Name	Strider Duerinckx	Project Manager	STRIDER
Phone №	0402808396	EDD Format (if other than default)	
Special Directions		Sampler(s)	CL
Purchase Order	~~2223-~~ 2021-71	Handed over by	
Quote ID №	Earth Water Consulting	Email for Invoice	strider@ewcon.com.au
		Email for Results	strider@ewcon.com.au

Analyses (Please indicate required analyses below (or attach a list) and tick one box per sample to indicate preservation used)

Containers (Please indicate container type & preservation)

Required Turnaround Time (Urgent TAT requests must be pre-booked)

*Surcharge will apply

☐ Overnight (reporting by 9am)* ☐ Same day* ☐ 1 day* ☐ 2 days* ☐ 3 days* ☑ 5 days (Standard) ☐ Other( )

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Soil: S, Water: W)	COMPOSITE	COMP ID	4S, Pb	OCP	500mL Plastic	250mL Plastic	125mL Plastic	250mL Amber Glass	40mL Vial	250mL EP/AP/HDPE	Jar (Glass or HDPE)	Sample Comments / Dangerous Goods Hazard Warning
1	148 S-17	19.6.23	S	~										✓	
2	148 S-18			~	C18	✓	✓							✓	
3	148 S-19			~										✓	
4	148 S-20			~										✓	
5	148 S-21			~										✓	
6	148 S-22			~	C19	✓	✓							✓	
7	148 S-23			~										✓	
8	148 S-24			~										✓	
9	148 S-25			~	C20	✓	✓							✓	
10	148 S-26	↓	↓	~										✓	
	Total Counts														

Method of Shipment: ☑ Courier (#) ☐ Hand Delivered ☐ Postal — Name: ROB LAIRD — Signature: — Date: — Time:

Eurofins | mgt Laboratory Use Only: Received By: — STD | ONE | MEL | PER | ADL | NTL | DRW — Signature — Date — Time — Temperature

Received By: — STD | ONE | MEL | PER | ADL | NTL | DRW — Signature — Date — Time — Report №

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☐ Brisbane Laboratory
Unit 21 Smallwood Place Murarrie QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
Unit 7 91 Leach Highway Kewdale WA 6105
08 6253 4800 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close Oakleigh VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Earth Water Consulting Pty Limited	Project №	2223-2021-71
Address	Unit 6 / 1A Maira Crescent, Urunga NSW 2455	Project Name	9 GAVROANS RD
Contact Name	Strider Duerinckx	Project Manager	STRIDER
Phone №	0402608366	EDD Format (Excel Standard)	
Special Directions		Sampler(s)	SD
Purchase Order	2223-2021-71	Handed over by	
Quote ID №	Earth Water Consulting	Email for Invoice	strider@ewcon.com.au
		Email for Results	strider@ewcon.com.au

Analyses (Please tick which analyses are required / Please write in any extra tests in the box below)

Containers (Please specify container type & size if necessary)

Required Turnaround Time (Urgent TAT's & Surcharges must be discussed)

*Surcharges will apply
☐ Overnight (reporting by 9am)♦
☐ Same day♦ ☐ 1 day♦
☐ 2 days♦ ☐ 3 days♦
☑ 5 days (Standard)
☐ Other( )

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid / Water / Other)	Analyses: COMPOSITE	comp ID	ASI Pb	OCP	250mL Plastic	250mL Plastic	125mL Plastic	250mL Amber Glass	40mL Vial	500mL Plastic (HDPE)	Jar (Glass or HDPE)	Sample Comments / Dangerous Goods Hazard Warning
1	148 S-27	19-6-23	S		C20	✓	✓							✓	
2	148 S-28	11	11											✓	
3	148 S-29	11	11											✓	
4	148 S-30	11	11		C21	✓	✓							✓	
5	148 S-31	11	11											✓	
6	148 S-32	11	11											✓	
7															
8															
9															
10															
		Total Counts													

Method of Shipment	☑ Courier (#)	☐ Hand Delivered	☐ Postal	Name	ROB LAIRD	Signature
					Date	Time

Eurofins | mgt Laboratory Use Only	Received By	SYD / BNE / MEL / PER / ADL / NTL / DRW	Signature	Date	Time	Temperature
	Received By	SYD / BNE / MEL / PER / ADL / NTL / DRW	Signature	Date	Time	Report to

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