PLANNING PROPOSAL

COFFS HARBOUR CITY COUNCIL

Reduce Minimum Lot Size
Lot 4 DP 1138855, 101 Faviell Drive, Bonville

May 2022
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** **November 2021**
Referred to DPE s3.34(1) **Version 1 - Pre_Exhibition**	**24 March 2022**
Gateway Determination s3.34(2) **Version 1 - Pre_Exhibition**	**28 April 2022**
Amendments Required:	
Public Exhibition – Schedule 1 Clause 4 **Version 2 - Exhibition**	**13 May 2022 - 27 May 2022**
Reported to Council – Initiate Revised PP s3.33 **Version x - Re_Exhibition**	
Revised PP Sent to the Minister - s3.35(1) **Version x - Re_Exhibition**	
Altered Gateway Determination s3.34(2) **Version x - Re_Exhibition**	
Public Exhibition – Schedule 1 Clause 4 **Version x - Re_Exhibition**	
Reported to Council – Endorsement (or Making of LEP if delegated) s3.36 **Version x - Post Exhibition**	
Endorsed by Council for Submission to Minister for Notification (or Making where not delegated) s3.36(2) **Version x – Post Exhibition**	

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APPENDICES

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 Local Environmental Plan 2013* ('Coffs Harbour LEP 2013').

A planning proposal assists those who are responsible for deciding whether an LEP amendment should proceed and is required to be prepared by a relevant planning authority. Council, as a relevant planning authority, is responsible for ensuring that the information contained within a planning proposal is accurate and accords with the *Environmental Planning and Assessment Act 1979* and the NSW Department of Planning and Environment's *Local Environmental Plan Making Guideline (December 2021)*.

What is the Intent of this Planning Proposal?

The intent of this planning proposal is to amend the Lot Size Map Sheet LSZ_006 of Coffs Harbour LEP 2013, as it relates to Lot 4 DP1138855, 101 Faviell Drive, Bonville, from 1 hectare to 5,000 m^2.

Public Exhibition

This planning proposal will be placed on public exhibition in accordance with any Gateway Determination issued by NSW Planning and Environment. Copies of the planning proposal and supportive information can be viewed on Council'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
Coffs Harbour City Council
Locked Bag 155
COFFS HARBOUR NSW 2450
Email: coffs.council@chcc.nsw.gov.au

Any questions, contact:
Joseph Kirwood on (6648 4628)
or email joseph.kirwood@chcc.nsw.gov.au

Note: Council is committed to openness and transparency in its decision making processes. The Government Information (Public Access) Act 2009 requires Council 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, Council 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 Council's Customer Service Section or on Council's website www.coffsharbour.nsw.gov.au/disclosurestatement.

BACKGROUND

Proposal	Reduce Minimum Lot Size
Property Details	Lot 4 DP1138855, 101 Faviell Drive, Bonville
Current Land Use Zone(s)	R5 Large Lot Residential
Proponent	Keiley Hunter Town Planning
Landowner	D and H Butler
Location	See Figure 1 – Locality Map

This planning proposal has been prepared in accordance with the *Environmental Planning and Assessment Act 1979* and *A guide to preparing planning proposals* (NSW Department of Planning and Environment 2018) and *A guide to preparing local environmental plans* (NSW Department of Planning and Environment 2018).

This planning proposal explains the intended effects of a proposed amendment to Coffs Harbour Local Environmental Plan 2013 ('LEP 2013') to enable amendment of the Lot Size Map from 1 hectare to 5,000m^2 for Lot 4 DP1138855, 101 Faviell Drive, Bonville. This shall allow the consequent subdivision of the site, creating a single additional lot as show in Figure 4. *Note: In preparing this planning proposal, Council has not endorsed the proposed plan of subdivision, as this is subject to the development application process.*

The Site

The site is located along Faviell Drive, Bonville and within a wider area largely developed for large lot residential purposes, as shown in Figure 1 below.

The site contains a dwelling house, is largely cleared, and contains domestic landscaping. It has a gentle fall from its north-eastern portion to the southwest.

The site has an area of 1.002 hectares and is zoned R5 Large Lot Residential under LEP 2013 as shown in Figure 2 below.

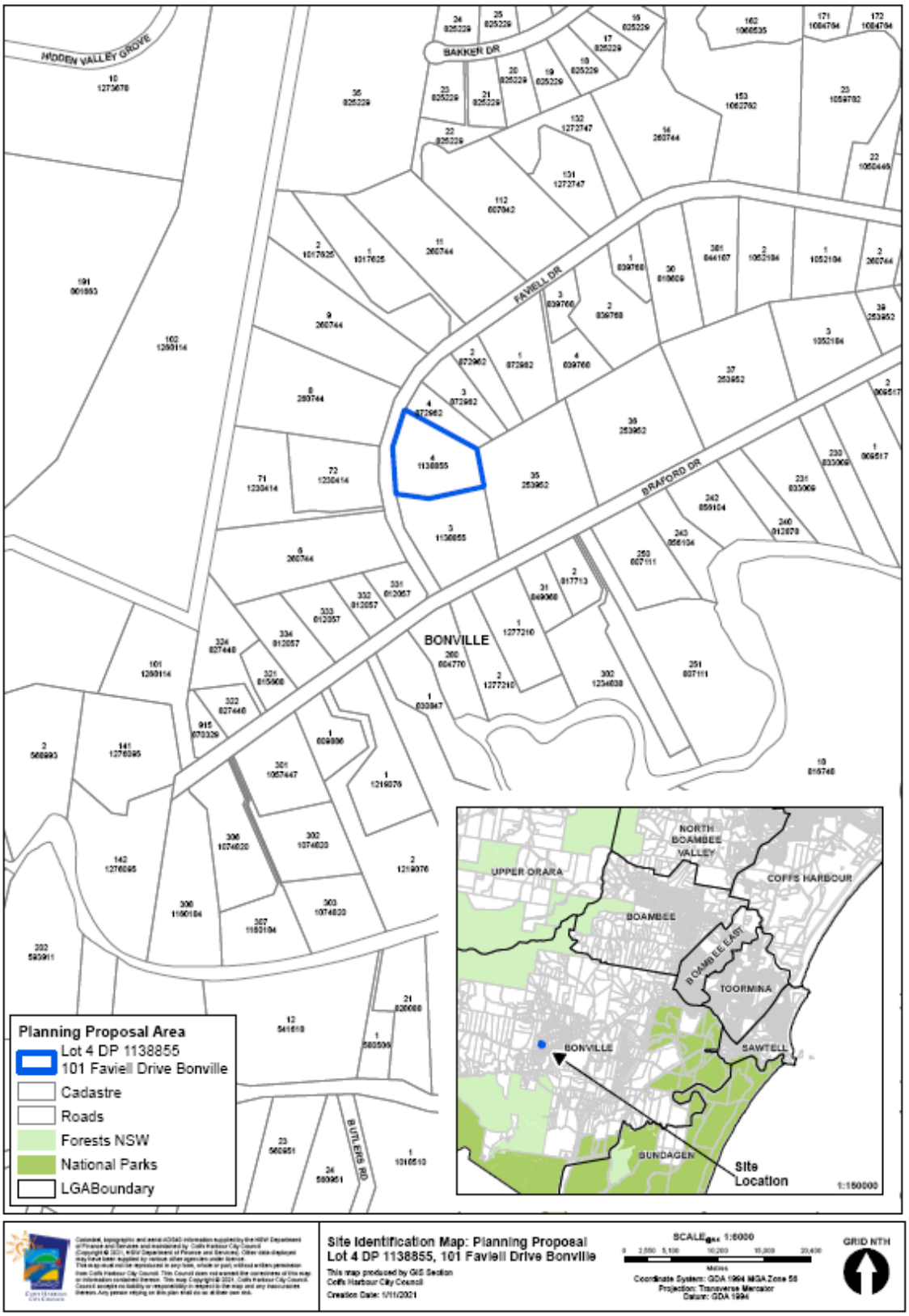

Figure 1: Locality Map (the site).

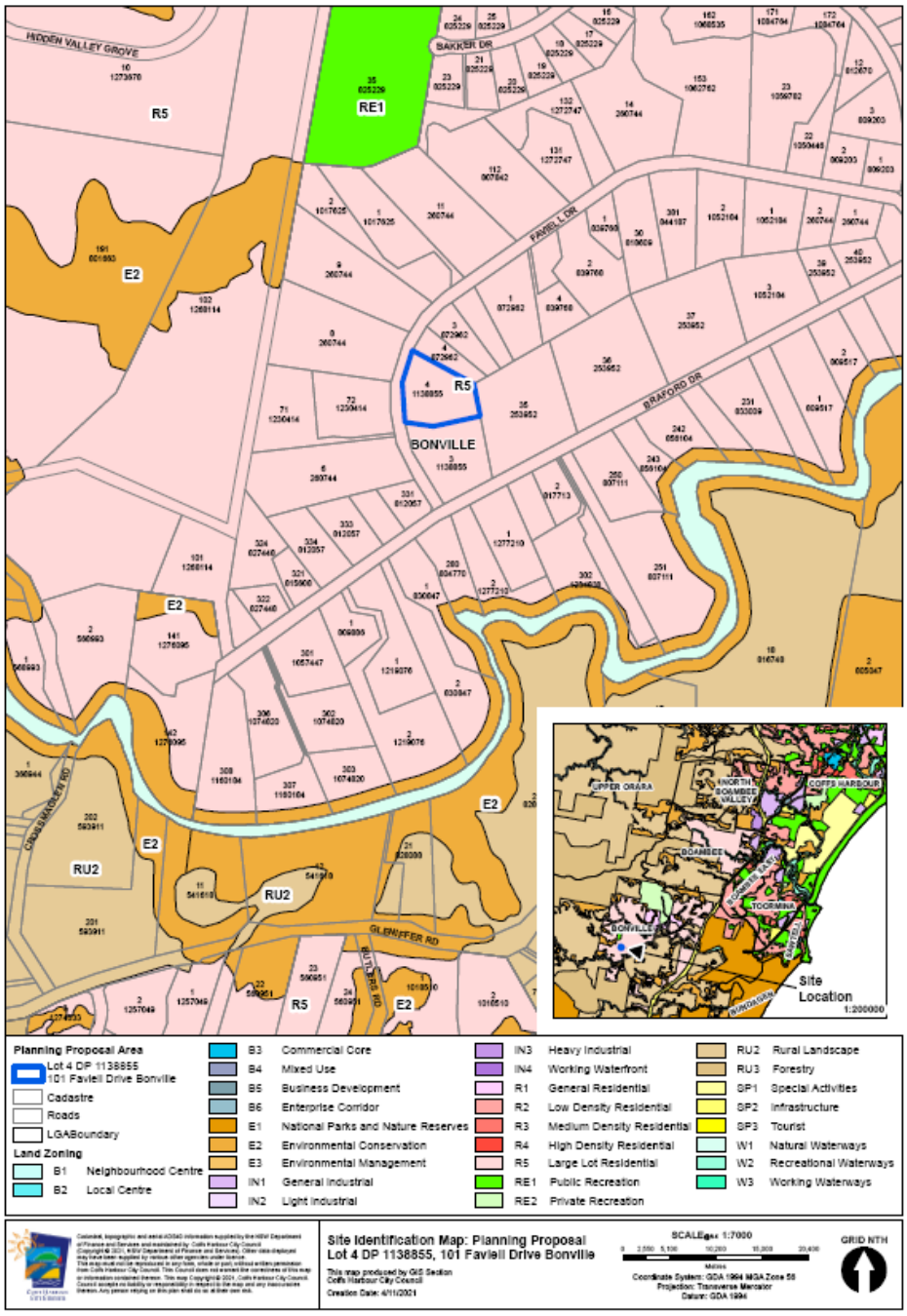

Figure 2: Current Land Use Zones (LEP 2013).

The minimum lot size under LEP 2013 is shown in Figure 3 below.

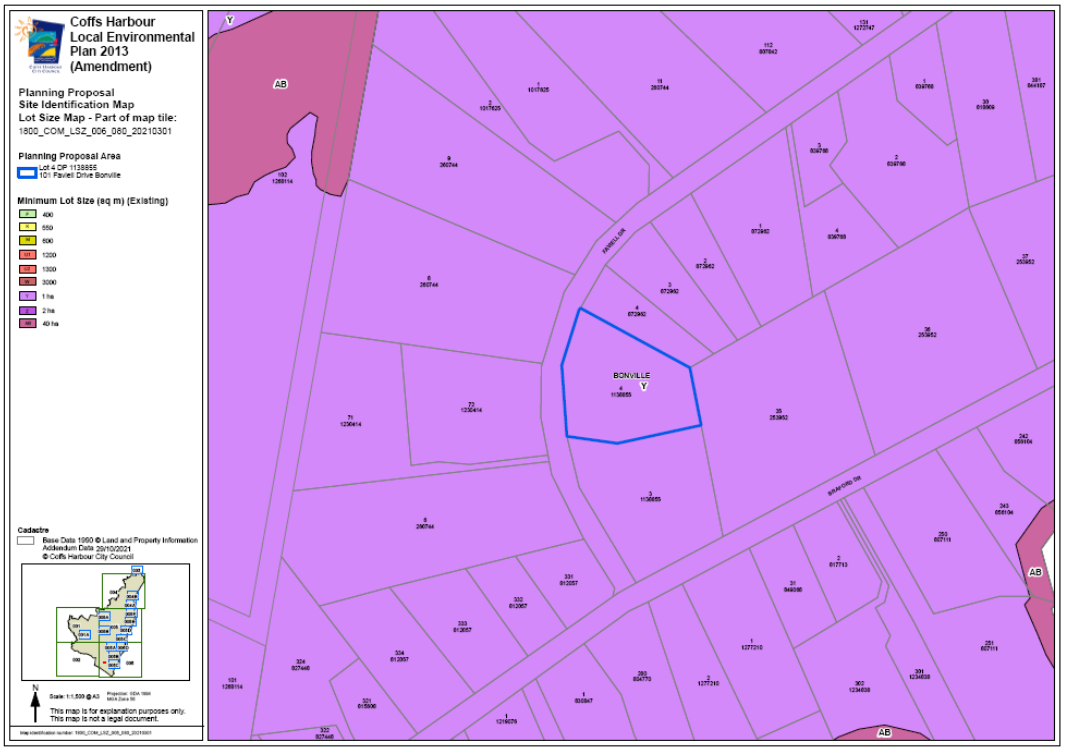

Figure 3: Current minimum lot size (LEP 2013).

An indicative large lot residential two-lot layout is shown below in Figure 4.

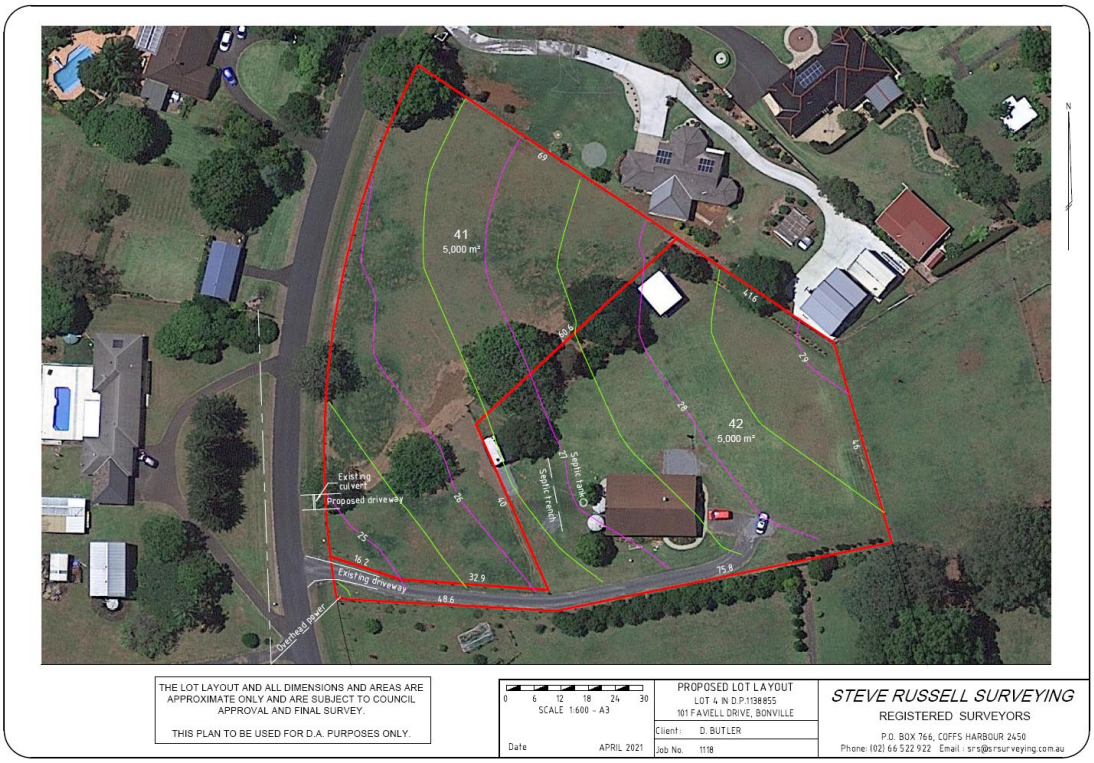

Figure 4: Indicative two-lot subdivision layout.

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

PART 1 – OBJECTIVES OR INTENDED OUTCOMES

The objective of this planning proposal is to amend the Lot Size Map (Sheet LSZ_006) of Coffs Harbour LEP 2013 to reduce the minimum lot size on the site from 1 hectare to 5,000m^2.

PART 2 – EXPLANATION OF PROVISIONS

The intended outcome of the proposed LEP amendment is to reduce the minimum lot size of 1 hectare to 5,000m^2 for Lot 4 DP1138855, 101 Faviell Drive, Bonville. This is to be achieved through the amendment of Sheet LSZ_006 (Lot Size Map) of LEP 2013.

PART 3 – JUSTIFICATION

This part provides a response to the following matters in accordance with A guide to preparing planning proposals (NSW Department of Planning and Environment 2018):

- Section A: Need for the planning proposal
- Section B: Relationship to strategic planning framework
- Section C: Environmental, social and economic impact

Section A – Need for the planning proposal

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

Yes. The site is included in an existing R5 Large Lot Residential zone and Council's Local Growth Management Strategy (LGMS) 2020, Chapter 6 – Large Lot Residential allows for the potential reduction of minimum lot size in the R5 zone, where sufficiently justified.

Coffs Harbour has a range of lots sizes in its large lot (rural residential) areas, which reflect varying minimum lot size standards that have changed over time. These varied lot sizes are apparent within the Bonville large lot area, and in close proximity to the site. A reduction in minimum lot size for the site would be consistent with the surrounding neighbourhood and its character, as smaller sized lots are already present.

The proposed minimum lot size of 5000m^2 will be sufficient to ensure that future lots might achieve a practical and efficient layout to meet their intended (rural residential) use. In this regard, the indicative layout in Figure 4 is demonstrative of this; achieving a practical and efficient layout in a rural residential context.

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

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 does not relate to ensuring growth within existing centres and minimising dispersed trip generating development; nor does it relate to promoting significant increased residential areas or densities, or significant increased employment areas or the like. The criteria in the Net Community Benefit test cannot be properly applied to this planning proposal.

Section B – Relationship to strategic planning framework

4. Will the planning proposal give effect to the objectives and actions contained within the North Coast Regional Plan 2036?

Yes; the proposed LEP amendment is considered to be consistent with the relevant goals, directions and actions within the North Coast Regional Plan 2036 as follows:

GOAL 1 – THE MOST STUNNING ENVIRONMENT IN NSW

- ***Direction 2 - Enhance biodiversity, coastal and aquatic habitats, and water catchments***

  Action 2.1 - Focus development to areas of least biodiversity sensitivity in the region and implement the 'avoid, minimise, offset' hierarchy to biodiversity, including areas of high environmental value.

  Comment - The planning proposal focusses development away from areas of biodiversity sensitivity (it is located on a site, and within an area, that contains no ecologically sensitive areas).

- ***Direction 3 - Manage natural hazards and climate change***

  Action 3.1 - Reduce the risk from natural hazards, including the projected effects of climate change, by identifying, avoiding and managing vulnerable areas and hazards.

  Comment - The site is not affected by any notable natural hazards.

GOAL 2 – A THRIVING, INTERCONNECTED ECONOMY

- ***Direction 11 - Protect and enhance productive agricultural lands***

  Action 11.1 - Enable the growth of the agricultural sector by directing urban and more residential development away from important farmland and identifying locations to support existing and small-lot primary production, such as horticulture in Coffs Harbour.

  Comment - The planning proposal will provide for the site to be developed to a greater density, thus providing for increased residential development away from farmland.

- ***Direction 13 - Sustainably manage natural resources***

  Action 13.1 - Enable the development of the region's natural, mineral and forestry resources by directing to suitable locations land uses such as residential development that are sensitive to impacts from noise, dust and light interference.

  Comment – The planning proposal will provide for the site to be further developed for rural residential purposes in a location that is not subject to noise, dust and light interference.

GOAL 3 – VIBRANT AND ENGAGED COMMUNITIES

- ***Direction 18 - Respect and protect the North Coast's Aboriginal heritage***

  Action 18.1 - Ensure Aboriginal objects and places are protected, managed and respected in accordance with legislative requirements and the wishes of local Aboriginal communities.

  Action 18.2 - Undertake Aboriginal cultural heritage assessments to inform the design of planning and development proposals so that impacts to Aboriginal cultural heritage are minimised and appropriate heritage management mechanisms are identified.

Comment - The site does not contain any mapped known or predictive Aboriginal Cultural Heritage (ACH) and an Aboriginal Heritage Information Management System (AHIMS) search has not revealed any ACH sites on or near the site.

GOAL 3 – VIBRANT AND ENGAGED COMMUNITIES

- ***Direction 23 - Increase housing diversity and choice***

  Action 23.1 - Encourage housing diversity by delivering 40 per cent of new housing in the form of dual occupancies, apartments, townhouses, villas or dwellings on lots less than 400 square metres, by 2036.

  Comment: - The planning proposal will result in the potential for only one additional lot to be created, as such it will have no appreciable impact on this Direction.

- ***Direction 24 - Deliver well-planned rural residential housing areas***

  Action 24.2 - Enable sustainable use of the region's sensitive coastal strip by ensuring new rural residential areas are located outside the coastal strip, unless already identified in a local growth management strategy or rural residential land release strategy approved by the Department of Planning and Environment.

  Comment - The planning proposal will provide for a maximum of one additional lot, it will therefore not compromise the achievement of Action 24.2. The site is located well outside the coastal strip.

5. Will the planning proposal give effect to a Council's endorsed local strategic planning statement, or another endorsed local strategy or strategic plan?

Coffs Harbour City Council adopted its Local Strategic Planning Statement (LSPS) on 25 June 2020. The LSPS was prepared in accordance with the *Environmental Planning and Assessment Act 1979* and Regulations and provides a 20-year land use planning vision for the Coffs Harbour LGA. It identifies 16 Planning Priorities to be delivered in four themes to 2040: connected, sustainable, thriving and leadership.

The planning proposal is consistent with the following relevant planning priorities and associated actions within the adopted LSPS:

Planning Priority	Action
5. Deliver greater housing supply, choice and diversity	A5.1 - Review and amend Council's local planning controls relating to housing supply, choice and diversity as outlined in the Local Growth Management Strategy
	A5.5 - Implement remaining actions from the Local Growth Management Strategy as funding allows

6. Is the planning proposal consistent with council's Community Strategic Plan and Local Growth Management Strategy?

MyCoffs Community Strategic Plan 2030

Council's Community Strategic Plan is based on four key themes: Community Wellbeing; Community Prosperity; A Place for Community; and Sustainable Community Leadership. Within each theme there are a number of objectives, and for each objective there are a number of strategies to assist in achieving the objectives. The planning proposal is generally consistent with the following relevant objectives and strategies within the Plan:

Objective	Strategy
Liveable Neighbourhoods with a Defined Identity	C1.1 We create liveable places that are beautiful and appealing
	C1.2 We undertake development that is environmentally, socially and economically responsible

Coffs Harbour Local Growth Management Strategy

The planning proposal is consistent with the LGMS.

The site is included in an existing R5 Large Lot Residential zone and the LGMS (Chapter 6 – Large Lot Residential) addresses the potential reduction of minimum lot size in the R5 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."

The planning proposal is supported by Appendix 3 – Minimum Lot Size and Land Capability Assessment and Appendix 4 - Bushfire Risk Management Plan, which indicate that the reduction of the minimum lot size is appropriate.

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 so it conforms with the requirements of the North Coast Regional Plan 2036. 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)?

Yes; 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 (s117 directions)?

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

Section C – Environmental, social and economic impact

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; there is little likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the planning proposal. The site is largely cleared and has been developed for rural residential purposes, and does not contain any threatened species habitat, nor is it located near any such habitat.

Given the degraded and highly modified nature of the site, the lack of native vegetation and high conservation value habitat for flora or fauna, biodiversity values at the site are relatively low. Consequently, the planning proposal will have minimal impacts on biodiversity.

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

No; the site is largely cleared and developed for large lot residential purposes.

In relation to the disposal of on-site wastewater, the planning proposal (and specifically the Minimum Lot Size and Land Capability Assessment included in Appendix 3) demonstrates that the site is suitable for on-site wastewater disposal (and specifically capable of accommodating a further on-site wastewater system).

Bushfire Risk

Bushfire risk has been addressed in a Bushfire Risk Management Plan (Appendix 4) submitted with the request to amend LEP 2013.

The Plan demonstrates that the planning proposal (and eventual two-lot large lot residential subdivision of the site) complies with relevant objectives (for the development type) and performance criteria within Planning for Bushfire Protection 2019. *Note: In preparing this planning proposal, Council has not endorsed the proposed plan of subdivision, as this is subject to the development application process.*

Wastewater Capability Assessment

The Minimum Lot Size and Land Capability Assessment (Appendix 3) demonstrates that a minimum lot size of 5,000m^2 is suitable to accommodate the sustainable application of wastewater (on-site) from both future and existing residential development, taking into account the intended future subdivision of the site for large lot residential purposes.

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

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

Section D – State and Commonwealth interests

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

Yes; the planning proposal is unlikely to create significant additional demand on existing public infrastructure. The subsequent amendment to LEP 2013 will enable the creation of one additional lot, which can be serviced by an existing reticulated water service, available to the site. Vehicular access to the new lot can be safely achieved from Faviell Drive, which fronts the site.

Reticulated power and telecommunications are also available to the site.

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

A Gateway determination has not been issued by NSW Planning and Environment as yet, thus consultation with public authorities and government agencies has not yet been undertaken. In this regard, it is proposed that the NSW Rural Fire Service be consulted in relation to the planning proposal, and that this consultation be undertaken concurrent with public exhibition of the proposal.

At this stage in the process there does not appear to be any matters of interest to Commonwealth authorities in relation to the planning proposal.

PART 4 – MAPPING

The existing and proposed LEP 2013 Lot Size Map is shown in Figure 5 below.

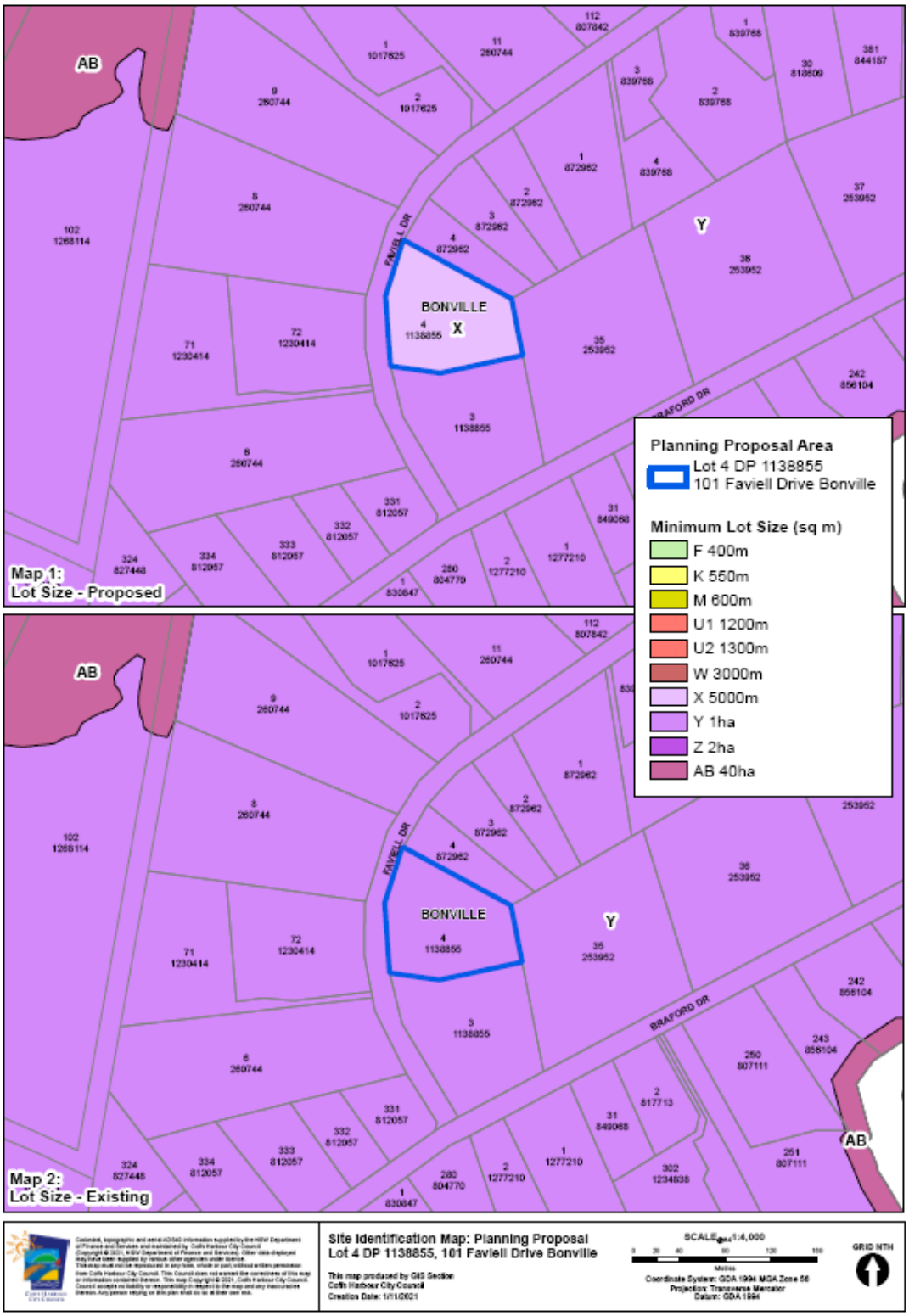

Figure 5: Coffs Harbour LEP 2013 – Existing and proposed minimum Lot Size Map.

PART 5 – COMMUNITY CONSULTATION

The Gateway determination issued by the Department of Planning and Environment specified that public exhibition of the planning proposal should be undertaken for a period of at least 10 working days.

Public Exhibition of the planning proposal will include the following:

Advertisement

Placement of an online advertisement in the Coffs Newsroom.

Consultation with affected owners and adjoining landowners

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

Website

The planning proposal will be made publicly available on Council'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

The Gateway Determination issued by the NSW Department of Planning and Environment requires the planning proposal to be completed by 26 October 2022. Based on this, the anticipated timeframes for the planning proposal are provided below in Table 1, noting that there can be unexpected delays in the process.

Table 1: Anticipated Timeline

Milestone	Anticipated Timeframe
Decision by Council to initiate the planning proposal	March 2022
Commencement (date of Gateway determination)	April 2022
Peer review & provision of additional information (if required)	-
Public exhibition & agency consultation	May 2022
Consideration of submissions	June 2022
Reporting to Council for consideration	July 2022
Submission to Minister for notification of the plan (if delegated)	August 2022

APPENDIX 1 – CONSIDERATION OF STATE ENVIRONMENTAL PLANNING POLICIES

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

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				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	No	N/A	Coffs Harbour City Council is not listed in Schedule 1 of this policy and thus the policy does not apply to the Coffs Harbour LGA at this point in time.
	Chapter 7 – Canal Estate Development	No	N/A	The aims of this chapter of the Policy are to prohibit canal estate development as described in this Policy in order to ensure that the environment is not adversely affected by the creation of new developments of this kind. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
SEPP (Exempt and Complying Development Codes) 2008	N/A – this is a standalone State Environmental Planning Policy	No	N/A	This Policy aims to provide streamlined assessment processes for development that complies with specified development standards by: a) providing exempt and complying development codes that have State-wide application, and b) identifying, in the exempt development codes, types of development that are of minimal environmental impact that may be carried out without the need for development consent, and c) identifying, in the complying development codes, types of complying development that may be carried out in accordance with a complying development certificate as defined in the Act, and d) enabling the progressive extension of the types of development in this Policy, and e) providing transitional arrangements for the introduction of the State-wide codes, including the amendment of other environmental planning instruments.

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

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				(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	No	N/A	The aims of this chapter of the Policy are: a) to identify development that is State significant development, b) to identify development that is State significant infrastructure and critical State significant infrastructure, c) to identify development that is regionally significant development. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 3 - Aboriginal Land	No	N/A	This chapter of the SEPP only applies to the Central Coast LGA at this point in time.
	Chapter 4 - Concurrences and Consents	No	N/A	The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
State Environmental Planning Policy (Precincts—	Chapter 6 - Urban Renewal	No	N/A	The aims of this chapter of the Policy are to: a) to establish the process for assessing and identifying sites as urban renewal precincts,

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
Central River City) 2021				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	No	N/A	The aims of this chapter of the Policy are to: a) to facilitate the development, redevelopment or protection of important urban, coastal and regional sites of economic, environmental or social significance to the State so as to facilitate the orderly use, development or conservation of those State significant precincts for the benefit of the State, b) to facilitate service delivery outcomes for a range of public services and to provide for the development of major sites for a public purpose or redevelopment of major sites no longer appropriate or suitable for public purposes The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
State Environmental Planning Policy (Primary Production) 2021	Chapter 2 - Primary Production and Rural Development	No	N/A	The aims of this chapter of the Policy are to: a) to facilitate the orderly economic use and development of lands for primary production, b) to reduce land use conflict and sterilisation of rural land by balancing primary production, residential development and the

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				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 proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
State Environmental Planning Policy (Resilience and Hazards) 2021	Chapter 2 - Coastal Management	No	N/A	The aim of this chapter of the Policy is to promote an integrated and co-ordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the Coastal Management Act 2016, including the management objectives for each coastal management area, by: a) managing development in the coastal zone and protecting the environmental assets of the coast, and b) establishing a framework for land use planning to guide decision-making in the coastal zone, and

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 does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 3 – Hazardous and Offensive Development	No	N/A	The aims of this chapter of the Policy are: a) to amend the definitions of hazardous and offensive industries where used in environmental planning instruments, and b) to render ineffective a provision of any environmental planning instrument that prohibits development for the purpose of a storage facility on the ground that the facility is hazardous or offensive if it is not a hazardous or offensive storage establishment as defined in this Policy, and c) to require development consent for hazardous or offensive development proposed to be carried out in the Western Division, and 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.

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 4 – Remediation of Land	No	N/A	The aims of this chapter of the Policy are to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment— a) by specifying when consent is required, and when it is not required, for a remediation work, and b) by specifying certain considerations that are relevant in rezoning land and in determining development applications in general and development applications for consent to carry out a remediation work in particular, and c) by requiring that a remediation work meet certain standards and notification requirements. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
State Environmental Planning Policy (Resources and Energy) 2021	Chapter 2 - Mining, Petroleum Production and Extractive Industries	No	N/A	The aims of this chapter of the Policy are, in recognition of the importance to New South Wales of mining, petroleum production and extractive industries: a) to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of 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

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				c) to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources, and d) to establish a gateway assessment process for certain mining and petroleum (oil and gas) development: (i) to recognise the importance of agricultural resources, and (ii) to ensure protection of strategic agricultural land and water resources, and (iii) to ensure a balanced use of land by potentially competing industries, and (iv) to provide for the sustainable growth of mining, petroleum and agricultural industries. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.

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

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				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 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

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				premises and consent authorities to facilitate the joint and shared use of the facilities of educational establishments with the community through appropriate design. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 4 – Major Infrastructure Corridors	No	N/A	The aims of this chapter of the Policy are: a) to identify land that is intended to be used in the future as an infrastructure corridor, b) to establish appropriate planning controls for the land for the following purposes— (i) to allow the ongoing use and development of the land until it is 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 North Coast Regional Plan 2036 (NCRP) applies to the Coffs Harbour LGA. The NCRP includes actions on environmental, economic and social (community) opportunities, as well as maintaining character and housing. Specific responses to relevant strategic directions and the accompanying actions contained within the NCRP are provided in Part 3, Section A (3) and Section B (4) above. It is considered that the planning proposal complies with the NCRP.
1.2 Development of Aboriginal Land Council land	This direction does not currently apply to the Coffs Harbour LGA.	N/A	
1.3 Approval and Referral Requirements	This direction applies to all relevant planning authorities when preparing a planning proposal. A planning proposal to which this direction applies must: (a) minimise the inclusion of provisions that require the concurrence, consultation or referral of development applications to a Minister or public authority, and (b) not contain provisions requiring concurrence, consultation or referral of a Minister or public authority unless the relevant planning authority has obtained the approval of: i. the appropriate Minister or public authority, and ii. the Planning Secretary (or an officer of the Department nominated by the Secretary), prior to undertaking community consultation in satisfaction of Schedule 1 to the EP&A Act, and	Yes	The planning proposal does not include provisions that require the concurrence, consultation or referral of development applications to a Minister or public authority. It also does not identify development as designated development.

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 does not allow a particular development to be carried out; it simply seeks to reduce the minimum lot size for subdivision.
Focus area 1: Planning Systems – Place Based			
Directions 1.5 – 1.17 do not apply to the Coffs Harbour LGA.			

S9.1 Direction	Applicable	Consistent	Comment
Focus area 2: Design and Place			
Directions yet to be included.			
Focus area 3: Biodiversity and Conservation			
3.1 Conservation Zones	This direction applies to all relevant planning authorities when preparing a planning proposal. (1) A planning proposal must include provisions that facilitate the protection and conservation of environmentally sensitive areas. (2) A planning proposal that applies to land within a conservation zone or land otherwise identified for environment conservation/protection purposes in a LEP must not reduce the conservation standards that apply to the land (including by modifying development standards that apply to the land). This requirement does not apply to a change to a development standard for minimum lot size for a dwelling in accordance with Direction 9.3 (2) of "*Rural Lands*". A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary which: i. gives consideration to the objectives of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study prepared in support of the planning proposal which gives consideration to the objectives of this direction, or (c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan prepared by the Department of Planning and Environment which gives consideration to the objective of this direction, or (d) is of minor significance.	Yes	The site does not include any environmentally sensitive areas. The site does not contain land within an conservation zone or land otherwise identified for environment conservation/protection purposes.

S9.1 Direction	Applicable	Consistent	Comment
3.2 Heritage Conservation	This direction applies to all relevant planning authorities when preparing a planning proposal. A planning proposal must contain provisions that facilitate the conservation of: (a) items, places, buildings, works, relics, moveable objects or precincts of environmental heritage significance to an area, in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item, area, object or place, identified in a study of the environmental heritage of the area, (b) Aboriginal objects or Aboriginal places that are protected under the *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.	Yes	*European Heritage* The subject land does not contain any items listed as Heritage Items in Schedule 5 of Coffs Harbour LEP 2013 or the State Heritage Register. There are no European Heritage issues that would prevent a reduction in minimum lot size applying to the subject land. *Aboriginal Cultural Heritage* The subject land does not contain any mapped known or predictive Aboriginal Cultural Heritage (ACH) and an AHIMS search of the subject land has not revealed any ACH sites on or near the site.
3.3 Sydney Drinking Water Catchments	This direction does not currently apply to the Coffs Harbour LGA.	N/A	
3.4 Application of C2 and C3 Zones and Environmental Overlays in Far North Coast LEPs	This direction does not currently apply to the Coffs Harbour LGA.	N/A	
3.5 Recreation Vehicle Areas	A planning proposal must not enable land to be developed for the purpose of a recreation	Yes	The planning proposal does not enable land to be developed for

S9.1 Direction	Applicable	Consistent	Comment
	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.		the purpose of a recreation vehicle area (within the meaning of the *Recreation Vehicles Act 1983*).
Focus Area 4: Resilience and Hazards			

S9.1 Direction	Applicable	Consistent	Comment
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, (g) are likely to result in a significantly increased requirement for government	Yes	The site is not identified as flood prone land.

S9.1 Direction	Applicable	Consistent	Comment
	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		

S9.1 Direction	Applicable	Consistent	Comment
	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*	Yes	The site is not 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 or coastal use area - and as identified by *State Environmental Planning Policy (Biodiversity and Conservation) 2021.*

S9.1 Direction	Applicable	Consistent	Comment
	Planning Policy (Coastal Management) 2018; or (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 (Coastal Management) 2018*: (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,		

S9.1 Direction	Applicable	Consistent	Comment
	which gives consideration to the objective of this direction, or (c) of minor significance.		
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, (b) for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service. If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the *Rural Fires Act 1997*), the APZ provisions must be complied with, (c) contain provisions for two-way access roads which link to perimeter roads and/or to fire trail networks,	No	The site is mapped as bushfire prone land. The Bushfire Risk Management Plan (Appendix 4) demonstrates that future development of the site by way of subdivision can comply with Planning for Bushfire Protection 2019. *Note: In preparing this planning proposal, Council has not endorsed the proposed plan of subdivision, as this is subject to the development application process.* As per the Gateway Determination issued by the Department of Planning and Environment, Council shall consult with the NSW Rural Fire Service in order to obtain the Secretary's agreement for consistency to this S9.1 Direction.

S9.1 Direction	Applicable	Consistent	Comment
	(d) contain provisions for adequate water supply for firefighting purposes, (e) minimise the perimeter of the area of land interfacing the hazard which may be developed, (f) introduce controls on the placement of combustible materials in the Inner Protection Area. 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	Yes	A review of Council records does not identify any past activities on the site that would suggest potential land contamination. The site is also not: • land that is within an investigation area within the meaning of the *Contaminated Land Management Act 1997*, • 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.

S9.1 Direction	Applicable	Consistent	Comment
	(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 (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 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	No	Part of the land is mapped as Class 5 on the Acid Sulfate Soils Map (LEP 2013). The planning proposal only seeks to reduce the minimum lot size permitted on the site. LEP 2013 contains suitable provisions (clause 7.1) to manage any disturbance of potential acid sulfate soils on the site from future development. Given the above, the inconsistency is considered to be of minor significance. As per the Gateway Determination issued by the Department of Planning and Environment, the inconsistency of the planning proposal with this direction is justified and no further approval is required.

S9.1 Direction	Applicable	Consistent	Comment
	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 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:	N/A	The planning proposal does not apply to land that: a) is within a mine subsidence district, or b) has been identified as unstable in a study, strategy or other assessment undertaken: i. by or on behalf of the relevant planning authority, or ii. by or on behalf of a public authority and provided to the relevant planning authority.

S9.1 Direction	Applicable	Consistent	Comment
	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, 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			

S9.1 Direction	Applicable	Consistent	Comment
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: (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.	Yes	The planning proposal does not create, alter or remove a zone or a provision relating to urban land, including land zoned for residential, business, industrial, village or tourist purposes.
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	N/A	The planning proposal does not create, alter or reduce land reserved for a public purpose.

S9.1 Direction	Applicable	Consistent	Comment
	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 (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.	N/A	The planning proposal does not create, alter or remove a zone or a provision relating to land near a regulated airport which includes a defence airfield.

S9.1 Direction	Applicable	Consistent	Comment
	(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 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		

S9.1 Direction	Applicable	Consistent	Comment
	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 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 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 Plan prepared by the Department of		

S9.1 Direction	Applicable	Consistent	Comment
	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: (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.	N/A	The planning proposal does not create, alter or remove a zone or a provision relating to land adjacent to and/ or adjoining an existing shooting range.
Focus area 6: Housing			
6.1 Residential Zones	This direction applies to all relevant planning authorities when preparing a planning proposal that will affect land within an existing or proposed residential zone (including the alteration of any existing residential zone boundary), or any other zone in which significant residential development is permitted or proposed to be permitted. (1) A planning proposal must include provisions that encourage the provision of housing that will:	Yes	The planning proposal will enable the creation of one additional lot on the site. The potential for an additional lot to be created will broaden the location for further housing. The planning proposal relates to land that has available to it infrastructure and services suitable for rural residential purposes.

S9.1 Direction	Applicable	Consistent	Comment
	(a) broaden the choice of building types and locations available in the housing market, and (b) make more efficient use of existing infrastructure and services, and (c) reduce the consumption of land for housing and associated urban development on the urban fringe, and (d) be of good design. (2) A planning proposal must, in relation to land to which this direction applies: (a) contain a requirement that residential development is not permitted until land is adequately serviced (or arrangements satisfactory to the council, or other appropriate authority, have been made to service it), and (b) not contain provisions which will reduce the permissible residential density of land. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary which: i. gives consideration to the objective of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or		Appropriate planning controls are also contained within Coffs Harbour DCP 2015 to ensure that eventual development is of good design.
	(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	Yes	The planning proposal does not identify suitable zones, locations and provisions for caravan parks or manufactured home estates.

S9.1 Direction	Applicable	Consistent	Comment
	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) 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		

S9.1 Direction	Applicable	Consistent	Comment
	(b) justified by a study prepared in support of the planning proposal which gives consideration to the objective of this direction, or (c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan prepared by the Department of Planning and Environment which gives consideration to the objective of this direction, or (d) of minor significance.		
Focus area 7: Industry and Employment			
7.1 Business and Industrial Zones	This direction applies to all relevant planning authorities when preparing a planning proposal that will affect land within an existing or proposed business or industrial zone (including the alteration of any existing business or industrial zone boundary). A planning proposal must: (a) give effect to the objectives of this direction, (b) retain the areas and locations of existing business and industrial zones, (c) not reduce the total potential floor space area for employment uses and related public services in business zones, (d) not reduce the total potential floor space area for industrial uses in industrial zones, and (e) ensure that proposed new employment areas are in accordance with a strategy that is approved by the Planning Secretary. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary, which: i. gives consideration to the objective of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study (prepared in support of the planning proposal) which gives consideration to the objective of this direction, or	N/A	The planning proposal will not affect land within an existing or proposed business or industrial zone (including the alteration of any existing business or industrial zone boundary).

S9.1 Direction	Applicable	Consistent	Comment
	(c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan prepared by the Department of Planning and Environment which gives consideration to the objective of this direction, or (d) of minor significance.		
7.2 Reduction in non-hosted short-term rental accommodation period	This direction does not currently apply to the Coffs Harbour LGA.	N/A	
7.3 Commercial and Retail Development along the Pacific Highway, North Coast	Applies when a relevant planning authority prepares a planning proposal for land in the vicinity of the existing and/or proposed alignment of the Pacific Highway. (1) A planning proposal that applies to land located on "within town" segments of the Pacific Highway must provide that: (a) new commercial or retail development must be concentrated within district centres rather than spread along the Highway; (b) development with frontage to the Pacific Highway must consider impacts that the development has on the safety and efficiency of the highway; and (c) for the purposes of this paragraph, "within town" means areas which prior to the draft LEP have an urban zone (e.g. Village, residential, tourist, commercial and industrial etc.) and where the Pacific Highway is less than 80km/hour. (2) A planning proposal that applies to land located on "out-of-town" segments of the Pacific Highway must provide that: (a) new commercial or retail development must not be established near the Pacific Highway if this proximity would be inconsistent with the objectives of this Direction. (b) development with frontage to the Pacific Highway must consider the impact the development has on the safety and efficiency of the highway. (c) For the purposes of this paragraph, "out-of-town" means areas which, prior to the draft local environmental plan, do not have an urban zone (e.g.: "village", "residential", "tourist", "commercial", "industrial", etc.) or are	N/A	The site is not located in the vicinity of the existing and/or proposed alignment of the Pacific Highway.

S9.1 Direction	Applicable	Consistent	Comment
	in areas where the Pacific Highway speed limit is 80 km/hour or greater. (3) Notwithstanding the requirements of paragraphs (4) and (5), the establishment of highway service centres may be permitted at the localities listed in Table 1, provided that the Roads and Traffic Authority is satisfied that the highway service centre(s) can be safely and efficiently integrated into the highway interchange(s) at those localities. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are of minor significance.		
Focus area 8: Resources and Energy			
8.1 Mining, Petroleum Production and Extractive Industries	This direction applies to all relevant planning authorities when preparing a planning proposal that would have the effect of: (a) prohibiting the mining of coal or other minerals, production of petroleum, or winning or obtaining of extractive materials, or (b) restricting the potential development of resources of coal, other minerals, petroleum or extractive materials which are of State or regional significance by permitting a land use that is likely to be incompatible with such development. (1) In the preparation of a planning proposal affected by this direction, the relevant planning authority must: (a) consult the Secretary of the Department of Primary Industries (DPI) to identify any: i. resources of coal, other minerals, petroleum or extractive material that are of either State or regional significance, and ii. existing mines, petroleum production operations or extractive industries occurring in the area subject to the planning proposal, and (b) seek advice from the Secretary of DPI on the development potential of resources identified under (1)(a)(i), and (c) identify and take into consideration issues likely to lead to land use conflict between other land uses and:	N/A	The planning proposal will not prohibit the mining of coal or other minerals, production of petroleum, or winning or obtaining of extractive materials; or restrict the potential development of resources of coal, other minerals, petroleum or extractive materials which are of State or regional significance (by permitting a land use that is likely to be incompatible with such development).

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

S9.1 Direction	Applicable	Consistent	Comment
	i. gives consideration to the objectives of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study prepared in support of the planning proposal which gives consideration to the objectives of this direction, or (c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan prepared by the Department of Planning and Environment which gives consideration to the objective of this direction, or (d) is of minor significance.		
9.2 Rural Lands	This direction applies when a relevant planning authority prepares a planning proposal for land outside the local government areas of lake Macquarie, Newcastle, Wollongong and LGAs in the Greater Sydney Region (as defined in the *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	N/A	The planning proposal will not affect land within an existing or proposed rural or conservation zone (including the alteration of any existing rural or environment protection zone boundary) or change the existing minimum lot size on land within a rural or conservation zone.

S9.1 Direction	Applicable	Consistent	Comment
	(f) support farmers in exercising their right to farm (g) prioritise efforts and consider measures to minimise the fragmentation of rural land and reduce the risk of land use conflict, particularly between residential land uses and other rural land use (h) consider State significant agricultural land identified *in* chapter 2 of the *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, 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.		

S9.1 Direction	Applicable	Consistent	Comment
9.3 Oyster Aquaculture	This direction applies to any relevant planning authority when preparing a planning proposal in 'Priority Oyster Aquaculture Areas' and oyster aquaculture outside such an area as identified in the *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 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	N/A	This direction applies only to Priority Oyster Aquaculture Areas and oyster aquaculture outside such an area as identified in the NSW Oyster Industry Sustainable Aquaculture Strategy (2006).

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

APPENDIX 3

Minimum Lot Size and Land Capability Assessment for 101 Faviell Drive, Bonville

23 July 2021

For: Mr and Mrs Butler

Authored by: Strider Duerinckx

Ref	Ver	Date	Distribution
2021-194-01	A	23/7/21	Client, Planner

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Appendices

1 Introduction

Earth Water Consulting Pty Limited (EWC) were engaged by Mr and Mrs ButlerMr and Mrs Butler to undertake a Minimum Lot Size (MLS) and Land Capability Assessment (LCA) for the proposed subdivision of 101 Faviell Drive, Bonville, 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 Steve Russell Surveying, it is understood that it is proposed to subdivide the subject properties as follows in **Table 1** and shown in Figure 2.

Table 1: Property Details

Existing Property	Lot & DP	Existing Size (m^2)	Proposed Lot	Proposed Building Envelopes (m^2)	Proposed Lot Size (m^2)
No. 101	L4, DP1138855	10,000	41	1 @ 400	5,000
			42	Existing House	5,000

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 one borehole 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 property is situated in a semi rural location, is zoned R5 (Large Lot Residential) and is located on the eastern side of Faviell Drive. The site is on a mid-position in the landscape at approximately 24mAHD. The property drains gradually down to the west towards a tributary of Burgess Creek, about 130m away.

A single dwelling is located on Proposed Lot 42, with associated sheds and driveway.

Photograph 1 – Looking south across Proposed Lot 41

Photograph 2 – Looking west across Proposed Lot 41 from the western boundary of proposed Lot 42.

4.1 Existing OSMS

The existing dwelling on Proposed Lot 42 has a primary treatment OSMS. The septic tank is located downhill to the west of the dwelling, and a single absorption trench has been surveyed in downslope of the septic tank.

The absorption trench is located about 9m upslope of the proposed lot boundary. As such upgrade of the OSMS will be required as part of the subdivision.

4.2 Site Constraints

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 41, 42 – Linear planar to linear divergent.	Both lots		
Exposure: Lot 1, 2, 3 - Good exposure. Minimal trees near the proposed EMA.	Both lots		
Slope: Gentle slopes of 7-10% to the west.	Both lots		
Rocks and Rock Outcrops: No rock outcrops were observed on the Site.	Both lots		
Erosion Potential: No erosion was observed.	Both lots		
Climate: The Site experiences a sub-tropical-temperate climate, typical of north-eastern NSW.	Both lots		
Vegetation: Cleared grass yards.	Both lots		
Fill: No filling at the proposed EMAs	Both lots		

Constraint	Degree of Limitation		
	Minor	Moderate	Major
Surface Waters: Intermittent drainage line about 130m to the west.	Both lots		
Groundwater: (NSW Office of Water: Groundwater Bore Search) A number of licensed bores are located along Faviell Drive. The closest bore is located on the Site in the corner of No.91 Faviell Dr (GW051882) (Figure 3). The bore was drilled in 1978 and is licensed for domestic use. A fractured hardrock aquifer was encountered at 16.8m depth beneath a thick clay layer of 8.5m thickness. A second bore is licensed for No.91 Faviell Drive (GW301123) based on GIS mapped location and driller provided coordinates. But the drillers log lists an address of 75 Bonville Road, and the mapped bore location may be incorrect. A fractured hardrock aquifer was encountered at 24m and 33m depth beneath a thick clay layer of 7m thickness. 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 and divergent landform means that runon would be minimal.	Both lots		
Flood Potential: The property is not impacted by 1:100 year flood extents on the CHCC flood mapping.	Both lots		

4.3 Soils

Regional soil mapping indicates that the proposed lot is underlain by soils belonging to the Ulong Soil Landscape. The Ulong Soil Landscape is an erosional landscape located on undulating rolling low hills on late Carboniferous-aged metasediments in the Coffs Harbour region. Soils are moderately deep to deep (>1m) well drained structured red earths and brown earths, with variability depending on the topographical position.

Soils were assessed by drilling one (1) borehole (Figure 3) to 1.2m depth (Appendix A). The soils encountered comprised:

- Approximately 150mm of clay loam topsoil, dark brown, no mottling, with earthy structure; overlying
- Approximately 150mm of clay loam, reddish brown, strong structure; overlying
- At least 900mm of clay loam, brownish red.

Competent bedrock was not encountered in the borehole. The borehole log is provided in Appendix A.

Photograph 3 – BH1 soil profile.

4.4 Soil Chemistry

Table 3 summarises the key soil physical and chemical assessments. Reference is made to the rating scale described in Table 6 of DLG (1998). One sample was selected for laboratory analysis (BH1 0.6-0.8). The laboratory report is included in Appendix B.

Table 3: Soil Assessment

Parameter	Constraint		
	Minor	Moderate	Major
Depth to bedrock or hardpan (m): The borehole was terminated at 1.2m with no bedrock encountered.	Both lots		
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 groundwater aquifer is expected to be more than 15m depth based on local groundwater bores.	Both lots		
Coarse Fragments (%): <5% encountered	Both lots		
Hydraulic loading rate: Soil structure: Strong	Both lots		

Parameter	Constraint		
	Minor	Moderate	Major
Soil texture: Clay loam Permeability category: Category 4a Hydraulic loading recommended: 20mm/day for secondary treated effluent into an absorption bed field adopted. Max rate is 30mm/day. Reasons for the hydraulic loading recommendation: Conservative rate as proof of concept.			
pH: 4.44 pH Units from. Strongly acidic soils.			Both lots
Electrical Conductivity (dS/m): 0.209dS/m. Not saline.	Both lots		
Dispersiveness: Class 3/6 (Slake 3) for both samples. The instability of these aggregates is expected to increase slightly with the application of effluent.		Both lots	
Sodicity (ESP): ESP of 1.4%. The ESP infers a minimal potential for structural degradation.	Both lots		
Cation Exchange Capacity: CEC was measured at 6.5cmol/kg, which indicates that the soils have a moderate ability to accept and release excess nutrients from effluent.		Both lots	
Phosphorus Adsorption: Psorp of 21,832kg/ha were reported in the subsoils.	Both lots		

5 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 the Site are:

- Treatment to a secondary standard and subsurface application into an appropriately sized absorption bed 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 land application by subsurface irrigation, or wet or dry compost systems.

6 Effluent Management Areas

6.1 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 **Table 4**.

Table 4: Proposed Design Hydraulic Load

No. of Bedrooms	Design Wastewater Load (L/day)
4	900

6.2 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:

Precipitation + Effluent Applied = Evapotranspiration + Percolation + Storage

The input data and results for the primary treated trench/ bed water balance are presented in **Table 5**, 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 **Table 5**.

Table 5: Inputs and Results of Secondary 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 only 5% runoff.
Crop Factor	unitless	0.6-0.8	Expected annual range for vegetation based on monthly values.
Design Loading Rate (DLR) - Primary	mm/day	20	Conservative rate for design purposes, based on strongly structured clay loam 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	21,832	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 secondary treatment trench/ bed basal area for hydraulic load (m^2)			106m^2 absorption trench field footprint
Minimum area for total phosphorus load (m^2)			315m^2
Minimum area for total nitrogen load (m^2)			180m^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 on proposed Lot 41 are shown on Figure 3.

The existing OSMS on proposed Lot 42 is located within the 12m buffer to the proposed subdivision boundary, as such the OSMS will need to be relocated. A nominal replacement EMA field location is presented on Figure 3.

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.

7 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 **Table 6** below.

Table 6: 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 bore located 26m from EMA**
Property boundary	Secondary - 6m downslope of, and 3m sideslope or upslope of	**Yes**
Driveway and building	6m downslope of / 3m upslope of	**Yes**

Although the recommended EMA falls 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. A risk assessment has been undertaken and is presented in Appendix D.

The risk to domestic licensed bore users from the subsurface land application of secondary treated effluent at the proposed lot has been assessed as "low" with a calculated acceptable buffer of 15m.

8 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.

8.1 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.

8.2 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:

- 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 based on Appendix R of AS/NZS1547:2012.

Buffer distances to domestic groundwater bores of 250m required by DLG (1998) were not factored in the MLS assessment. This is because the DLG (1998) buffer does not consider the level of treatment, the type of land application, or the nature of the groundwater aquifer. Appendix R of AS/NZS1547:2012 provides a more nuanced risk assessable buffer to domestic bores of 15m for secondary treated wastewater and deep hardrock aquifers. 15m is a buffer easily achievable.

Secondary treatment was selected for modelling purposes. Primary treatment may be possible on a case by case basis, but given the smaller lot sizes around 5,000m^2 the land application of primary treated wastewater is more problematic due to the larger buffer distances required from property boundaries of 6m and 12m.

8.3 MLS Comparative Lots Assessed

Three nearby lots were selected that have already been subdivided (**Table 7**) (Figure 4). The lots ranged in size from 3,828-4,366m^2 area. As such the smaller lot sizes assessed provide a worst case scenario of OSMS restrictions.

Table 7: Comparative Lots Assessed

Address	Lot Area (m^2)
85 Faviell Drive	4,366
87 Faviell Drive	4,196
91 Faviell Drive	3,828

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.

8.4 MLS Assessed Available EMA

Table 8 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)	Total Restricted Area (m^2) [1]	Available Eff. Application Area (m^2)	Percent of Lot Available for Eff. Disp. (%)	>630m^2 Area Available for Secondary Treatment? [2]
85	4,366	2,366	2,000	46	Yes
87	4,196	2,488	1,708	41	Yes
91	3,828	2,817	1,011	26	Yes

1. Includes developed area of house, driveway, sheds, water tanks, protected vegetation and buffers to waterways and boundaries
2. Includes main and reserve EMA

8.5 Discussion

A MLS comparison of nearby properties suggests that:

- From the sample selection of lots investigated, the properties of are all smaller than the proposed 5,000m2 subject lots, with areas ~3,800-4,300m^2;
- The smaller lot of 3,828m^2 has 1,011m^2 of available area for effluent land application, representing 26% of the total lot area. The remaining two lots greater than 4,000m2 in area have around 2,000m2 of available area and between 41-46% of the total lot area available for effluent application;
- The 630m^2 footprint modelled required for a sustainable land application of effluent of secondary treated effluent are able to be met in all three lots still be able to be met, but the area footprint in the smallest lot is more fragmented and would pose increased complexity and cost for installation. As such the smaller lot size sub-4,000m^2 appears to be heavily constrained; and
- Given the site and soil features at 101 Faviell Drive, the proposed 5,000m^2 lot sizing would be considered acceptable.

9 Conclusions & Recommendations

Having undertaken a minimum lot size and land capability assessment for the proposed subdivision of 101 Faviell Drive, EWC consider that there is the opportunity for the sustainable application of wastewater following subdivision of the property into two smaller lots of 5,000m2 each.

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

0 80 120 160

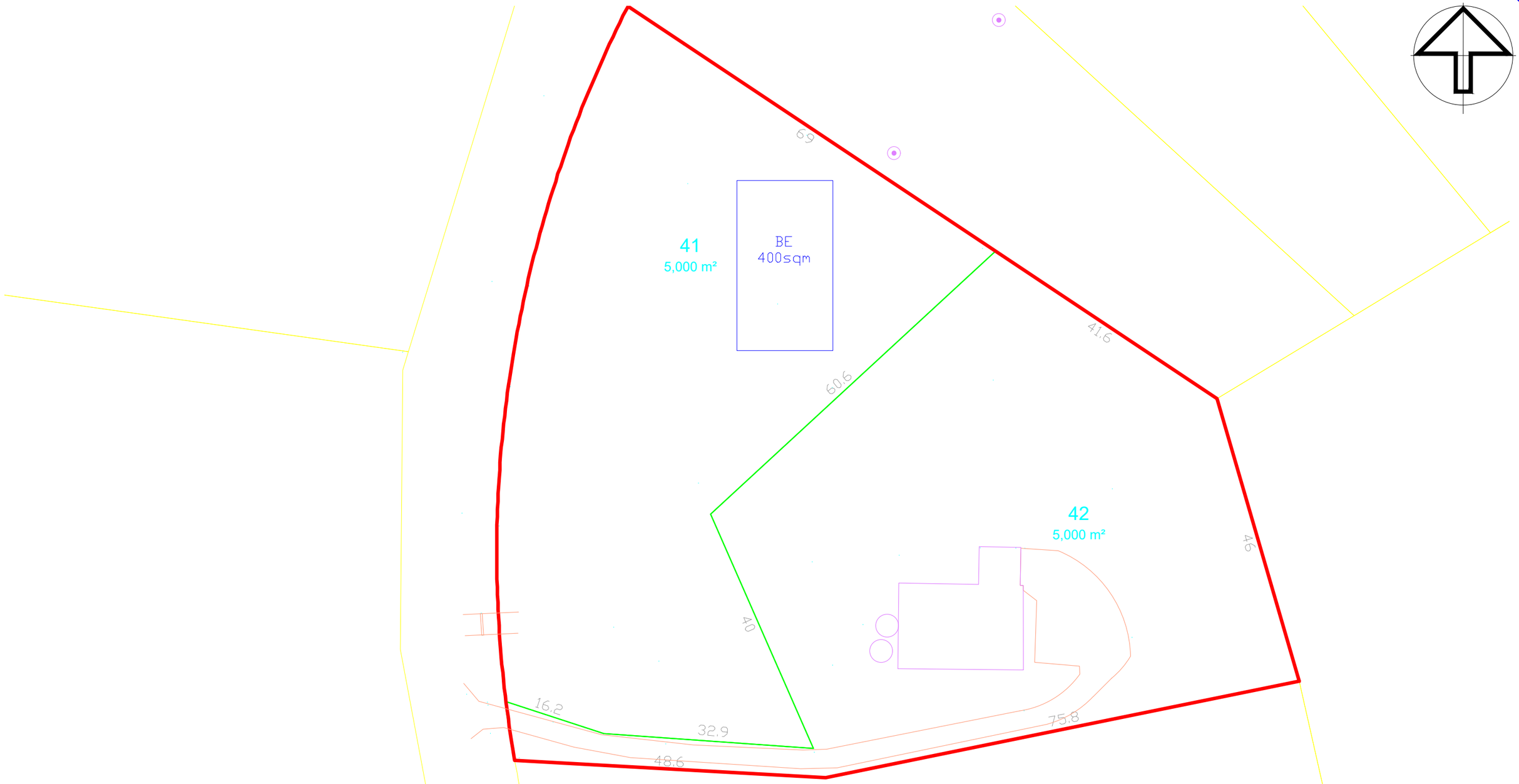
Horizontal Scale (metres) 1:4000

EARTH WATER CONSULTING

LEGEND

- Property Boundary
- Contour (10m)
- Drainage Alignment

TITLE: Site Location			PROJECT: LCA for 101 Faviell Drive, Bonville		CLIENT: Drew Butler
FIGURE: Figure 1					
SHEET: 1 OF 1	ISSUE: A	AUTHOR: SD	DATE: 22/7/21	SCALE: 1:4000	PROJECT: 2021-194



0 10 20 30

Horizontal Scale (metres) 1:600

LEGEND

- Property Boundary
- Proposed Building Envelope
- Existing Building
- Driveway

TITLE: Site Layout			FIGURE: Figure 2
			SHEET: 1 OF 1 / ISSUE: A
PROJECT: LCA for 101 Faviell Drive, Bonville			CLIENT: Drew Butler
AUTHOR: SD	DATE: 22/7/21	SCALE: 1:600	PROJECT: 2021-194

0 10 20 30

Horizontal Scale (metres) 1:600

EARTH WATER CONSULTING

LEGEND

- Property Boundary
- Drainage Alignment
- Fenceline
- Proposed Building Envelope
- Existing Building
- Contour Line (0.5m)
- Driveway
- Existing OSMS
- Slope % — Slope Direction and Extent
- Approximate Borehole Location
- Recommended EMA

TITLE: Site Layout and Recommended EMA			FIGURE: Figure 3
			SHEET: 1 OF 1 ISSUE: A
PROJECT: LCA for 101 Faviell Drive, Bonville			CLIENT: Drew Butler
AUTHOR: SD	DATE: 22/7/21	SCALE: 1:600	PROJECT: 2021-194

0 15 30 45

Horizontal Scale (metres) 1:700

LEGEND

- Property Boundary
- Drainage Alignment
- MLS Restricted Area
- MLS Available Area

TITLE: MLS Lot Assessment			FIGURE: Figure 4
			SHEET: 1 OF1 ISSUE: A
PROJECT: LCA for 101 Faviell Drive, Bonville			CLIENT: Drew Butler
AUTHOR: SD	DATE: 22/7/21	SCALE: 1:700	PROJECT: 2021-194

APPENDIX A

Soil Borelog

Borehole No:	**BH1**
Logged by:	NS
Drilling date:	17/06/2021
Drilling method:	Powered Auger
Borehole location:	Figure 2
Borehole coords:	0501794, 6640103

Project ref:	2021-194
Client:	Mr and Mrs Butler
Address:	101 Faviell Road, Bonville

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	Brownish Black	Nil	<5%	SM	Topsoil
0.2			B1	Clay Loam	Strong	Reddish Brown	Nil	Nil	SM	Residual
0.3										
0.4			B2	Clay Loam	Strong	Brownish Red	Nil	<5%	SM	Residual
0.5										
0.6										
0.7	**BH1_ 0.6-0.8**									Trace Charcoal Fragments
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 B

WASTEWATER DISPOSAL SOIL ASSESSMENT

1 sample supplied by Earth Water Consulting Pty Limited on 7/6/2021 - Lab Job No. K7802
Analysis requested by Strider Duerinckx. - **Your Project: BH1-0.6-0.8**
PO Box 50 BELLINGEN NSW 2454

	SAMPLE 1 BH1-0.6-0.8
Job No.	*K7802/1*
Description	Clay loam
Moisture Content (% moisture)	19
Emerson Aggregate Stability Test (SAR 5 Solution) note 12	EAST Class 3/6, slake 3[see note 12]
Soil pH (1:5 $CaCl_2$)	4.44
Soil Conductivity (1:5 water dS/m)	0.024
Soil Conductivity (as EC_e dS/m)[note 10]	0.209
Native NaOH Phosphorus (mg/kg P)	21.80
Residual phosphorus remaining in solution from the initial phosphate phosphorus	
Initial Phosphorus concentration (ppm P)	**32.44**
72 hour - 3 Day (ppm P)	9.80
120 hour - 5 Day (ppm P)	7.05
168 hour - 7 Day (ppm P)	5.87
Equilibrium Phosphorus (ppm P)	2.92
EXCHANGEABLE CATIONS	
Calcium (cmol+/kg)	2.40
Magnesium (cmol+/kg)	0.75
Potassium (cmol+/kg)	0.17
Sodium (cmol+/kg)	0.09
Aluminium (cmol+/kg)	1.27
Hydrogen (cmol+/kg)	1.85
ECEC (effective cation exchange capacity)(cmol+/kg)	6.5
Exchangeable Calcium %	36.7
Exchangeable Magnesium %	11.5
Exchangeable Potassium %	2.5
Exchangeable Sodium % (ESP)	1.4
Exchangeable Aluminium %	19.5
Exchangeable Hydrogen %	28.4
Calcium/ Magnesium Ratio	3.19

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 60C 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).

NATA
WORLD RECOGNISED ACCREDITATION
Accreditation No. 14960
Accredited for compliance with ISO/IEC 17025 - Testing

Checked:.....

PHOSPHORUS SORPTION TRIAL

1 sample supplied by Earth Water Consulting Pty Limited on 7/6/2021 - Lab Job No. K7802
Analysis requested by Strider Duerinckx. - Your Project: BH1-0.6-0.8

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	**K7802/1**	2.9	32.43825	1181	22	1202	0.59	**2,025**

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	*K7802/1*	2025	(=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	*K7802/1*	2025	1701	1679	**3,275**	**21,832**

Environmental Analysis Laboratory, Southern Cross University,
Tel. 02 6620 3678, website: scu.edu.au/eal

Checked:.....

APPENDIX C

Nutrient Balance

Proj Ref: 2021-194

Site Address: 101 Faviell Drive, Bonville

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		21832	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	1.0916	kg/m^2
P uptake	0.125	kg/m^2
P generated	219	kg
Area required for Phosphorus	**180**	m^2

Nutrient Balance

Proj Ref: 2021-194

Site Address: 101 Faviell Drive, Bonville

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		15640	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	0.782	kg/m^2
P uptake	0.125	kg/m^2
P generated	219	kg
Area required for Phosphorus	**241**	m^2

APPENDIX D

AS1547:2012 Table R1 and R2 Buffer Risk Assessment

Client Butler
Property 101 Faviell Dr
Job Number 2021-194

Feature	Setback Distance Range (m)	Constraint	Constraint Scale			Risk Assessment				Adopted Buffer Distance	
			Low Constraint	High Constraint	Applicable Constraint	Low = 1 Point	Mod = 2 Points	High = 3 Points	Overall Risk Rating	Accept Buffer (m)	Minimum Available Buffer (m)
Groundwater Bores	15-50	Microbial Quality of Effluent	Secondary treated effluent with disinfection	Primary treated effluent	Secondary	X			Low	15	26
		Groundwater	Category 5 and 6 soils, low resource/environmental value	Category 1 and 2 soils, gravel aquifers, high resource/ environmental value	Cat4/5 soil, domestic bores	X					
		Geology and Soils	Cateogry 3 and 4 soils, low porous regolith, deep, uniform soils	Category 1 and 6 soils, fractured rock, gravel aquifers, highly porous regolith	Cat4/5 soil, low porous regolith	X					
		Application Method	Drip irrigation or subsurface application of effluent	Surface/above ground application of effluent	Subsurface	X					

APPENDIX 4

Bushfire Risk Management Plan

for Residential Subdivision

Lot 4, DP1138855

101 Faviell Drive

Bonville

prepared by

BushfireSafe

(aust) pty ltd

June 2021

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Bushfiresafe (Aust) P/L has been engaged by Mr Drew Butler to undertake a complete Bushfire Risk Assessment for a 2-lot residential subdivision of Lot 4 DP1138855, 125 James Small Drive, Korora. The assessment was conducted in accordance with section 4.46 of the Environmental Planning & Assessment Act (1979) and section 100B of the Rural Fires Act (1997), and followed the guidelines recommended in the Planning for Bushfire Protection guidelines (RFS, 2019).

Description of property

The area subject to the proposed development is located on the eastern side of Faviell Drive within the settlement of Bonville. The property currently supports an existing dwelling is located within the south/east portion of the property and shall be retained within proposed Lot 42, the remainder of the property consists of managed grassland with several retained trees. The subject land has an approximate area of 1ha and is currently zoned R5 Large Lot Residential in the Coffs Harbour Local Environment Plan (LEP) (Coffs Harbour Council, 2013). The subject property is adjoined by Faviell Drive to the west followed by developed residential properties.
Developed residential properties adjoin the northern, eastern and southern boundaries.

This development proposal seeks approval for a 2-lot large lot residential subdivision of Lot 4 DP1138855, 101 Faviell Drive, Bonvile. The proposed residential subdivision will consist of both lots having an area of 5000m². Both lots shall have access directly from Faviell Drive.

The vegetation of the subject property and adjacent properties up to 140m (where practicable) from the subject property were assessed during a site visit on 31st of May 2021. The property inspection identified the majority of the property as maintained lawns and gardens with an area of forest vegetation occurring 120 metres to the south of the property and 140 metres to the north/west adjacent to Faviell Drive.

Asset Protection Zones (APZ)
Based on the assessment of the vegetation communities and slopes present on and adjacent to the subject property and in accordance with Planning for Bushfire Protection (RFS 2019), this bushfire risk assessment identified the proposed subdivision has a current lateral separation is greater than the maximum APZ required in accordance with PBP 2019.

Bush Fire Attack Categories
An assessment of the bushfire attack level applicable to the proposed development was carried out using the methodology detailed in Planning for Bushfire Protection (RFS, 2019). This bushfire risk management assessment concluded the two lot subdivision is within a BAL-LOW bushfire attack classification.

Access
Access to the existing buildings are via a hard-surfaced driveway off Faviell Drive and are less than 30m in length.

Services
Reticulated water supply is currently not available to the property. A 10,000L fire fighting water supply must be available to existing dwelling.

Electrical transmission is currently connected to the existing building from an existing overhead easement along Faviell Drive.

Construction Standards
The existing dwelling and proposed Lot 41 are outside the identified bushfire buffer zones and therefore will not require further upgrading or bushfire construction requirements as part of the development application.

BUSH FIRE RISK MANAGEMENT PLAN

1.0 SCOPE OF THE PLAN

The Bushfire Risk Management Plan (BFRMP) is a strategic document which identifies: the level of bush fire risk for human habitation; strategies which will be implemented to manage the bush fire risk identified; and those persons responsible for implementing and maintaining this Bushfire Risk Management Plan.

1.1 Area

This Plan covers the 2-lot residential subdivision of Lot 4, DP1138855, 101 Faviell Drive, Bonville within Coffs Harbour City Council Local Government Area.

1.2 Period of Operation

Once approved by the Local Authority and the NSW Rural Fire Service, this Plan will have a period of operation of the life of the development.

1.3 Aim and objectives of the Plan

The aim of this Plan is to provide for the mitigation of bush fires for the protection of life and property for the habitants, visitors and emergency personnel in bush fire situations Secondly, the Plan aims to reduce the treat to ecological and environmental assets. To achieve this aim, the Bushfire Risk Management Plan must address a number of specific objectives.

i. Identify the area most at risk from bush fire attack.
ii. Reduce the risk of bush fire damage to life and property.
iii. Ensure that the developer/owner/occupier understands their bush fire management responsibilities.
iv. Reduce the impact of bush fire on the development.
v. Develop sustainable Asset Protection Zones (APZ) surrounding the proposed building

1.4 Bushfire Risk Management Strategies

This Plan contains a number of strategies, which are directed at addressing the risk to the residential development from bushfire emergencies. This is achieved through addressing and managing fuel loads, separation distances from the assessed dominant bushfire vegetation, and recommending appropriate bushfire building standards.

1.5 Implementation

Implementation of the strategies in this Plan is the responsibility of the developer and shall be undertaken as part of the development infrastructure. The ongoing maintenance of the

strategies in this Plan shall be the responsibility of the owner/occupiers of each proposed residential allotment to the limit of their property boundaries. Finally, the local authority or their delegated authority, for the life of the development shall monitor this Plan.

2.0 LEGISLATIVE BUSHFIRE HAZARD MANAGEMENT RESPONSIBILITIES

2.1 Coffs Harbour City Council

The Coffs Harbour City Council has responsibility, under Section 66 of the Rural Fires Act, to issue a notice in writing requiring an owner / occupier of any land within the LGA to carry out bushfire hazard reduction works on that land. Section 100E of the Rural Fires Act requires the council to issue bushfire hazard reduction certificates for hazard reduction to be undertaken on private lands.

2.2 New South Wales Rural Fire Service

The NSW Rural Fire Service (RFS) has the responsibility for undertaking fire suppression activities, hazard management activities and other functions relative to emergency management, within its areas of operation. Section 73 of the Rural Fires Act (1997) enables the Commissioner to carry out bush fire hazard reduction works on any land as required by a bush fire risk management plan if the work has not been carried out satisfactorily. Incurred costs can be recovered as a debt owed to the Crown.

2.3 NSW Fire Brigade

The NSW Fire Brigade has the responsibility for undertaking fire suppression activities, and other functions relative to emergency management, within its area of operation. Through mutual aid agreements, the NSW Fire Brigade can provide assistance to the NSW Rural Fire Service, particularly for structural fire operations within the NSW Rural Fire Brigade Districts. Furthermore, Hazmat operations within New South Wales are the responsibility of the NSW Fire Brigade.

2.4 Coffs Harbour City Council Bush Fire Management Committee

The Coffs Harbour City Council Bushfire Management Committee has the responsibility for planning for co-ordinated fire fighting activities / hazard management activities on a local government level. It is not an operational organisation, a fire fighting organisation or a funding source for fire management activities. The Bush Fire Management Committee is supported by the following provisions of the Rural Fires Act (1997).

> **Section 50** of the Act requires the Bush Fire Co-ordinating Committee to constitute a Bush Fire Management Committee for the whole of the area of any local Council area for which a rural fire district is constituted.

Section 51(1A) requires a Bush Fire Management Committee to report to the Bush Fire Coordinating Committee on the implementation of the requirements of the Bushfire Risk Management Plan.

Section 52 requires each Bush Fire Management Committee to prepare a draft bush fire management plan for their local areas which includes a plan of operations and a bush fire risk management plan.

Section 54 of the Act specifies that a draft bush fire risk management plan is to 'set out schemes for the reduction of bush fire hazards in the rural fire district or other part of the State'. A draft bush fire risk management plan may also restrict or prohibit the use of fire or other fire hazard reduction activities in all or specified circumstances or places to which the plan applies.

2.5 Private Land Owners / Occupiers

The Rural Fires Act, 1997 provides several legislative opportunities to require land owners and occupiers to manage hazardous fuels. These are listed below:

Section 63(2) states that 'it is the duty of the owner or occupier of land to take the notified steps (if any) and any other practicable steps to prevent the occurrence of fires on, and to minimise the danger of the spread of fires on or from that land'. In this section; 'notified steps' means any steps that:
(a) a bushfire risk management plan (or the Co-ordinating Committee) advises a person to take;
(b) are included in a bush fire risk management plan that applies to that land.

Section 87 allows the removal of hazards in the bush fire danger period by the provision of a permit system. The permits are valid for 21 days, excluding total fire ban (TOBAN) days. Section 10 permits are not required to adhere to Part V provisions of the Environmental Planning & Assessment Act (1979) (EP&A Act) in any assessment of impact, except for public authorities. An owner/occupier of private land must obtain from the NSW Rural Fire Service, a bushfire hazard reduction certificate before undertaking hazard reduction works on that land (see Section 100E of the Rural Fires Act (1997)).

3.0 INTRODUCTION

Development applications on bush fire prone land must be accompanied by a bush fire assessment report that demonstrates compliance with the aim and objectives of the Planning for Bushfire Protection (PBP) guidelines. In particular, the following matters must be addressed:

a) A statement that the site is bush fire prone land, where applicable.
b) The location, extent and vegetation formation of any bushland on or within 100m of the site.
c) The slope and aspect of the site and of any bush fire prone land within 100m of the site, which may determine the likely path of any bush fire.
d) Any features on or adjoining the site that may mitigate the impact of a high intensity bush fire on the proposed development.

e) A statement of the likely environmental impact of any proposed bush fire protection measures; and
f) Whether any building complies with AS 3959/2009 in relation to the construction level for bush fire protection.

3.1 Background

Bushfiresafe (Aust) P/L has been engaged by Mr Drew Butler to undertake a complete Bushfire Risk Assessment for a 2-lot residential subdivision of Lot 4 DP1138855, 125 James Small Drive, Korora. The assessment was conducted in accordance with section 4.46 of the Environmental Planning & Assessment Act (1979) and section 100B of the Rural Fires Act (1997), and followed the guidelines recommended in the Planning for Bushfire Protection guidelines (RFS, 2019).

The assessment has involved the following activities:

i. Verifying of terrain attributes in relation to the assessed bushfire vegetation.
ii. Identification of the appropriate bushfire protection for any identified environmental assets.
iii. Determination of the location of adequate water supplies for fire fighting purposes.
iv. Identifying the capacity of public roads to handle increased volumes of traffic in a bushfire situation.
v. Identification of adequacies for implementation of fire trails which link to Public roads in the vicinity.
vi. Identification of adequacy of arrangements for access and egress from the development for the purposes of an emergency response.
vii. Identification of construction standards to be used for building elements in the development.
viii. Identification of adequacy of bushfire maintenance plans and fire emergency procedures for the development.
ix. Identification of additional bushfire protection measures.

3.2 Description of property

The area subject to the proposed development is located on the eastern side of Faviell Drive within the settlement of Bonville. The property currently supports an existing dwelling is located within the south/east portion of the property and shall be retained within proposed Lot 42, the remainder of the property consists of managed grassland with several retained trees. The subject land has an approximate area of 1ha and is currently zoned R5 Large Lot Residential in the Coffs Harbour Local Environment Plan (LEP) (Coffs Harbour Council,

2013). The subject property is adjoined by Faviell Drive to the west followed by developed residential properties.

Developed residential properties adjoin the northern, eastern and southern boundaries.

Figure 1: Aerial photo showing the subject property in relation to the identified bushfire prone vegetation.

3.3 Proposal

This development proposal seeks approval for a 2-lot large lot residential subdivision of Lot 4 DP1138855, 101 Faviell Drive, Bonvile. The proposed residential subdivision will consist of both lots having an area of 5000m². Both lots shall have access directly from Faviell Drive.

3.4 NSW Rural Fire District BFRMP

The Coffs Harbour City Council Bushfire Management Options are to:

(a) **Reduce the hazard -** encourages the development of asset protection zones along the settlement area - bushland interface.

(b) **Reduce vulnerability -** maintain development and building controls and standards appropriate to the level of hazard.

4.0 VEGETATION CLASSIFICATION

The vegetation of the subject property and adjacent properties up to 140m (where practicable) from the subject property were assessed during a site visit on 31st of May 2021. The vegetation communities present were identified and classified into formations as described in Keith (2004). Appendix A2.3 of Planning for Bushfire Protection (PBP) manual (RFS, 2019) outlines the methodology for determining the predominant bushfire prone

vegetation to the distance of at least 140 metres in all directions from the future development on the site. Vegetation is classified using Table A2.1 of Planning for Bushfire Protection 2019, which classifies vegetation types into the following groups:

(a) Forests [wet & dry sclerophyll forests];
(b) Woodlands;
(c) Plantations – being pine plantations not native plantations;
(d) Forested Wetlands;
(e) Tall Heath lands;
(f) Short Heath lands;
(g) Freshwater Wetlands;
(h) Saline Wetlands
(i) Alpine Complex;
(j) Semi – arid Woodlands;
(k) Arid Woodlands; and
(l) Rainforests

4.0 Vegetation communities within 140m from the Designated Building Site & Existing Dwellings;

The property is surrounded by developed rural lifestyle properties which consists of maintained lawns and landscaped areas, an area of forest vegetation occurs to the north/west greater than 140 metres from the development property, an area of forest vegetation occurs to the south greater than 120 metres from the development property (Figure 2).

Figure 2: view to the north of the existing dwelling showing maintained lawns followed by developed residential properties (Photograph W. Hadaway)

Figure 3: view to the west of the development property showing grassland vegetation with forest veget5ation in the background greater than 140m from the development property (Photograph W. Hadaway)

Figure 4: View to the south showing developed residential properties beyond the adjoining grassland vegetation, forest vegetation in the background is greater than 120m from the development property (Photograph W. Hadaway)

Figure 5: View to the east of the existing dwelling showing maintained lawns (Photograph W. Hadaway)

Figure 6: View of the existing dwelling which shall retained within proposed Lot 42 (Photograph W. Hadaway)

4.2 Assessed Dominant Bushfire Vegetation in Relation to the Proposed Subdivision

The Coffs Harbour City Council Bushfire Prone Lands (CHBPL) map (Coffs Harbour City Council, 2020) identifies the subject property is impacted by Category 3 vegetation (grassland) an area of forest vegetation located to the north/west and south was identified as being greater than 140 metres and 120 metres respectively from the subject property.

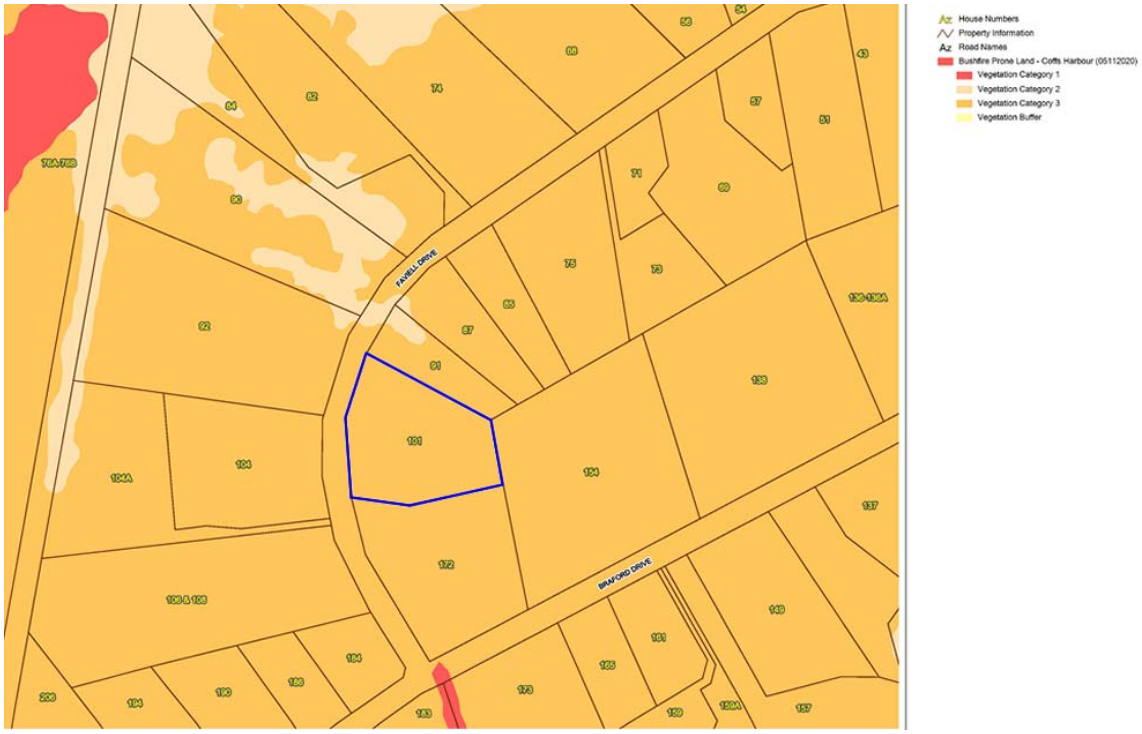


Figure 9: Coffs Harbour City Council bushfire prone land map showing the subject property.

5.0 LANDFORM ASSESSMENT

Inspection of published topographic maps and an on-site assessment using a clinometer verified the following land forms were present over the survey area.

5.1 Assessed Dominant Slope in relation to identified bushfire prone vegetation

Appendix 2 of Planning for Bushfire Protection (RFS, 2019) recommends that slopes should be assessed, over a distance of at least 100m from a development site and that the dominant gradient of the land should be determined on the basis of which will most significantly influence the fire behaviour at the site.

The onsite bushfire hazard assessment identified the terrain for a distance greater than 100 metres in all directions from the development property as being generally flat.

6.0 BUSHFIRE ASSESSMENT FOR PROPOSED DEVELOPMENT

6.1 Asset Protection Zones

Based on the assessment of the vegetation communities, slopes present on and adjacent to the subject property, and using the methodology detailed in Appendix 3 of Planning for Bushfire Protection (RFS 2019), this bushfire risk assessment recommends the following Asset Protection Zones (APZ), Inner Protection Area (IPA) should be established from the existing building envelopes.

The subject property has a current lateral separation greater than 140 metres from the identified forest vegetation to the north/west and greater than 120 metres from the identified forest vegetation to the south. The current lateral separation from the identified forest vegetation is achieved through utilising the surrounding developed large lot residential properties and council maintained roads. The current lateral separation from the development property exceeds the maximum asset protection zone requirements under Planning for Bushfire Protection 2019.

6.2 Assessed Bushfire Attack Level

Determination of Bushfire Attack Level (BAL) – FDI 80 (1090K)

An assessment of the bushfire attack level applicable to the proposed subdivision was carried out using the methodology detailed in Planning for Bushfire Protection (RFS, 2019) and Appendix B of AS 3959-2018. This bushfire risk management assessment concluded the following bushfire attack levels for the proposed development.

The proposed subdivision

The proposed subdivision was identified as being within a **BAL-LOW** Bushfire Attack Level using the following parameters;

- Forest vegetation as the bushfire prone vegetation to the north/west and south;
- Developed residential areas to the north and east;
- A current lateral separation (APZ) of greater than 140m from the vegetation to the north/west;
- A current lateral separation (APZ) of greater than 120m from the vegetation to the south;
- The subject property is in an FDI 80 area

6.3 Electricity Supply

Electrical transmission is currently connected to the existing buildings within subject property and available along Faviell Drive through existing overhead power easement.

6.4 Adequacy of Water Supply

Reticulated water supply is currently not available to the property. A 10,000L fire fighting water supply must be available to existing dwelling. The fire fighting water supply shall meet the following requirements.

a) A hardened ground surface for fire fighting truck access is to be constructed up to and within 4 metres of the fire fighting water supply.
b) A 65mm metal Storz outlet with a gate or ball valve, shall be fitted to any fire fighting water supply tank(s) and be accessible for a fire fighting truck. The Storz outlet fitting shall not be located facing the hazard or the approved structure.
c) The gate or ball valve, pipes and tank penetration are adequate for full 50mm inner diameter water flow through the Storz fitting and are constructed of a metal material.
d) All associated fittings to the fire fighting water supply tank(s) shall be non-combustible.
e) All water supplies for fire fighting purposes shall be clearly signposted as a fire fighting water supply.
f) Fire fighting water supply tank(s) and associated fittings, located within 60 metres of a bushfire hazard and on the hazard side of an approved building, shall be provided with radiant heat shielding to protect the tank from bush fire impacts and maintain safe access to the water supply for fire fighters. Should new tank(s) be installed to provide an adequate fire fighting water supply, they shall meet the following additional requirements:

All delivery water lines shall be installed underground to a minimum depth of three hundred millimetres (300mm), with all points above ground using metal pipes or raisers with a minimum internal diameter of nineteen millimetres (19mm).

6.5 Adequacy of Access and Egress in Bushfire Situations

Access to the proposed allotments shall be via a hard-surfaced driveway from Faviell Drive. The access driveways for proposed lot 42 is existing and less than 30m in length. The access driveways shall have a minimum trafficable width of 4 metres with a metre on each side, maintained as a bushfire fuel free area: complying with access requirements in PBP, 2019. The access provided for this proposed development shall meet the Intent of Measures and Performance Criteria as outlined in the NSW Rural Fire Service document "*Planning for Bushfire Protection*".

7.0 BUSHFIRE CONSTRUCTION STANDARDS

The existing dwelling is outside the identified bushfire buffer zones and therefore will not require further upgrading as part of the development application.

8.0 LANDSCAPING AND PROPERTY MAINTENANCE – BUSHFIRE PROVISIONS

According to the PBP manual, the principles of landscaping for bush fire protection are to: prevent flame impingement on the dwelling; provide a defendable space for property protection; reduce fire spread; deflect and filter embers; provide shelter from radiant heat; and reduce wind speed. Careful consideration of the species selection, their location relative to their flammability, and on-going maintenance to readily remove flammable fuels (leaf litter, twigs and debris) is critical to providing for bushfire protection (RFS, 2019).

9.0 EXTENT OF COMPLIANCE AND/OR DEVIATION FROM SPECIFICATIONS

The proposed development will comply with the minimum requirements for:

1. Asset Protection Zones detailed in Table A1.12.3 (Minimum Specifications for Asset Protection Zones (APZ) for Residential and Rural Residential Subdivision Purposes for Class 1 and 2 buildings in FDI 80 areas (≤29kW/m^2).
2. Access in accordance with section 5.3.2 in *Planning for Bushfire Protection* (RFS, 2019).
3. Water and Electricity supply in accordance with section 5.3.3 *Services* in *Planning for Bushfire Protection* (RFS, 2019).

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Coffs Harbour, 2020. Coffs Harbour City Council Bushfire Prone Lands (CHBPL) map. webpage:

Keith, D., 2004. *Ocean shores to Desert Dunes*. Department of Environment and Conservation, Sydney.

Coffs Harbour City Council, 2013. Coffs Harbour Local Environment Plan

RFS, 2019. *Planning for Bushfire Protection, New South Wales Rural Fire Service*. NSW, Sydney.

Standards Australia, 2018. *Australian Standard Construction of Buildings in Bushfire-prone Areas*. Standards Australia, Sydney.

GLOSSARY

APZ	Asset Protection Zone
BFRMP	Bushfire Risk Management Plan
CHBPL	Coffs Harbour Bushfire Prone Lands map
EP&A	Environmental Planning and Assessment Act
IPA	Inner Protection Area
LGA	Local Government Area
OPA	Outer Protection Area
PBP	Planning for Bushfire Protection manual
RFS	Rural Fire Service of New South Wales
TOBAN	Total Fire Ban

COMMERCIAL IN CONFIDENCE

GUIDELINES

for

Asset Protection Zones

- WHAT IS AN ASSET PROTECTION ZONE?
- WHERE CAN I PUT AN APZ?
- WHAT WILL THE APZ DO?
- COMPONENTS OF AN APZ
- RECOGNISING A BUSH FIRE HAZARD
- WHAT APPROVALS ARE REQUIRED FOR CONSTRUCTING AN APZ?
- ASSET PROTECTION ZONE WIDTHS
- MANAGING BUSH FIRE FUEL TO REDUCE BUSH FIRE HAZARDS
- LANDSCAPING AND BUSH FIRE HAZARD REDUCTION
- HOW CAN I FIND OUT MORE?

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GUIDELINES FOR ASSET PROTECTION ZONES

INTRODUCTION

Bush fires are a natural and periodic event in the Australian bush. Many Australian plants and animals have adapted to fire over thousands of years and require fire as part of their life cycle. However, development adjacent to bushland areas has increased the risk of fire impacting on people and their assets. Fire management needs to strike a balance between the protection of life and property and the maintenance of ecological processes and systems.

In Australia, bush fires are inevitable and an essential aspect of the Australian landscape. However, the impact on property and life can be mitigated with responsible preparation and management of bush fire hazards. This is the responsibility of all land managers, as well as communities and individuals taking responsibility for their own fire safety.

The level of protection for life or whether or not a house or other assets survive a bush fire ultimately depends on the landowner and their level of preparedness against bush fire attack.

This guideline provides advice to private landowners to assist them in creating and maintaining an Asset Protection Zone (APZ) for residential buildings and other personal assets.

WHAT IS AN ASSET PROTECTION ZONE?

An Asset Protection Zone (APZ) is an area surrounding an asset, managed to reduce bush fire fuels to a level that will minimise the impact of fire on that asset. The APZ serves as a buffer zone between an asset and the bush fire hazard. The primary purpose of the APZ is to ensure that a progressive reduction of bush fire fuels occurs between the bush fire hazard and any habitable structures within the development.

WHERE CAN I PUT AN APZ?

An APZ is located between your house and the bush fire hazard. An APZ may only be implemented on land with the land owners written consent. You cannot undertake any clearing of vegetation on a neighbours property, including National Park estate, Crown land or land under the management of your local council. The APZ should be located wholly within your land. If you believe that the land adjacent to your property is a bush fire hazard and may require clearing to create an APZ, you can lodge a complaint with the RFS your complaint be investigated and appropriate action will be taken if required.

WHAT WILL THE APZ DO?

An APZ, if designed correctly and maintained regularly, will reduce the likelihood of:

- Ember attack on the asset;
- Damage to the built asset (eg. a house) from intense radiant heat;
- A ground fire burning up to the walls of the house and setting fire to the house

The APZ should provide a safe point for firefighters and home owners to defend their property.

Within this area, bush fire fuels that could become a part of the fire should be minimised. When considering the level of clearing required, you need to keep in mind that the aim of the APZ is to ensure that fuels are discontinuous, that is, the vegetation does not provide a path for the transfer of fire to the asset from the surface to the tree canopy or through the canopy.

RECOGNISING A BUSH FIRE HAZARD

Recognising that a bush fire hazard exists is the first step in developing an APZ for a property.

Generally, the more flammable and dense the vegetation, the greater the hazard will be. A large area of continuous vegetation on sloping land may also increase the potential bush fire hazard.

The amount and structure of vegetation around a house will influence the severity of damage from a bush fire. Basically, the higher the available fuel loading the more intense a fire will be.

Isolated areas of vegetation

isolated areas of vegetation generally may not be considered an insignificant bush fire hazard, as they are not large enough to produce fire of an intensity that will threaten dwellings.

This includes the following vegetation:

- Bushland areas of less than 1 hectare (100 metres x 100 metres) that are more than 100 metres from a high hazard area;
- Strips of vegetation less than 20 metres wide e.g. road and river corridors;
- Vegetation not mapped on your local council's Bush Fire Prone Land Map.

If you are not sure whether or not there is a bush fire hazard in or around your property, contact your local NSW Rural Fire Service District Office for further details.

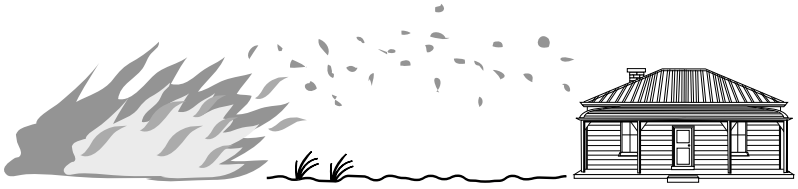
Isolated areas of vegetation may not be considered a significant bush fire hazard

CAUSE OF DAMAGE FROM BUSH FIRE

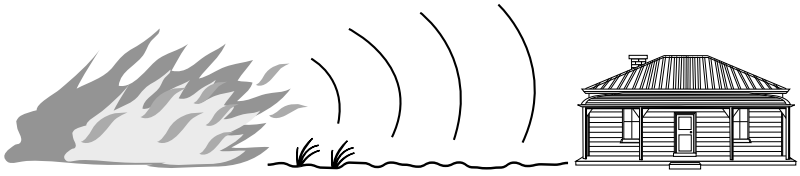
Houses can be ignited during bush fires by any of the following ways:

a) Wind
The wind during a bush fire can be extremely strong. This may throw debris and branches of the trees that are too close causing damage to buildings (especially windows & roofs). This will create openings and make the structure more prone to ember attack.

b) Embers
Embers (sparks) are the main cause of houses catching alight during bush fires. Extreme fire weather days are accompanied by strong to gale force winds, which carry burning debris. Embers gain entry to houses through broken windows or gaps in and around walls or roof cladding and ignite the contents. Embers can also lodge between and ignite horizontal timber decking, guttering, steps and windowsills. They can be blown up against and ignite timber used for supports, floor joists, posts and steps.



c) Radiation
Radiant heat can crack windows, allowing embers to enter. Radiant heat also preheats the buildings and contents, increasing the risk of ignition by embers and flame. In severe situations this may cause such things as curtains and fabric furnishings to burst into flames.



d) Flame contact
A significant risk to an asset is from ignition of vegetation growing directly against a dwelling, in turn igniting the dwelling through those areas described above.

People may also be adversely affected by smoke generated by bush fires, particularly in sensitive locations such as schools, nursing homes and hospitals.

WHAT APPROVALS ARE REQUIRED FOR CONSTRUCTING AN APZ?

If you intend to undertake bush fire hazard reduction works to create or maintain an APZ you must gain the written consent of the land owner/ manager. You cannot undertake any clearing of a neighbour's land without their agreement (this includes NPWS, councils etc.). All works must be undertaken wholly within the boundary of the affected property.

If you are constructing an APZ for a new dwelling you will need to comply with the requirements in *Planning for Bushfire Protection 2001*. Any approvals required will have to be obtained as part of the Development Application process. *Planning for Bushfire Protection 2001* outlines the distance requirements for APZs around new dwellings including the requirements for an Inner and Outer Protection Area.

If you wish to create or maintain an APZ for an existing structure you may be required to obtain a Bush Fire Hazard Reduction Certificate or other environmental approval. The RFS offers a free environmental assessment and certificate issuing service. Contact the Fire Mitigation Officer at your local RFS Fire Control Centre to determine if you can use this approval process.

If you intend to use fire to remove the bush fire hazard from your property you may also need to obtain a fire safety Permit through the RFS or NSW Fire Brigades. The RFS document *Before You Light That Fire* explains when a permit is required.

ASSET PROTECTION ZONE WIDTHS

The practical extent of APZs depends on the type of vegetation and slope of the land. Fires are more intense when they run uphill therefore, if the fuel is downslope of the house the distance of the APZ from the asset will need to be greater than if it is upslope of the asset.

Calculating an APZ
The RFS Bush Fire Environmental Assessment Code allows for a maximum distance of clearing based on likely environmental impact. These distances (below) are based on the most common vegetation type found in NSW and are specifically for the stream lined assessment process required for the issue of a Bush Fire Hazard Reduction Certificate.

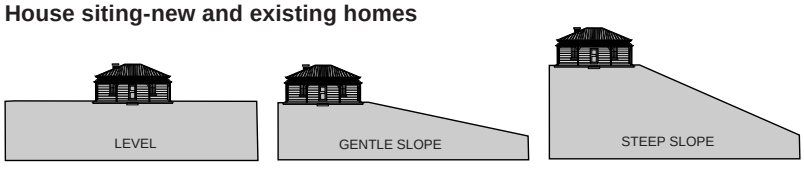
a) Residential Dwellings

Bush Fire Environmental Assessment Code distances for APZ (distances are measured from the wall of the dwelling towards the hazard);

Slope	Distance
Hazard upslope (<18°)	20 metres
Hazard downslope 0°-5°	25 metres
Hazard downslope 5°-10°	30 metres
Hazard downslope 10°-15°	40 metres
Hazard downslope 15°-18°	50 metres

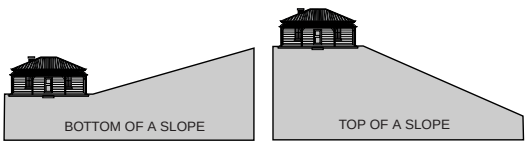
b) Other Buildings
APZs protecting other buildings and infrastructure such as farm sheds can be up to 10 metres.

House siting-new and existing homes



Flat ground is safer

Gentle slopes are safer than steep slopes



The bottom of a slope is safer than the top of s slope

Ground fuels such as fallen leaves, twigs and barks should be removed on a regular basis.

MANAGING BUSH FIRE FUEL TO REDUCE BUSH FIRE HAZARDS

The intensity of bush fires can be greatly reduced where there is little to no available fuel for burning. In order to manage bush fire fuels you can reduce, remove or change the state of the fuel through several means.

Reduction of fuel does not have to be as drastic as removing all vegetation. Environmentally this would be disastrous and often trees and plants can provide you with some bush fire protection from strong winds, intense heat and flying embers by filtering embers and changing wind patterns.

Bush fire fuels can be managed by:

a) **Removal or pruning of trees, shrubs and understorey**
The management of existing vegetation involves both selective fuel reduction (removal, thinning and pruning) and the retention of vegetation. Vegetation can act as a windbreak and radiant heat barrier.

The majority of leaves and ground cover should be removed from the surface. Valuable native trees and shrubs should be retained as clumps or islands and should retain a covering of at least 20% of the area.

The pattern of cleaning should involve:

- Removing noxious and environmental weeds first;
- Removing highly flammable species such as species within the genus Melaleuca and Leptospermum.
- Removal of trees and shrubs less than 3 metres in height.
- Removal of significant native species last.

Refer to the landscaping section in this document for more detailed information.

b) **Raking or manual removal of fine fuels**
Ground fuels such as fallen leaves, twigs and barks should be removed on a regular basis. The most flammable fuel is dry vegetation, sticks and other debris less than 6mm in diameter.

c) **Mowing of grass**
Grass needs to be kept short.

d) **Slashing and trittering**
Slashing and trittering are economical methods of fuel reduction in an APZ. For slashing or trittering to be effective, the cut material must be removed or allowed to rot down well before summer starts. Slashing and mowing may leave grass in rows thus increasing fuel in some places. Trittering or turbo mowing also mulches the vegetation leaving the fuel where it is cut. Ensure you remove the clippings and dispose of them in a green waste bin where available or compost on site (it is illegal and dangerous to dump clippings in the bush).

When correctly applied, this method has the advantage of inhibiting the growth of weeds. Weeds should be completely removed, as they tend to be extremely flammable as well as growing and spreading at a fast rate.

e) **Ploughing and grading**
Ploughing and grading can produce effective firebreaks, however, these areas may need constant maintenance. Loose soil from ploughed or graded ground may erode in steep areas, particularly where there is high rainfall and strong winds.

f) **Burning (hazard reduction burning)**
Burning off (or hazard reduction burning) is a method of removing unwanted ground litter and bush fire hazards through the use of fire. Controlled burning or prescribed burning of vegetation is more often used by land management agencies for strategic bush fire management.

Before any vegetation is burned within an APZ, the type of fire should be determined i.e. is it a pile burn or is it a burn of an area of bushland (prescribed burn). The type of burn may determine the types of conditions to be imposed as part of any environmental approval.

Any hazard reduction burning, including pile burns, must be planned carefully and carried out with extreme caution under correct weather conditions. Otherwise there is a real danger that the burn will get out of control. More bush fires result from escaped burning off work than from any other single cause. Planning for the use of fire must therefore ensure that it is effective and environmentally sound.

During the planning phase for a prescribed burn, there are many considerations such as smoke management, scorch height, frequency of burning and cut off points for the fire. For further information refer to the document entitled *Guidelines for Low Intensity Hazard Reduction Burning* (produced by the NSWRFS).

g) **Pile Burning**
In some cases you may use pile burning to remove material that has been cleared in creating or maintaining an APZ. In areas where smoke regulations control burning in the open you will need to obtain a Bush Fire Hazard Reduction Certificate or written approval from Council to undertake the burning. In these areas you will need to justify why you cannot remove the material through the normal garbage collection system. For further information refer to the document *Guideline for Pile Burning.*

LANDSCAPING AND BUSH FIRE HAZARD REDUCTION

Your home and garden can blend with the natural environment and be landscaped for fire protection at the same time.

To produce a garden that protects your home, it is necessary to plan the layout of the garden and to give consideration to features such as fire resistant plants, barriers and windbreaks.

Layout of gardens in an APZ

The following advice is recommended when creating and maintaining garden that is part of an APZ:

- Ensure that vegetation does not provide a path for the transfer of fire to the house;
- Remove all noxious weeds. Local councils can provide a list of noxious weeds for their local government area and information on control options for different types of weeds. Refer to Appendix A for a list of weeds ‘prohibited for sale’ in Sydney.
- Separate tree crowns by at least 2 metres so that the canopy is not continuous; and do not permit a canopy to overhang to within 5 metres of the dwelling.
- Plant or clear vegetation into clumps rather than continuous rows;
- Prune low branches 2 metres from the ground to prevent a ground fire from spreading into trees;
- Locate vegetation far enough away so that plants will not ignite the house by direct flame contact or radiant heat emission;

- Plant and maintain short green grass around the house as this will slow the fire and reduce fire intensity or provide non flammable pathways directly around the curtlidge of the dwelling;
- Gardens should not directly abutt the dwelling. Where this does occur gardens should contain non-flammable plants and any mulch should be well watered;
- Do not erect brush type fencing and do not plant “pencil pine” type trees, which are highly flammable.

Removal of other materials

Woodpiles, wooden sheds, combustible material, storage areas, large areas/quantities of garden mulch, stacked flammable building materials etc should be stored away from the house. These areas should preferably be located in a designated cleared location with no direct contact with bush fire hazard vegetation.

Other protective features

You can also take advantage of existing or proposed protective features such as fire trails, gravel paths, rows of trees, dams, creeks, swimming pools, tennis courts and vegetable gardens as part of the property’s APZ.

Fire resistant plants

While the design of the garden is important, so too is the type of plant species selected. No plant is fireproof, however, many plants have features that minimise the extent to which they contribute to the spread of bush fires.

Given the right conditions, all plants will burn. Low to moderate fires scorch or burn plants, while severe bush fires cause more damage. In extreme circumstances, high-intensity fires can incinerate most plants and spread the fire further into the property bush fire protection area.

Fire resistant plants, which are hard to burn, have the following features:

- High moisture content
- High levels of salt
- Low volatile oil content of leaves
- Smooth barks without “ribbons” hanging from branches or trunks.

If possible, water plants during summer to maintain leaf moisture content. The higher the moisture content of the leaves, the less likely the plants are to ignite. Native plants from the local area are less likely to suffer from drought and these should be used in preference to introduced species.

Trees with loose, fibrous or stringy bark should be avoided in the APZ. These trees can easily ignite and encourage the ground fire to spread up to and then through the crown of the trees. Wind can carry burning bark, especially loose, flaky or ribbon bark, away to start new fires. When deciding which trees to plant in the APZ, it is recommended that you use trees that have smooth bark and are planted so that the final tree height and crown width complies with recommended separation distances.

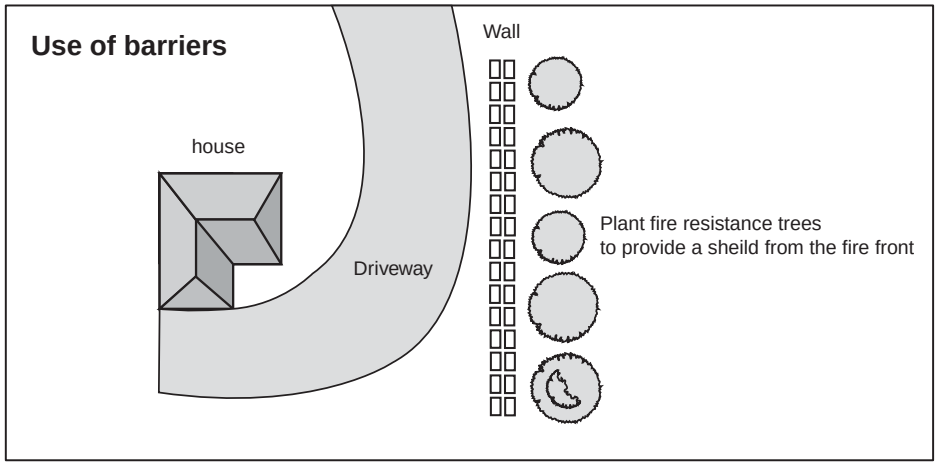
A combination of fire resistant plants and shrubs planted on your property will assist in reducing the spread of fire during bush fire incidents. As mentioned earlier, when choosing fire resistant plants, be sure not to introduce noxious or environmental weed species into your garden that can cause greater long-term environmental damage.

For further information on appropriate plant species for your locality, contact your local council, plant nurseries or plant societies.

Barriers

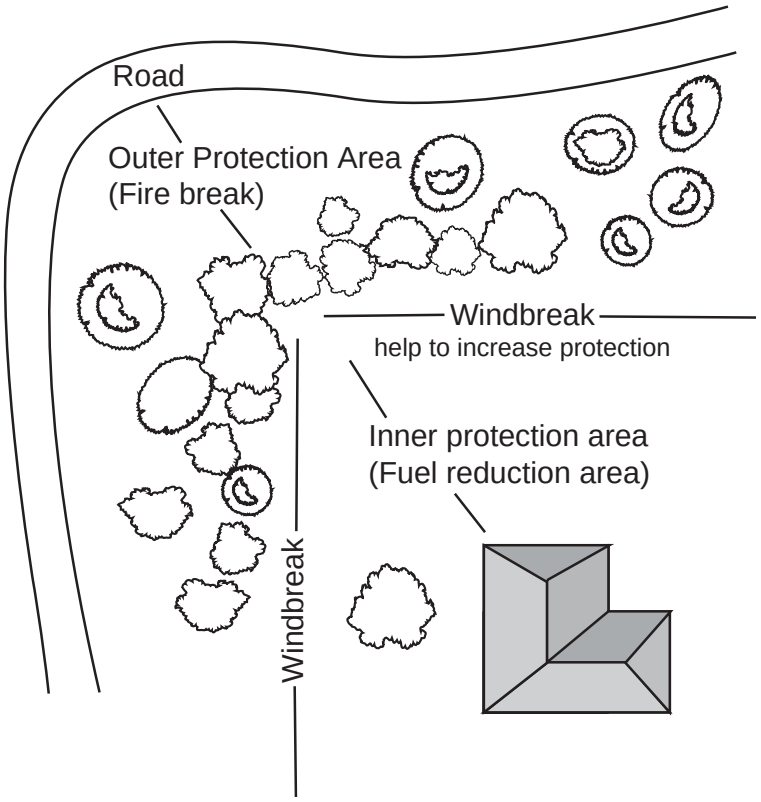
You can stop many embers (sparks) and slow down a bush fire by creating barriers around your assets.

Barriers may include stone, masonry walls and earth mounds or other non-combustible fencing. Such barriers will help protect assets from possible attack of burning embers, heat radiation and direct flame contact.



Wind breaks

Rows of trees provide a more than useful windbreak, trapping embers and flying debris, which would otherwise reach the house.



Tree crowns will rarely carry fire without a significant fuel loading on the ground providing supporting fuel & heat.

By reducing the wind speed, a row of trees also slows the rate of spread of a bush fire and a dense foliage traps radiant heat, lowering bush fire intensity.

To be effective a windbreak should

- *Be located on the side of the property from which extreme fire weather normally approaches. In NSW this is typically the northwest aspect.*
- *Be of sufficient length (generally 100 metres minimum length if possible)*
- *Be located at a distance of 1 to 3 times the height of fully grown trees if possible;*
- *Use smooth barked eucalyptus or deciduous trees;*
- *Allow 50-60% of the wind to pass through.*

Windbreaks should be located towards the outer edge of the APZ.

Ground fuel should be reduced around the windbreak so as to prevent any approaching bush fire from climbing into the crowns of the trees and spreading further.

HOW CAN I FIND OUT MORE?

If you require any further information please contact:

- your local NSW Rural Fire Service District Office; or
- call the NSW RFS Education Line 1 800 654 443 (Monday to Friday, 9am to 5pm), or
- the NSW RFS website at **www.rfs.nsw.gov.au.**

Produced by the NSW Rural Fire Service, Locked Mail Bag 17,
GRANVILLE, NSW 2142. Ph 02 9684 4411
www.rfs.nsw.gov.au

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APPENDIX A

Which plants NOT to grow? (Species list)

Weeds should be completely removed, as they tend to be extremely flammable and grow and spread at a fast rate. Below is a list of weeds 'Prohibited from Sale' in Sydney. NSW Agriculture has a full list of weeds for each Local Government Area in the State.

Noxious & Environmental Weeds

Common Name	Botanical Name	Locality
Lantana	Lanatan Cummara	All Sydney
Turkey Rhubarb	Acetosa sagitatta	North
Madeira Vine	Anredera cordifolia	All Sydney
Giant Reed	Arundo donax	All Sydney, Blue Mts
Bridal Creeper	Asparagus asparagoides	Blue Mts
Asparagus fern	A. densiflorus	North, Central, Coastal
Climbing Asparagus	A. plumosus	North, Central, Coastal
Cabomba	Cabomba spp.	All Sydney
Balloon Vine	Cardiospermum grandiflorum	North, South, Coastal
Camphor Laurel	Cinnamonum camphora	Blue Mts, North
Cotoneaster	Cotoneaster glaucophyllus	Coastal
	C. pannosus	Coastal
Montbretia	Crocosmia x crocosmiiflora	Blue Mts
Cape Ivy	Delairea odorat	North, Central, Coastal
Cockspur Coral Tree	Erythrina crista-galli	Coastal
Morning Glory	Ipomea cairica	North, South, Coastal
	I. indica	North, South, Coastal
Cape Broom	Genista monspessulana	North, Coastal, Central, Blue Mts
Kochia	Kochia scopari	All Sydney
Broadleaf Privet	Ligustrum lucidum	All Sydney
Narrowleaf Privet	L. sinens	All Sydney
Cat's claw Creeper	Macfadyena urguis-cati	North, Central, Coastal
Fishbone Fern	Nephrolepis cordifolia	Coastal
Rhizomatous Bamboo	Phyllostachys spp.	Blue Mts
Willow	Salix spp.	All Sydney
Senna	Senna pendula	Coastal
Wandering Jew	Tradescantia fluminensis	North, Coastal

DEVELOPED RESIDENTIAL PROPERTY
(MANAGED GRASSLAND)

> 14.0m

DEVELOPED RESIDENTIAL PROPERTY
(MANAGED GRASSLAND)

FAVIELL ROAD

41
5,000 m²

42
5,000 m²

EXISTING
DWELLING

Proposed
Driveway

Maintained Lawns

Existing Driveway

DEVELOPED RESIDENTIAL PROPERTY
(MANAGED GRASSLAND)

DEVELOPED RESIDENTIAL PROPERTY
(MANAGED GRASSLAND)

> 12.0m

LEGEND

- Property Boundary
- Proposed Boundary
- Adjoining Boundary
- Existing Building Envelope
- Maintained Lawns
- Access Roads / Driveway

General Notes

This drawing was prepared by Bushfiresafe (Aust) P/L to demonstrate the vegetation communities surrounding the property and the required asset protection zones and should not be used for any other purpose.

The vegetation line has not been surveyed and has been assumed from data collected from the onsite assessment and aerial photographs.

Bushfiresafe (Aust)
20 Maclachlan St
Maclean NSW 2463

(02) 6645 1099

CLIENT:
Drew Butler
101 Faviell Road, Bonville

Project

Bushfire Assessment of Lot 4, DP1138855, Faviell Road Bonville

Date: June 2021

Scale: @A3

Ref# 21077

APPENDIX 5

Whitehead & Associates
Environmental Consultants

PO Box 23 Bellingen NSW 2454 Australia
Telephone +61 2 6655 9623 Facsimile +61 2 6655 9623
Email mnc@whiteheadenvironmental.com.au

Bonville Local Environment Study

Wastewater Assessment

Prepared for: Coffs Harbour City Council

Project Manager: Strider Duerinckx
Whitehead & Associates Environmental Consultants Pty Ltd
Room 2 / 1A Oak Street
BELLINGEN
NSW 2454

Telephone: 02 6655 9623
Facsimile: 02 6655 9623
Email: strider@whiteheadenvironmental.com.au

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Disclaimer

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

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

Copyright Note

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1. Introduction

Bonville was identified as a priority release area for the Coffs Harbour Rural Residential Strategy (RRS) (2009) to allow rezoning of land for rural residential subdivision. This report forms part of a broad Local Environment Study for the preparation of a planning proposal to form an amendment to the Coffs Harbour City Local Environment Plan (LEP) 2000 and draft Coffs Harbour LEP 2012.

This Wastewater Assessment provides a hazard assessment of the study area in relation to site and soil limitations which can affect on-site wastewater management and the potential for subdivision. The report also provides a minimum lot size analysis and modelling to determine maximum lot density for subdivision.

1.1. The Study Area

Bonville is located on the Mid North Coast of New South Wales; approximately 13km south of Coffs Harbour to both the east and west of the Pacific Highway. Bonville was selected as a preferred area for rural residential subdivision because of its proximity to other town centres. It is proposed that approximately 420 hectares of land will be released in the area for rural residential/large lot residential subdivision. Preliminary assessments undertaken have determined the most suitable areas, with 17 Candidate Areas identified (CA1-17) for subdivision as shown in Figure 1.

W&A identified an average candidate area based on slopes, soil types and lot sizes upon which to undertake minimum lot size analysis upon. Candidate Area 2 (CA2) was adopted for these purposes. Ten lots were identified within this Candidate Area and minimum lot size analysis undertaken.

2. Site & Soil Assessment

2.1. Slope

Table K1 of *AS/NZS 1547:2012* (Standards Australia 2012) details a range of factors likely to limit the selection and applicability of land application systems; with slope/gradient identified as one critical factor. Steep slopes (>10-15%), particularly when combined with shallow or poorly drained soils, can lead to surface breakout of effluent downslope of the land application area. Conventional On-site Sewage Management (OSSM) systems will most likely be unsuitable and these lots will require a detailed site assessment and site specific design to enable a sustainable outcome. Steeply sloping sites are generally unsuitable for trenches and beds and can also be problematic for surface irrigation systems. Conversely, flat and gently sloping sites are less likely to experience such problems and are considered lower risk.

2.2. Soils

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

There are approximately sixteen (16) mapped soil landscapes within the Bonville Study Area; of which ten (10) soil landscapes fall within the Candidate Areas identified for potential subdivision. Most of the soil landscapes in the Candidate Areas are

characterised by a similar limiting subsoil horizon of light clay. No detailed soil investigations have been undertaken for this project but interpretation based on the Coffs Harbour 1:100,000 soil landscape series (Milford, 1999). Indicates a limiting soil of light clay at approximately 300–400mm depth. Table 1 summarises the soil landscapes within the adopted Candidate Area 2 and provides an overview of the limiting soil horizons. Figure 2 shows the distribution of soil landscapes throughout the study area.

Table 1: Summary of Soil Landscapes (Milford 1999)

Soil Landscape Name	Landscape	Slopes	Vegetation	Soils
Coffs Creek	level to gently undulating floodplains	0-5%	Completely cleared tall open forest	Loamy sand to sandy loam
				Loam
				Clay loam to light clay
				Clay loam to light clay
				Light to medium clay
Megan	Rolling low hills	5-20%	Partially cleared tall open forest and tall closed forest	Loam
				Clay loam
				Light clay
				Clay loam to light clay
Promised Land	Undulating to rolling low hills	3-15%	Extensively cleared tall open forest	Loam
				Clay loam to silty clay loam
				Light clay
				Light clay
				Light to medium clay
Ulong	Undulating to low rolling hills	5-20%	Partially cleared tall open forest and tall closed forest	Loam to silty loam with fine sand
				Clay loam to silty clay loam
				Light to medium clay
				Light to medium clay

The predominant and most limiting soil landscapes in the Candidate Area 2 are the Promised Land and Megan Soil Landscapes. The Megan and Promised Land Soil Landscapes are similarly characterised by dark reddish brown pedal loam to clay loam, moderately structured topsoil (up to 300mm thick) underlain by reddish brown pedal light clay moderately pedal subsoil (to 3.5m depth depending on location). Bedrock is typically greater than 1.5m depth.

Light clay is considered the most limiting soil for effluent application with a Design Loading Rate (DLR) of 5mm/day for trenches and a Design Irrigation Rate (DIR) of 3mm/day for secondary treatment with subsurface irrigation recommended by *AS/NZS 1547:2012.*

2.3. Climate

The nearest Bureau of Metrology (BoM) weather station to Bonville is Coffs Harbour (BoM number 059040). Coffs Harbour experiences a mean annual rainfall of 1,647mm, with a monthly high of 232mm in March and monthly low of 68.2mm in September. Coffs Harbour experiences mean annual pan evaporation of 1,602mm, with a monthly high of 192mm in January and a monthly low of 69mm in June.

Mean rainfall data was conservatively utilised for the modelling of effluent application at this broad scale of study. Selection of the appropriate rainfall data for site specific modelling will be dependent on the size of the development and risk assessment, and may be reduced to "median" rainfall, or increased to 70-90th percentile.

2.4. Water & Nutrient Balance

2.4.1 Primary Treatment with Trenches/Beds

Water balance modelling was undertaken to determine sustainable effluent application rates, and from this estimate the necessary size of the Effluent Management Area (EMA) required for effluent to be applied from a primary treatment system to 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:

Precipitation + Effluent Applied = Evapotranspiration + Percolation + Storage

Mean monthly rainfall data was conservatively utilised in the modelling. Mean data has a higher rainfall than median data typically adopted for domestic wastewater investigations. The water balance conservatively assumes a retained rainfall coefficient of 0.8; that is, generally 80% of rainfall will percolate into the soil and 20% will run off. Given the moderate slopes and good groundcover in Candidate Area 2, this is considered a conservative value. The rainfall hydraulic load is incorporated into the water balance to ensure that runoff from the EMA will not occur under typical (design) climate conditions.

Water balance modelling has been based on a four bedroom home on tank water in accordance with *AS/NZS 1547:2012* with a rate of 120L/p/day. The input data and results for the trench water balance are presented in Table 2, and calculation sheets in Appendix A.

A conservative nutrient balance was also undertaken, which calculates the minimum buffer around a trench to enable nutrients to be assimilated by the soils and vegetation. The nutrient balance used here is based on the simplistic DLG (1998) methodology, but improves this by more accurately accounting for natural nutrient cycles and processes. It acknowledges that a proportion of nitrogen will be retained in the soil through processes such as ammonification (the conversion of organic nitrogen to ammonia) and a certain amount will be lost by denitrification, microbial digestion and volatilisation (Patterson, 2003). Patterson (2002) estimates that these processes may account for up to 40% of total nitrogen loss from soil. In this case, a more conservative estimate of

20% is adopted for the nitrogen losses due to soil processes. A summary of the nutrient balance is provided in Table 3..

Table 2: Inputs for and Results of Hydraulic Modelling

Data Parameter	Units	Value	Comments
Hydraulic load	L/day	720	6 persons
Precipitation	mm/month	Coffs Harbour	BoM, mean monthly
Pan Evaporation	mm/month	Coffs Harbour	BoM, mean monthly
Retained rainfall	unitless	0.8	Proportion of rainfall that remains onsite and infiltrates the soil, allowing for 10% runoff.
Crop Factor	unitless	0.7-0.8	Expected annual range for vegetation based on monthly values.
Design Loading Rate (DLR)	mm/day	5	Maximum rate for design purposes, based on light clay subsoils.
Minimum trench basal area for hydraulic load (m^2)			**272m^2**

Table 3: Inputs for and Results of Nutrient Balance Modelling

Data Parameter	Units	Value	Comments
Effluent total nitrogen concentration	mg/L	60	Target effluent quality for primary treatment systems.
Nitrogen lost to soil processes (denitrification and volatilisation)	annual percentage	20	Patterson (2002).
Effluent total phosphorus concentration	mg/L	30	Target effluent quality for primary treatment systems.
Soil phosphorus sorption capacity	mg/kg	702	Value based on reported data for soil landscape.
Nitrogen uptake rate by plants	kg/Ha/yr	130	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 irrigation area for total phosphorus load, without off-site export			**970m^2**
Minimum irrigation area for total nitrogen load, without off-site export			**761m^2**

2.4.2 Secondary Treatment with Irrigation

Water and nutrient balance modelling was also undertaken to determine sustainable sizing of irrigation EMAs. The procedures for this generally follow the DLG (1998) guidelines.

The water balance used is a monthly model adapted from the "Nominated Area Method" described in DLG (1998). These calculations determined minimum EMA sizes for given effluent loads for each month of the year. The water balance can be expressed by the following equation:

Precipitation + Effluent Applied = Evapotranspiration + Percolation + Storage

Irrigation areas are calculated to achieve no net excess of water and hence zero storage for all months.

A conservative nutrient balance has also been undertaken. The water and nutrient balances were modelled using the estimated average daily effluent load of 720L/day based on a four bedroom dwelling on tank water. Table 4 and Table 5 below contain the input data and results of the water and nutrient balances.

Table 4: Inputs for and Results of Water Balance Modelling

Data Parameter	Units	Value	Comments
Average effluent load	L/day	720	Design dwelling 4 bedrooms, 120 L/person/day.
Precipitation	mm/month	Coffs Harbour	BoM, mean Monthly
Pan Evaporation	mm/month	Coffs Harbour	BoM, mean Monthly
Retained rainfall	unitless	0.8	Proportion of rainfall that remains onsite and infiltrates the soil, allowing for 20% runoff.
Crop Factor	unitless	0.7-0.8	Expected annual range for vegetation based on monthly values.
Design Irrigation Rate (DIR)	mm/day	3	Maximum rate for design purposes, based on light clay subsoils.
Minimum irrigation area for hydraulic load, without wet weather storage (m^2)		**1,043**	Assuming zero wet weather storage.

Table 5: Inputs for and Results of Nutrient Balance Modelling

Data Parameter	Units	Value	Comments
Effluent total nitrogen concentration	mg/L	30	Target effluent quality for secondary treatment systems.
Nitrogen lost to soil processes (denitrification and volatilisation)	annual percentage	20	Patterson (2002).
Effluent total phosphorus concentration	mg/L	15	Target effluent quality for secondary treatment systems.

Data Parameter	Units	Value	Comments
Soil phosphorus sorption capacity	mg/kg	702	Value based on reported data for soil landscape.
Nitrogen uptake rate by plants	kg/Ha/yr	130	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 irrigation area for total phosphorus load, without off-site export			**381m^2**
Minimum irrigation area for total nitrogen load, without off-site export			**486m^2**

As a result of the two water and nutrient balances undertaken for absorption trenches and irrigation areas, the most limiting balance has been used in calculating lot density in Section 4 below (Table 6). Based on the modelling, a minimum EMA of 1,043m^2 required for secondary treatment with subsurface irrigation has been adopted.

Table 6: Minimum Land Application Area Required

LAA system	Area Required
Trench/Bed Absorption System	970m^2
Subsurface Irrigation	1,043m^2

2.5. 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 subsurface irrigation based on DLG (1998), are:

- 250m from domestic groundwater bores;
- 100m from permanent watercourses;
- 40m from downslope intermittent watercourses and dams;
- 12m from property boundaries; and
- 6m if area up-gradient and 3m if area down-gradient of buildings.

These buffer distances have been applied to our Minimum Lot Size Analysis for all future OSSM systems in the assessed Candidate Area. Figure 3 highlights the buffers to watercourses within the Bonville LES study area.

3. Minimum Lot Size Analysis

3.1. Methodology

When considering the suitability for a lot to sustainably manage wastewater on-site, we typically refer to 'adequate available area'. This broadly refers to available areas (i.e. not built out or used for a conflicting purpose) where OSSM will not be unduly constrained by underlying site and soil characteristics. Available area on a developed (or potentially developable) lot is determined by the following factors:

- total building area (including dwellings, sheds, pools etc.);
- driveways and paths (impervious areas), and gardens/vegetated areas unsuitable for effluent reuse;
- dams, intermittent and permanent watercourses running through lots; and
- maintenance of appropriate setback distances from property boundaries, buildings, driveways and paths, dams and watercourses.

Available areas may also be unsuitable or constrained for OSSM, due to other factors, including (but not limited to):

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

Ten (10) representative lots were selected that have already been subdivided to ~1ha or less lot sizes (zoned R5) from the Bonville LES study area associated with Grandis Road and Faviell Drive (Figure 4). Selected lots typically included a dwelling, garage/shed, pool, trees and shrubs and impervious surfaces (driveways, tanks etc). It is assumed that this existing development style will be similar to that proposed for the Candidate Areas and therefore minimum lot size and development potential should be consistent.

The residual areas (areas not otherwise occupied by improvements, buffers or conservation vegetation) were then calculated for the selected lots (eg. Figure 5), and the results recorded. A percentage of the total lot area that is available for effluent disposal was then determined and the lowest percentage of available area to lot size was then used to conservatively determine the minimum lot size.

3.2. Results

Table 7 shows the assessment of available area for each lot. As is evident the variability of lot sizes and on-lot improvements of developed lots in the study area makes selection of a "typical" lot difficult, however, we have adopted a conservative approach to define minimum sustainable lot size as many lots are affected by watercourses which were not always evident within the 10 lots assessed.

From the sample selection of lots investigated the minimum percentage of the lot available for effluent disposal is 27%. The corresponding minimum lot size (for sustainable irrigation of secondary effluent) is 3,863m^2. Thus, a conservative minimum lot size for subdivision in the study area would be ~4,000m^2. This lot size allows for development of the site with a four bedroom (or smaller) dwelling together with

associated driveways, sheds, paths and pool, whilst still providing sufficient area for secondary wastewater treatment and sustainable land application.

The selection of 4,000m^2 as the minimum lot size presents a conservative approach that is similar in comparison to lot sizes that have been calculated for other catchments that have been assessed on the mid north coast. As can be seen by the variability in results, some lots may be capable of being developed to a smaller lot size. In addition, we assumed secondary treatment without full nutrient reduction capabilities, and use of mean rainfall rather than median rainfall which has resulted in larger required EMAs than could be achieved with site specific assessment and design.

Table 7: Minimum Lot Size Assessment Results

Lot	Lot Area (m^2)	Developed Area (m^2)	Available Area (m^2)	Percentage of Lot Available for Eff. Disp. (%)	Area required for Secondary Treatment (m^2)	Minimum Lot Size (m^2)
1	20,106	14,257	5,849	30	1,043	3,585
2	19,051	11,392	7,659	40	1,043	2,594
3	6,842	4,858	1,984	29	1,043	3,597
4	7,018	3,727	3,291	47	1,043	2,224
5	4,387	3,088	1,299	30	1,043	3,522
6	10,591	6,844	3,747	35	1,043	2,948
7	4,407	3,227	1,180	27	1,043	3,895
8	4,387	3,151	1,236	28	1,043	3,702
9	20,077	4,154	15,923	80	1,043	1,315
10	13,122	5,460	7,662	58	1043	1,786

4. Maximum Lot Density

The maximum number of 4,000m^2 lots was assessed for each of the lots within Candidate Area 2 (CA2) based on the lesser of the amount derived from total lot size or the amount derived following an aerial photograph review of available area. CA2 was selected due to its large variety of lot sizes, large total area and number of surface water features which may affect future development.

Table 8 provides the results of this assessment. In total, for the about 1,191.7ha CA2, 373 lots could be sustainably generated at a rate of 1.94lots/ha.

Table 8: Maximum Lot Density Assessment

Lot Number *	Total Lot Area m^2	Available Area m^2	Max No. Lots Using Lot size	Max No. Lots Using Min OSSM	Maximum Subdivision Potential for Lot
1	115,222	26,690	28.81	25.42	25
2	8,398	5,909	2.10	5.63	2
3	15,552	199	3.89	0.19	0
4	8,972	2,597	2.24	2.47	2
5	50,336	5,545	12.58	5.28	5
6	43,406	3,952	10.85	3.76	4
7	16,557	11,067	4.14	10.54	4
8	29,123	11,628	7.28	11.07	7
9	4,138	791	1.03	0.75	1
10	3,753	909	0.94	0.87	1
11	16,767	11,111	4.19	10.58	4
12	29,238	14,845	7.31	14.14	7
13	20,608	11,540	5.15	10.99	5
14	2,004	2,004	0.50	1.91	1
15	16,954	16,401	4.24	15.62	4
16	22,974	22,974	5.74	21.88	6
17	20,944	20,944	5.24	19.95	5
18	52,751	37,198	13.19	35.43	13
19	50,100	36,851	12.53	35.10	13
20	41,021	17,111	10.26	16.30	10
21	38,711	26,221	9.68	24.97	10
22	40,337	23,813	10.08	22.68	10
23	4,098	4,098	1.02	3.90	1
24	40,782	7,383	10.20	7.03	7
25	40,160	8,973	10.04	8.55	9
26	3,700	1,932	0.93	1.84	1
27	22,486	9,612	5.62	9.15	6
28	24,480	16,555	6.12	15.77	6
29	3,865	3,865	0.97	3.68	4
30	14,973	13,603	3.74	12.96	4
31	4,165	4,165	1.04	3.97	1
32	3,693	1,303	0.92	1.24	1
33	21,233	19,637	5.31	18.70	5
34	197,360	24,029	49.34	22.88	23
35	70,776	6,079	17.69	5.79	6
36	44,391	34,811	11.10	33.15	11
37	280,275	45,368	70.07	43.21	43
38	283,211	79,769	70.80	75.97	71
39	54,207	2,926	13.55	2.79	3
40	156,183	34,233	39.05	32.60	33

Note:
* Lot numbers are an identifier for assessment purposes only. They are not actual Lot/DP numbers.

5. Cumulative Impact Assessment

5.1. Rationale and Methodology

We assessed the sustainability of the lot density for application of wastewater on the local receiving environment from OSSM systems. Desktop data was used to model OSSM operation and pollutant discharge to groundwater and sensitive surface receptors for CA2 using the Decentralised Sewer Model (DSM) as described below.

5.2. Decentralised Sewerage Model

The DSM is a GIS based tool designed to compare a range of wastewater servicing options and has the ability to assess long term environmental and human health performance of wastewater systems.

The DSM was developed by W&A for the purpose of providing a rapid-assessment tool to predict the performance of on-site and decentralised wastewater management systems under varying environmental conditions. It does this by simulating the movement of pollutants (nitrogen, phosphorus and pathogens) within the effluent load as it travels from the point source (on-site or community-scale systems) down the catchment as surface or subsurface flows. The model simulates a 72 year period and is designed to provide conservative estimates of OSSM system performance CA2.

The DSM has five modules, an on-lot performance module, a particle tracking module, a node-link module, a central management components module and a costing module.

It is important to note that the OLPM makes the conservative assumption that the entire, non-attenuated pollutant load is transported down the catchment and that no dilution occurs within the receiving waters. The key model inputs are provided in Table 9 below. The raw data as used in the DSM has been included in Appendix B as well as the raw outputs.

Table 9: Input Data Summary for DSM

Input Parameter	Unit	On-site Scenario
Average Wastewater Flow per system	L/day (m^3/day)	720 (0.72)
Total Average Wastewater Flow per system	ML/year	0.02628
EMA Type	-	Future Development - SSI 325 systems Existing Development - Trenches 43 systems not upgraded
Application Type	-	No storage with fixed rate
Storage Type	-	No storage
Effluent Total Nitrogen Concentration	mg/L	SSI - 30 Trench - 60
Effluent Total Phosphorus Concentration	mg/L	15
Effluent Virus Concentration[1]	MPN/100mL	SSI – 100 Trench – 10,000,000
Average Annual Rainfall	mm	1,647
Average Annual Evaporation	mm	1,602

Input Parameter	Unit	On-site Scenario
Average Air Temperature (in lieu of ground temperature)	ºC	21.8
Crop Factor [2]	unitless	0.7-0.8 grass
Buffer From Dam/Intermittent Waterway	m	40
Buffer From Property Boundaries	m	12
Buffer From Driveways	m	6
Slope	%	5-20
Required Effluent Application Area	m^2	SSI - 1043 Trench - 272
Soil Phosphorus Adsorption (P-sorb) Capacity	mg/kg	702
Soil Depth for P-sorb	mm	800
Fixed Application Rate	Mm/day	SSI - 3 Trench - 5
Crop Nitrogen Uptake [3]	kg/ha/year	130
Crop Phosphorus Uptake [3]	kg/ha/year	25
Attenuation Rate for Total Phosphorus	%	94
Attenuation Rate for Total Nitrogen	%	93
Attenuation Rate for Viruses	%	97
Attenuation for Surface Flow	%	0.6

5.3. DSM Results

The predicted deep drainage of nutrients and viruses from the developed CA2 that reaches Bonville Creek was compared to expected background deep drainage from an agricultural catchment. Figure 6 provides an overview of the layout of the DSM model for CA2. A summary of the results of the DSM is provided in Table 10 below.

The results from the DSM modelling indicated that mean annual nutrient concentrations in deep drainage represented less than a 1% increase on existing background pollutant levels, and there were no net increase in nutrients in surface runoff. The DSM modelling also indicates that virus surface runoff would not occur at the applied loading rate and that virus deep drainage is very low.

Based on this, by improving the level of treatment and land application of OSSM an increase in lot density is predicted to have negligible effect on nutrient and virus export from the catchments and that the predicted maximum lot density is sustainable.

Table 10: Average Daily Modelled Deep Drainage

(For Candidate Area 2)	TP kg/day	TN kg/day	Virus MPN/m^2/day
Background Pollutants (Fletcher, 2004)	1.27	5.39	-
W&A DSM Model Deep Drainage	$3.7x10^{-5}$	$2.3x10^{-4}$	0.03
% increase from background levels	0.0029	0.0043	-
W&A DSM Model Surface Discharge	0	0	0
% increase from background levels	0	0	0

* All percentages are relative to the total background load generated annually (Fletcher et al., 2004)

5.4. Discussion

Whilst the DSM modelling undertaken has shown that one system per 4,000m^2 is sustainable, the limitations of this study should be noted. This study has been undertaken and based on a desktop analysis of site and soil data, there were no provisions for soil sampling and confirmation of site conditions throughout the study area and therefore individual site conditions may vary. As a consequence conservative modelling was undertaken using assumed soil and climate parameters to overestimate the minimum areas and maximum lot densities achievable.

Therefore is would still be necessary to undertake detailed land capability assessments for each lot prior to subdivision to ensure that there is sufficient available area OSSM land application plus improvements for each lot within a proposed subdivision which meets Council requirements.

6. Conclusions

This report provides a desktop hazard assessment of the study area in relation to site and soil limitations which can effect on-site wastewater management and the potential for subdivision.

The recommended minimum lot size for future subdivision is 4,000m^2 and DSM modelling indicates that lot density for subdivision allows one onsite wastewater management system per 4,000m^2. Due to the unique locality and minimum available area for effluent management identified within the CA2 we recommend that all future subdivision require a detailed land capability assessment for onsite wastewater management to ensure any proposed subdivision can be sustainable.

7. References

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FIGURES

Figure 1:
Existing Planning Scheme Zones Map Showing Selected Candidate Area and Lots for Assessment

CHCC Planning Zones (2009)

- R5
- R1
- Wetlands
- National Parks
- Roads
- Creeks
- RU2
- W2
- Forests
- W1
- SP2
- RU3
- R2
- E2
- E1
- RE1

- Bonville Study Area
- Candidate Areas 1-17
- Selected Candidate Areas and Lots for Assessment

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Drawn: Jasmin Kable
Date: 17 July 2013
Scale: Not to Scale

N

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Figure 2:
Soil Landscape Map of Bonville

NEWRY
COFFS CREEK
SUICIDE
MEGAN
NEVER NEVER
TOORMINA
PINE CREEK
DAIRYVILLE
ULONG
GLENIFFER
PROMISED LAND
BONVILLE
COFFS HARBOUR
COFFS CREEK variant a
Bonville Study Area
Candidate Areas

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Date: 17 July 2013
Scale: Not to Scale

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Figure 3:
Buffer Analysis of Bonville Showing Available Areas for OSSM

Bonville Study Area
Candidate Areas
Buffers
Cadastre
Creeks
Surface Water Features

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Drawn: Jasmin Kable
Date: 17 July 2013
Scale: Not to Scale

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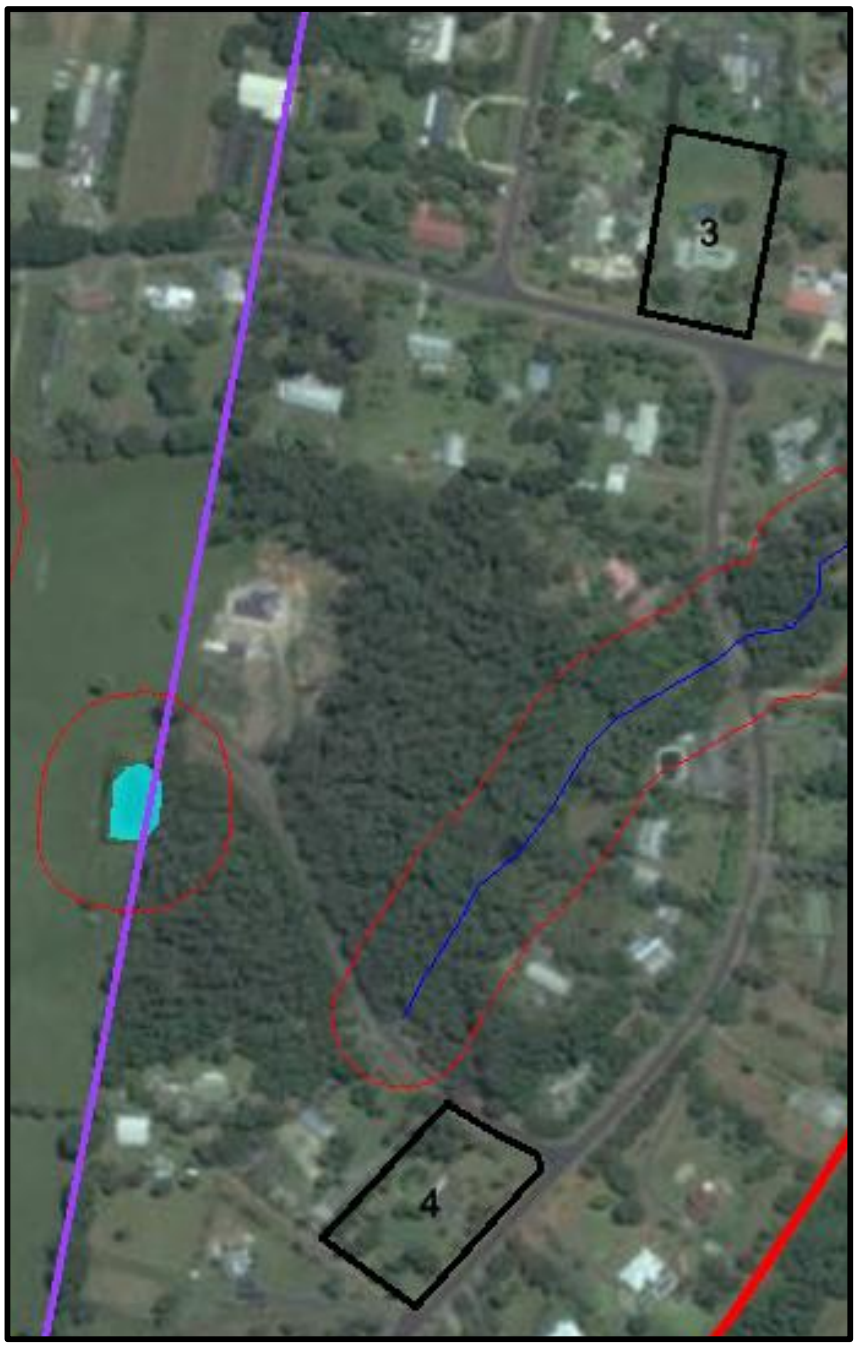

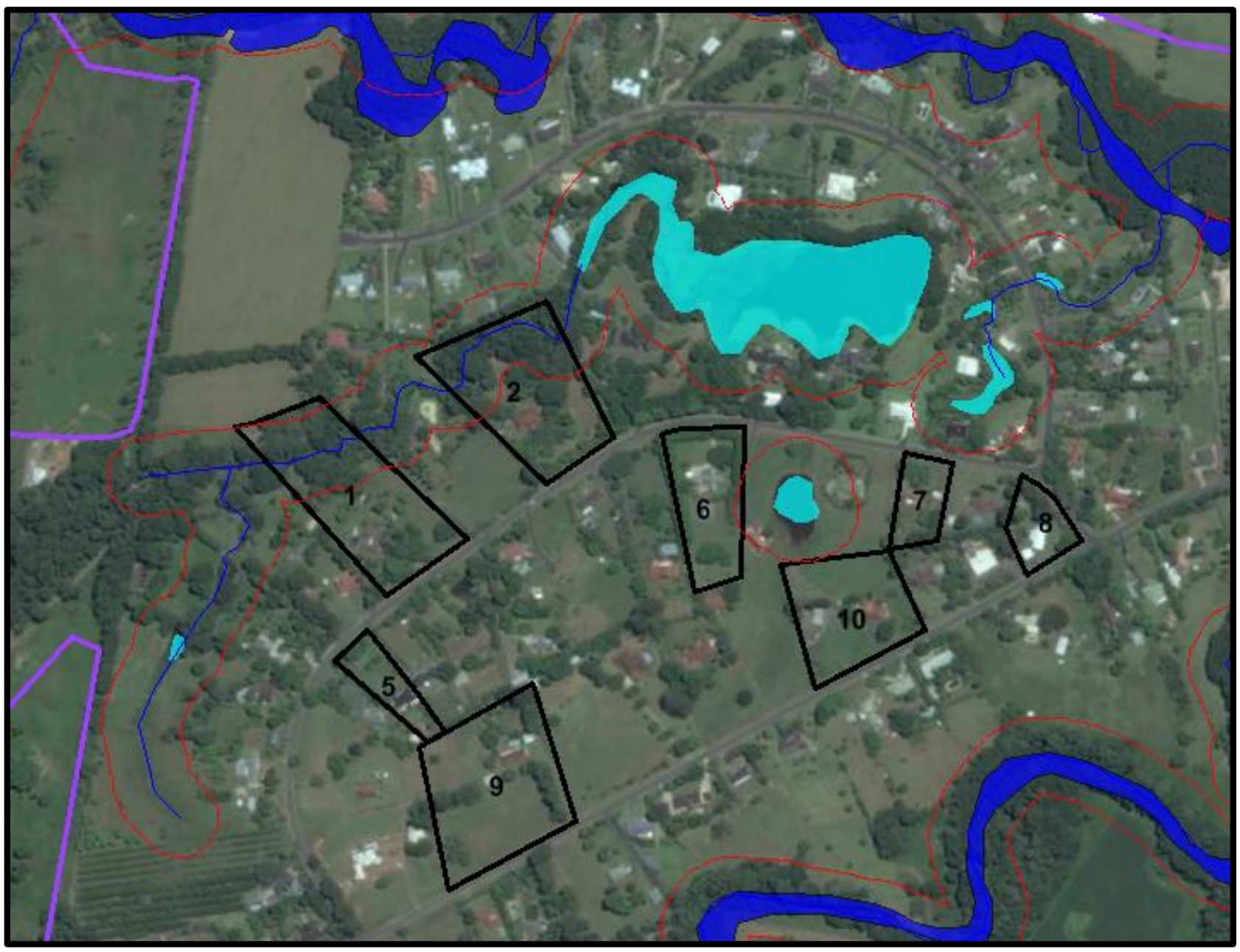

Figure 4:
Overview of Minimum Lot Size Analysis

Candidate Area Boundary
Lot Boundary
Buffers
Creeks
Surface Water Features

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Date: 17 July 2013
Scale: Not to Scale

N

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Figure 5:
Minimum Lot Size Analysis- Lot 1

Lot Boundary
Buffers
Available Area for OSSM
Creeks
Surface Water Features

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Figure 6: Decentralised Sewage Model, Bonville

Selected Candidate Area
Buffers
Cadastre
Creeks
Surface Water Features
*Soil Landscapes as labelled

Link
Receiving Node
Site Point (Individual OSSM systems)

*Digital Elevation Model underlay (red is highest elevation and dark blue is the lowest elevation)

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Date: 17 July 2013
Scale: Not to Scale

N

APPENDIX A

Water & Nutrient Balances

Nominated Area Water Balance & Storage Calculations - Trench/Bed Design

Whitehead & Associates
Environmental Consultants Pty Ltd

Site Address: **Bonville Subdivision**

INPUT DATA

Design Wastewater Flow	Q	720	L/day	Estimated daily flow from residence with tank water
Daily DLR		5.0	mm/day	Litres per sq.m. per day - recommended max loading rate based on AS/NZS 1547:2012 for primary effluent
Nominated Land Application Area	L	272	m sq	Used for iterative purposes to determine storage requirements based on nominated trench/bed bottom area
Crop Factor	C	0.7	unitless	Estimates evapotranspiration as a fraction of pan evaporation; varies with season and crop type
Retained Rainfall	RR	0.8	unitless	Proportion of rainfall that remains onsite and infiltrates; function of slope/cover, allowing for any runoff
Void Space Ratio	V	0.3	unitless	Proportion of bed/trench that is available for storage
Rainfall Data		BOM Coffs Harbour		Mean Monthly data
Evaporation Data		BOM Coffs Harbour		Mean Monthly data

WW Flow Allowance	120	L/p/d
No. of Bedrooms	4	Bdrm
Occupancy	1.5	p/Bdrm

Parameter	Symbol	Formula	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Days in month	D	\	days	31	28	31	30	31	30	31	31	30	31	30	31	31	28	31	30	31	30	**365.0**
Rainfall	R	\	mm/month	169.3	207	232	189	138.4	129.9	93.9	81.3	68.2	95.7	104.4	136.8	169.3	207.0	232.0	189.0	138.4	129.9	**1,647**
Evaporation	E	\	mm/month	192.2	156.8	148.8	117	86.8	69	77.5	102	139.5	161.2	171	192.2	192.2	156.8	148.8	117.0	86.8	69.0	**1,602**
Crop Factor	C			0.80	0.80	0.80	0.70	0.70	0.70	0.70	0.70	0.70	0.80	0.80	0.80	0.80	0.80	0.80	0.70	0.70	0.70	
OUTPUTS (LOSSES)																						
Evapotranspiration	ET	ExC	mm/month	154	125	119	82	61	48	54	71	98	129	137	154	154	125	119	82	61	48	**1,232.0**
Percolation	B	(DLR)xD	mm/month	155.0	140.0	155.0	150.0	155.0	150.0	155.0	155.0	150.0	155.0	150.0	155.0	155.0	140.0	155.0	150.0	155.0	150.0	**1,825.0**
Outputs		ET+B	mm/month	308.8	265.4	274.0	231.9	215.8	198.3	209.3	226.4	247.7	284.0	286.8	308.8	308.8	265.4	274.0	231.9	215.8	198.3	**3,057.0**
INPUTS (GAINS)																						
Retained Rainfall	Re	R*RR	mm/month	135.4	165.6	185.6	151.2	110.7	103.9	75.1	65.0	54.6	76.6	83.5	109.4	135.4	165.6	185.6	151.2	110.7	103.9	**1,316.7**
Applied Effluent	W	(QxD)/L	mm/month	82.1	74.1	82.1	79.4	82.1	79.4	82.1	82.1	79.4	82.1	79.4	82.1	82.1	74.1	82.1	79.4	82.1	79.4	**966.2**
Inputs		Re+W	mm/month	217.5	239.7	267.7	230.6	192.8	183.3	157.2	147.1	134.0	158.6	162.9	191.5	217.5	239.7	267.7	230.6	192.8	183.3	**2,282.9**
STORAGE CALCULATION (Δ)																						
Storage remaining from previous month			mm/month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Storage for the month	S	(Re+W)-(ET+B))^	mm/month	-304.2	-85.7	-21.3	-4.3	-76.6	-49.9	-173.6	-264.3	-378.9	-417.8	-412.9	-390.9	-304.2	-85.7	-21.3	-4.3	-76.6	-49.9	**-2,580.4**
Cumulative Storage	M		mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Maximum Storage Depth for Nominated Area	N		mm	**0.0**																		
Maximum Storage Vol. for Nominated Area	V	NxL	L	**0**																		
BOTTOM AREA REQUIRED FOR ZERO STORAGE			m^2	129	202	252	268	212	229	166	138	112	108	106	112	129	202	252	268	212	229	

MINIMUM BOTTOM AREA REQUIRED FOR ZERO STORAGE: **267.7** m^2

Value is based on the worst month of the year, so the balance overestimates the storage requirement for all other months. Assumes zero effluent depth (storage) in trench/bed. Model is run for 18-months to ensure trench/bed empties at least once per cycle.

Nutrient Balance

Site Address: **Bonville**

Whitehead & Associates
Environmental Consultants Pty Ltd

Please read the attached notes before using this spreadsheet.

SUMMARY - LAND APPLICATION AREA REQUIRED BASED ON THE MOST LIMITING BALANCE = **970 m^2**

INPUT DATA [1]

Wastewater Loading			Nutrient Crop Uptake				
Hydraulic Load	720	L/Day	Crop N Uptake	130	kg/ha/yr	which equals	36 mg/m^2/day
Effluent N Concentration	60	mg/L	Crop P Uptake	25	kg/ha/yr	which equals	7 mg/m^2/day
% Lost to Soil Processes (Geary & Gardner 1996)	0.2	Decimal	**Phosphorus Sorption**				
Total N Loss to Soil	8,640	mg/day	P-sorption result	702	mg/kg	which equals	7,862 kg/ha
Remaining N Load after soil loss	34,560	mg/day	Bulk Density	1.4	g/cm3		
Effluent P Concentration	30	mg/L	Depth of Soil	0.8	m		
Design Life of System	50	yrs	% of Predicted P-sorp. [2]	0.5	Decimal		

METHOD 1: NUTRIENT BALANCE BASED ON ANNUAL CROP UPTAKE RATES

Minimum Area required with zero buffer		
Nitrogen	970.34	m^2
Phosphorus	760.83	m^2

Determination of Buffer Zone Size for a Nominated Land Application Area (LAA)		
Nominated LAA Size	1,044.00	m^2
Predicted N Export from LAA	-0.96	kg/year
Predicted P Export from LAA	-2.93	kg/year
Phosphorus Longevity for LAA	78	Years
Minimum Buffer Required for excess nutrient	0	m^2

PHOSPHORUS BALANCE
STEP 1: Using the nominated LAA Size

Nominated LAA Size	1,044	m^2				
Daily P Load	0.0216	kg/day	→	Phosphorus generated over life of system	394.2	kg
Daily Uptake	0.007151	kg/day	→	Phosphorus vegetative uptake for life of system	0.125	kg/m^2
Measured p-sorption capacity	0.78624	kg/m^2				
Assumed p-sorption capacity	0.393	kg/m^2	→	Phosphorus adsorbed in 50 years	0.393	kg/m^2
Site P-sorption capacity	410.42	kg	→	Desired Annual P Application Rate	10.818	kg/year
				which equals	0.02964	kg/day
P-load to be sorbed	5.27	kg/year				

NOTES

Nominated Area Water Balance & Storage Calculations

Site Address: Bonville

Whitehead & Associates
Environmental Consultants Pty Ltd

INPUT DATA

Design Wastewater Flow	Q	720	L/day	
Design Percolation Rate	DIPR	21	mm/week	
Daily DPR		3.0	mm/day	Litres per sq.m. per day - based on Table M1 AS/NZS 1547:2012 for secondary effluent
Nominated Land Application Area	L	1044	m sq	
Crop Factor	C	0.7-0.8	unitless	Estimates evapotranspiration as a fraction of pan evaporation; varies with season and crop type
Runoff Coefficient		0.8	untiless	Proportion of rainfall that remains onsite and infiltrates; function of slope/cover, allowing for any runoff
Rainfall Data		Coffs Harbour		Mean Monthly Data
Evaporation Data		Coffs Harbour		Mean Monthly Data

Flow Allowance	120	L/p/d
No. of bedrooms	4	
Occup Rate	1.5	

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**
Rainfall	R	\	mm/month	169.3	207	232	189	138.4	129.9	93.9	81.3	68.2	95.7	104.4	136.8	**1,647**
Evaporation	E	\	mm/month	192.2	156.8	148.8	117	86.8	69	77.5	102	139.5	161.2	171	192.2	**1,602**
Daily Evaporation				6.2	5.6	4.8	3.9	2.8	2.3	2.5	3.3	4.7	5.2	5.7	6.2	
Crop Factor	C			0.80	0.80	0.80	0.70	0.70	0.70	0.70	0.70	0.70	0.80	0.80	0.80	
OUTPUTS																
Evapotranspiration	ET	ExC	mm/month	154	125	119	82	61	48	54	71	98	129	137	154	**1232.0**
Percolation	B	(DPR/7)xD	mm/month	93.0	84	93.0	90.0	93.0	90.0	93.0	93.0	90.0	93.0	90.0	93.0	**1095.0**
Outputs		ET+B	mm/month	246.8	209.44	212.0	171.9	153.8	138.3	147.3	164.4	187.7	222.0	226.8	246.8	**2327.0**
INPUTS																
Retained Rainfall	RR	R*runoff coef	mm/month	135.44	165.6	185.6	151.2	110.72	103.92	75.12	65.04	54.56	76.56	83.52	109.44	**1316.7**
Effluent Irrigation	W	(QxD)/L	mm/month	21.4	19.3	21.4	20.7	21.4	20.7	21.4	21.4	20.7	21.4	20.7	21.4	**251.7**
Inputs		RR+W	mm/month	156.8	184.9	207.0	171.9	132.1	124.6	96.5	86.4	75.2	97.9	104.2	130.8	**1568.4**
STORAGE CALCULATION																
Storage remaining from previous month			mm/month	0.0	0.0	0.0	0.0	0.0	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	-89.9	-24.5	-5.1	0.0	-21.7	-13.7	-50.8	-78.0	-112.4	-124.0	-122.6	-115.9	**-193.7**
Cumulative Storage	M		mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Maximum Storage for Nominated Area	N		mm	**0.00**												
	V	NxL	L	**0**												
LAND AREA REQUIRED FOR ZERO STORAGE			m^2	201	460	844	1043	519	628	309	225	162	154	151	163	

MINIMUM AREA REQUIRED FOR ZERO STORAGE: **1,043** m^2

Nutrient Balance

Site Address: **Bonville**

Whitehead & Associates
Environmental Consultants Pty Ltd

Please read the attached notes before using this spreadsheet.

SUMMARY - LAND APPLICATION AREA REQUIRED BASED ON THE MOST LIMITING BALANCE = **485 m^2**

INPUT DATA [1]

Wastewater Loading			Nutrient Crop Uptake				
Hydraulic Load	720	L/Day	Crop N Uptake	130	kg/ha/yr	which equals	36 mg/m²/day
Effluent N Concentration	30	mg/L	Crop P Uptake	25	kg/ha/yr	which equals	7 mg/m²/day
% Lost to Soil Processes (Geary & Gardner 1996)	0.2	Decimal	**Phosphorus Sorption**				
Total N Loss to Soil	4,320	mg/day	P-sorption result	702	mg/kg	which equals	7,862 kg/ha
Remaining N Load after soil loss	17,280	mg/day	Bulk Density	1.4	g/cm3		
Effluent P Concentration	15	mg/L	Depth of Soil	0.8	m		
Design Life of System	50	yrs	% of Predicted P-sorp. [2]	0.5	Decimal		

METHOD 1: NUTRIENT BALANCE BASED ON ANNUAL CROP UPTAKE RATES

Minimum Area required with zero buffer		
Nitrogen	485.17	m^2
Phosphorus	380.41	m^2

Determination of Buffer Zone Size for a Nominated Land Application Area (LAA)		
Nominated LAA Size	1,044.00	m^2
Predicted N Export from LAA	-7.26	kg/year
Predicted P Export from LAA	-6.88	kg/year
Phosphorus Longevity for LAA	308	Years
Minimum Buffer Required for excess nutrient	0	m^2

PHOSPHORUS BALANCE
STEP 1: Using the nominated LAA Size

Nominated LAA Size	1,044	m^2				
Daily P Load	0.0108	kg/day	→	Phosphorus generated over life of system	197.1	kg
Daily Uptake	0.007151	kg/day	→	Phosphorus vegetative uptake for life of system	0.125	kg/m^2
Measured p-sorption capacity	0.78624	kg/m^2				
Assumed p-sorption capacity	0.393	kg/m^2	→	Phosphorus adsorbed in 50 years	0.393	kg/m^2
Site P-sorption capacity	410.42	kg	→	Desired Annual P Application Rate	10.818	kg/year
				which equals	0.02964	kg/day
P-load to be sorbed	1.33	kg/year				

NOTES

APPENDIX B

DSM Model Inputs and Outputs

Project Dir = C:\Users\JasminKable\Desktop\
Output Dir = C:\Users\JasminKable\Desktop\Outputs\
Table Dir = C:\Users\JasminKable\Desktop\Tables\
MU Filenames =
MU1.csv
RN Filenames =
receiving node creek.csv
nUnits = 1
nNodes = 1
nSites = 368
nLinks = 1
nSoils = 8
nCrops = 1
nData = 26664
StartDate = 1/01/1940
EndDate = ########

SiteID	X_coord	Y_coord	LAA	WWF	WWF_File	TN	TP	Virus	StorageTy	LAAType	AppMethod	SC	SD	SKsat	FAD	SWT	AAD	CropN	CropP	CropFactor
1	501577.9	6641069	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
2	501543.6	6641043	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
3	501771.9	6640978	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
4	501753.6	6641131	1043	0.72		30	15	100	1	2	1	0	0	0	5	0	0	130	25	Grass
5	501676	6641109	1043	0.72		30	15	100	1	2	1	0	0	0	5	0	0	130	25	Grass
6	501762	6641065	1043	0.72		30	15	100	1	2	1	0	0	0	5	0	0	130	25	Grass
7	501683.1	6641056	1043	0.72		30	15	100	1	2	1	0	0	0	5	0	0	130	25	Grass
8	501693	6640985	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	DEFAULT
9	501828.7	6641028	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
10	501877.1	6641140	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
11	501823.5	6641163	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
12	501832.5	6641098	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
13	501881.3	6640981	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
14	501907.2	6641048	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
15	501893.1	6641200	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
16	501942.9	6641112	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
17	501946.2	6641196	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
18	502136.4	6641179	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
19	502183.4	6641137	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
20	502290.5	6641080	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
21	502334.2	6641098	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
22	502360	6641033	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
23	502359.1	6640966	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
24	502339.8	6640917	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
25	502407.5	6641030	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
26	502501.9	6640991	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
27	502559.7	6640990	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
28	502444.6	6641018	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
29	502555	6640924	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
30	502493.4	6640939	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
31	502438	6640952	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
32	502432.4	6640893	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
33	502510.3	6640877	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
34	502622.6	6640833	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
35	502600.5	6640875	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
36	502609.5	6640928	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
37	502617	6640990	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
38	502674.8	6640984	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
39	502666.8	6640918	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
40	502661.1	6640862	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
41	502712.8	6641047	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
42	502737.7	6640954	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
43	502724.1	6640880	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
44	502632.5	6641078	272	0.72		60	15	10000000	1	1	1	0	0	0	0	0	0	130	25	Grass
45	501631	6641067	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
46	501639.4	6641018	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
47	501579.7	6641099	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
48	501534.2	6641092	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
49	501616.4	6640991	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
50	501605.1	6641084	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
51	501716.5	6641116	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
52	501725.4	6641060	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass

53	501732	6640983	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
54	501817.9	6640960	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
55	501869.1	6641070	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
56	501846.1	6641131	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
57	501801	6641140	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
58	501804.8	6641079	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
59	501900.6	6641067	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
60	501925	6641064	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
61	501954.6	6641056	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
62	501939.1	6641036	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
63	501923.6	6640998	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
64	501914.7	6641025	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
65	502114.8	6641196	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
66	502075.8	6641221	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
67	501932.5	6641143	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
68	501954.6	6641219	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
69	501988.9	6641248	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
70	502043.9	6641239	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
71	502221.9	6641113	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
72	502273.1	6641116	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
73	502330	6641071	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
74	502327.1	6641040	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
75	502545.6	6640892	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
76	502469.9	6640910	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
77	502456.8	6641046	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
78	502650.8	6641342	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
79	502552.6	6641139	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
80	502583.6	6641134	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
81	502678.5	6641046	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
82	502734	6641040	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
83	502764.5	6641029	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
84	502771.5	6640979	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
85	502762.1	6640938	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
86	502757.9	6640901	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
87	502742.4	6640983	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
88	502734	6640919	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
89	502720.3	6640859	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
90	502712.3	6640820	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
91	502741.9	6640808	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
92	502707.2	6640993	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
93	502703.9	6640968	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
94	502697.8	6640937	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
95	502692.6	6640901	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
96	502689.8	6640873	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
97	502686.5	6640845	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
98	502684.6	6640822	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
99	502651.7	6641002	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
100	502643.8	6640967	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
101	502639.1	6640935	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
102	502634.8	6640905	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
103	502627.8	6640881	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
104	502625.9	6640863	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
105	502653.6	6640833	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
106	502615.6	6640955	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
107	502628.7	6641009	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
108	502583.2	6640856	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
109	502545.1	6641320	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
110	502497.2	6641166	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
111	502524	6641157	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
112	502486.4	6641124	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
113	502519.7	6641121	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
114	502426.7	6641164	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
115	502390.1	6641236	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
116	502465.2	6641153	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
117	502460.5	6641129	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
118	502415.5	6641129	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
119	502442.2	6641139	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
120	502453.5	6641108	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
121	502435.7	6641426	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass

122	502438	6641401	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
123	502401.4	6641418	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
124	502368.9	6641413	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
125	502340.3	6641413	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
126	502310.7	6641455	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
127	502452.1	6641577	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
128	502452.6	6641607	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
129	502467.6	6641636	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
130	502485.5	6641662	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
131	502492.5	6641701	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
132	502352	6641688	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
133	502409.3	6641816	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
134	502419.7	6641837	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
135	502427.7	6641852	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
136	502297.5	6641238	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
137	502353	6641249	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
138	502339.8	6641199	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
139	502335.6	6641163	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
140	502305.5	6641190	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
141	502275	6641203	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
142	502400.9	6641192	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
143	502198.9	6641267	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
144	502218.1	6641222	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
145	502240.2	6641349	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
146	502181.5	6641365	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
147	502207.1	6641317	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
148	502099.7	6641349	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
149	502136.8	6641378	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
150	502096.7	6641390	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
151	502102.5	6641446	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
152	501992.2	6641558	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
153	502023.5	6641518	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
154	502003.2	6641488	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
155	502046.1	6641501	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
156	502026.4	6641465	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
157	502061.8	6641471	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
158	502050.8	6641411	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
159	502088.6	6641678	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
160	501886.8	6641724	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
161	501948	6641670	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
162	501939.3	6641635	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
163	501952.6	6641588	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
164	502064.7	6641289	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
165	502001.7	6641322	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
166	501913.7	6641504	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
167	501935.2	6641452	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
168	501957.8	6641407	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
169	501982.2	6641364	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
170	501840.4	6641450	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
171	501867.2	6641488	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
172	501905.6	6641365	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
173	501867.2	6641332	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
174	501906.1	6641294	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
175	501692.4	6641484	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
176	501745.2	6641180	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
177	501798.1	6641211	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
178	501850.4	6641236	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
179	501738.2	6641248	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
180	501784.7	6641266	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
181	501838.2	6641288	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
182	501716.8	6641313	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
183	501763.8	6641325	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
184	501825.4	6641340	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
185	501709.2	6641376	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
186	501778.9	6641373	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
187	501810.9	6641443	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
188	501667.3	6641316	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
189	501632.5	6641481	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
190	501611.6	6641441	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass

191	501649.9	6641445	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
192	501601.7	6641392	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
193	501666.8	6641397	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
194	501644.7	6641355	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
195	501703.4	6641200	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
196	501577.9	6641223	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
197	501547.7	6641149	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
198	501639.5	6641167	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
199	501640.6	6641220	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
200	501357.7	6641354	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
201	501359.5	6641368	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
202	501374	6641342	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
203	501363	6641337	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
204	501379.2	6641323	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
205	501374.6	6641317	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
206	501382.7	6641305	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
207	501380.4	6641292	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
208	501392	6641276	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
209	501394.9	6641260	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
210	501400.1	6641249	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
211	501408.9	6641238	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
212	501413.5	6641228	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
213	501429.8	6641559	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
214	501492.5	6641134	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
215	501329.8	6641469	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
216	501363.5	6641469	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
217	501405.4	6641468	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
218	501329.8	6641446	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
219	501365.9	6641446	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
220	501414.7	6641448	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
221	501341.5	6641415	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
222	501375.7	6641418	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
223	501419.3	6641422	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
224	501356	6641389	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
225	501400.7	6641390	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
226	501457.1	6641397	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
227	501395.5	6641351	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
228	501435.6	6641360	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
229	501484.4	6641374	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
230	501394.9	6641317	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
231	501442.5	6641327	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
232	501475.7	6641333	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
233	501398.4	6641287	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
234	501443.1	6641297	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
235	501412.9	6641258	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
236	501448.9	6641268	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
237	501437.3	6641247	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
238	501381	6641371	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
239	501348.4	6641785	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
240	501382.7	6641772	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
241	501416.4	6641759	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
242	501336.8	6641734	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
243	501367.6	6641748	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
244	501450.1	6641756	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
245	501374.9	6641831	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
246	501641.8	6641793	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
247	501649.4	6641816	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
248	501658.1	6641842	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
249	501629	6641856	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
250	501618	6641831	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
251	501608.1	6641875	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
252	501595.9	6641848	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
253	501587.8	6641886	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
254	501571.5	6641861	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
255	501557	6641902	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
256	501532	6641878	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
257	501534.9	6641943	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
258	501512.8	6641924	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
259	501494.3	6641896	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass

260	501487.3	6641946	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
261	501462.9	6641971	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
262	501425.7	6641994	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
263	501360.6	6641867	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
264	501390.8	6641856	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
265	501354.8	6641840	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
266	501346.7	6641814	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
267	501439.6	6641794	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
268	501461.1	6641777	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
269	501393.8	6641805	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
270	501684.3	6641776	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
271	501687.7	6641726	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
272	501649.6	6641561	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
273	501719.6	6641683	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
274	501753.4	6641649	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
275	501726	6641580	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
276	501712.7	6641632	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
277	501781.5	6641613	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
278	501765.6	6641577	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
279	501879.4	6641622	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
280	501905.6	6641564	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
281	501823.6	6641508	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
282	501842.8	6641771	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
283	501836.3	6641798	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
284	501849.3	6641844	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
285	501872.7	6641875	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
286	501902.1	6641847	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
287	501863.4	6641817	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
288	501897.7	6641892	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
289	501881.7	6641795	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
290	501982.2	6641975	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
291	501944.2	6642003	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
292	501948	6641981	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
293	501814.1	6641887	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
294	501792.6	6641935	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
295	501853.6	6642052	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
296	501806.2	6642054	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
297	501811.4	6641913	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
298	501784.4	6641898	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
299	502236	6641444	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
300	502108	6641487	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
301	502267.2	6641486	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
302	502274.2	6641526	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
303	502280	6641569	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
304	502286.9	6641618	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
305	502296.8	6641669	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
306	502300.3	6641704	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
307	502266	6641713	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
308	502255	6641654	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
309	502253.2	6641603	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
310	502244.5	6641551	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
311	502236.4	6641517	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
312	502240.5	6641738	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
313	502234.1	6641695	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
314	502219.5	6641655	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
315	502214.3	6641619	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
316	502208.5	6641758	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
317	502205	6641727	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
318	502191.7	6641693	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
319	502181.2	6641658	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
320	502141.7	6641640	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
321	502153.3	6641676	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
322	502162.6	6641709	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
323	502166.7	6641734	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
324	502176	6641770	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
325	502160.9	6641804	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
326	502148.7	6641770	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
327	502143.4	6641748	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
328	502137.1	6641716	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass

329	502131.8	6641693	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
330	502127.2	6641660	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
331	502110.9	6641696	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
332	502120.2	6641734	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
333	502131.8	6641774	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
334	502137.6	6641801	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
335	502144.6	6641825	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
336	502092.9	6641709	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
337	502098.1	6641732	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
338	502102.8	6641759	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
339	502107.4	6641784	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
340	502117.3	6641820	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
341	502098.1	6641846	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
342	502088.3	6641822	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
343	502080.1	6641784	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
344	502067.3	6641752	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
345	502038.3	6641766	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
346	502048.8	6641789	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
347	502058.6	6641819	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
348	502065.6	6641845	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
349	502074.3	6641870	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
350	502017.4	6641777	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
351	502028.4	6641840	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
352	502041.8	6641879	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
353	502013.3	6641878	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
354	502023.8	6641915	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
355	502002.3	6641905	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
356	502008.1	6641955	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
357	502145.8	6641959	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
358	502186.4	6641966	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
359	502226.5	6641970	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
360	502272.4	6641964	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
361	502170.2	6641934	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
362	502205.6	6641940	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
363	502248	6641942	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
364	502270.7	6641920	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
365	502234.1	6641905	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
366	502275.3	6641888	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
367	502255.6	6641872	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	
368	502279.4	6641841	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass	

LinkID	k_Flow_ov	k_TN_over	k_TP_over	k_Virus_ov	k_Flow_su	k_TN_surf	k_TP_surf	k_Virus_su	k_Flc	k_TN_dd	k_TP_dd	k_Virus_dd
1	0.6	0.93	0.94	0.97	0.6	0.93	0.94	0.97	0.6	0.93	0.94	0.97

Date	R	ET	E	T								
26664	26664	26664	26664	26664				325				
1/01/1940	0	5.3	6.2	23				43				
2/01/1940	1.6	4.8	6.4	20.8								
3/01/1940	0	4.8	6.4	23.5								
4/01/1940	0	6	6.4	25.2								
5/01/1940	0.8	4.6	6.4	22.8								
6/01/1940	0	4.5	6.4	23.2								
7/01/1940	0	4.3	6.4	21.5								
8/01/1940	8.9	5.3	6.4	21.5								
9/01/1940	1.1	4.8	6.4	22								
10/01/1940	0	4.4	6.4	23.5								
11/01/1940	0	4.3	6.2	24								
12/01/1940	0	5	6.2	25								
13/01/1940	0	4.8	6.2	23.2								
14/01/1940	0.9	4.1	6	22.5								
15/01/1940	0.5	6.4	6.2	25.5								
16/01/1940	46.5	4.8	6.2	27								
17/01/1940	1.4	5.7	6.2	27.8								
18/01/1940	0.6	5.3	6	25.5								
19/01/1940	7.2	5.8	6.2	25.2								
20/01/1940	8.6	5.4	6.4	24.5								
21/01/1940	0	4.3	6.4	25.5								
22/01/1940	0.7	7.2	6.4	28								
23/01/1940	0	7.1	6.4	24.5								
24/01/1940	0	7.7	6.4	27.2								
25/01/1940	0	6.8	6.2	29								

DSM Soil Data Inputs

Data Input	Code	Value	Unit	Typical Source of Information
Bio-physical Data				
Soil water at effective saturation	SAT	mm	352-437	saturated capacity. need to represent a trench media if trench, but soil if irrig area. porosity *0.9 or 0.95
Field capacity	FC		130-240	field capacity. point at which soil stops draining. See Interp Soil Test Results (Hazelton 2007) table 2.5
Permanent Wilting Point	PWP		16-25	permanent wilting point. Point at which plants cannot obtain enough water. See Interp Soil Test Results (Hazelton 2007) table 2.5
Saturated hydraulic conductivity	SHC	mm/day	60-380	rate of percolation through the saturated soil profile. Use limiting layer
Soil depth for phosphorus sorption	SDP	mm	350-1500	soil depth for p sorp. Use limiting layer
Bulk density	BD	kg/m^3	1400-1600	bulk density. Average value based on soil depth
Initial depression storage	DS	mm	6	depression storage. Initial loss before infiltration
Dry soil infiltration rate	INF	mm/day	60-120	infiltration rate of water
Infiltration exponent	EXP1	dimensionless	5698	exponent 1. how slowly ifiltration decreases once soil gets wet.
Freundlich adsorption coefficient	A1	g/L	259	A1 is exp10 of intercept of isotherm with y axis
Freundlich adsorption exponent	B1	dimensionless	0.99	B1 is slope of log normal line
Freundlich desorption exponent	B2		0.495	B2 is half of B1

DSM Output Summary

DSM Outputs	**Receiving Node**
Mean Annual Surface Runoff (m3) =	0.00
Mean Annual Surface N (g) =	0.00
Mean Annual Surface P (g) =	0.00
Mean Annual Surface V (MPN) =	0.00
Mean Annual Deep Drainage (m3) =	315.45
Mean Annual Deep Drainage N (g) =	84.52
Mean Annual Deep Drainage P (g) =	13.61
Mean Annual Deep Drainage V (MPN) =	170921296.00

N: Total Nitrogen
P: Total Phosphorus
V: viruses (Most Probable Number).

APPENDIX 6

Office of Environment & Heritage

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : 07072021

Client Service ID : 604414

Grahame Fry

10 Bailey Avenue
Coffs Harbour New South Wales 2450

Attention: Grahame Fry

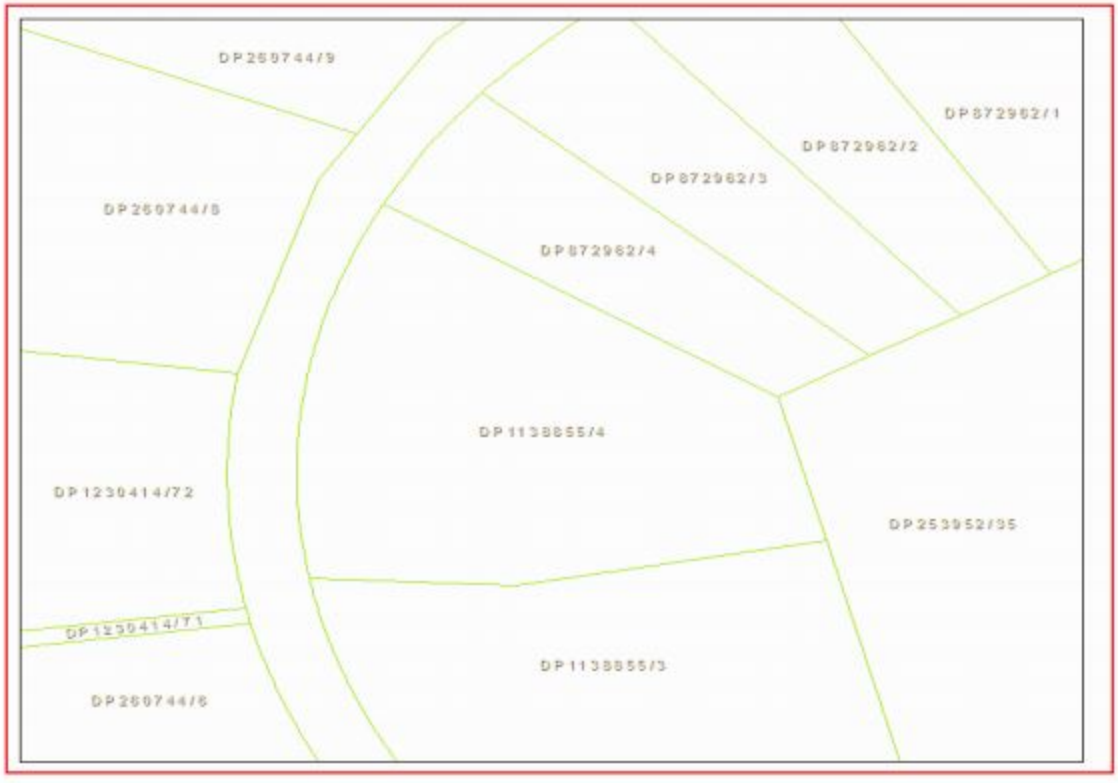
Email: grahamecfry@yahoo.com.au

Date: 07 July 2021

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 4, DP:DP1138855 with a Buffer of 50 meters, conducted by Grahame Fry on 07 July 2021.

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



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

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