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AGRICULTURAL ASSESSMENT

on

Lot 2 DP 1159910

66 The Saddle Road, Brunswick Heads

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1 EXECUTIVE SUMMARY

1. An agricultural report has been requested in relation to a proposed rezoning of lands identified as Lot 2 DP 1159910 situated at 66 The Saddle Road Brunswick Heads.

2. The report has determined that the land comprises approximately 80% Class 5 lands with the remaining 20% being Class 3. Overall the land is best suited to low intensity grazing operations on native pastures which is reflective of the current land use. A higher agricultural land classification is limited by a combination of localised steep slopes, shallow and poorly structured soils, significant rock outcrop and flood prone areas. A higher agricultural land use for the identified Class 3 land is limited by the small area of land that is available (and therefore low economic viability) and also the higher perceived value of the land for non-agricultural uses.

3. Much of the land within the site has been identified as Significant Non-Contiguous Farmland under the Northern Rivers Farmland Protection Project. This report disagrees with this assessment and has provided comments in this regard. As a general summary the land does not have the same inherent characteristics of other Regionally Significant Farmlands of the wider region that are known to be good quality grazing lands and or that which are moderately well suited to horticultural production. This land due to its shallow and highly erosive soils, localised steep slopes and significant rock outcrops is neither good quality grazing land and nor is it well suited to horticultural production.

4. The Byron Shire Business and Industrial Lands Strategy has highlighted a demand for increased jobs, business and industrial premises in line with the projected population growth of the region. While approval of this development proposal will result in the alienation of the land from future agricultural production it is also inevitable that the development of current non-industrial lands in the locality to industrial will occur.

5. Given the lands limited potential for agricultural production both now and into the future, approval of this proposal will in no way significantly detract from the existing or future agricultural production of the wider region. Furthermore, approval of the proposal will take pressure off surrounding better quality agricultural lands for similar developments.

6. From an agricultural perspective therefore, there is no reason why Council should not approve the application.

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2 INTRODUCTION

7. Allen & Associates have been requested to undertake an agricultural assessment of the land situated at 66 The Saddle Road (Lot 2 DP 1159910) Brunswick Heads.

8. Land within the Lot 2 and in particular that portion that exists on the northern side of The Saddle Road and to the south of Gulgan Road has been identified (Byron Shire Business and Industrial Lands Strategy) for further investigation as to its suitability to industrial development. The agricultural assessment will be submitted therefore as a part of an investigation for the release of the land to Industrial land use.

2.1 Byron Shire Business and Industrial Lands Strategy – October 2020

9. The Byron Shire Business and Industrial Lands Strategy was published in October 2020 by Byron Shire Council. This Strategy was prepared in response of the North Coast Regional Plan (NCRP) which as a part of its first direction requires Councils to "prepare land release criteria to assess appropriate locations for commercial and industrial uses."[1] The Plan acknowledges an anticipated population growth for the region and a subsequent increased demand for a range of jobs, business and industrial premises.

10. The Byron Shire Business and Industrial Lands Strategy as prepared provides specific directions to be taken in order to deliver on the Strategy's aim. Direction 3 of the Strategy in particular is to: "Secure a sustainable long term supply of suitable industrial lands[2]. This Direction states that the current supply of zoned industrial land for the Shire is insufficient for future demands. Subsequently 7 investigation areas for new industrial and or business parks were identified. A portion of the lands that are the subject of this report are listed as one of these investigation areas and are identified within the Strategy as Area 5 Gulgan North industrial and business park.

11. Of particular relevance to this report is the current classification of land within the site as Regionally Significant Farmland (non-contiguous) and also any potential impacts that the development to Industrial purposes will have on surrounding lands.

3 PROPERTY DESCRIPTION

3.1 General

12. Appendix 1 shows the location of the site which is situated approximately 2.5 kilometres by sealed road from the township of Brunswick Heads directly to the northeast. Refer to Appendix 1 which also shows the location of the Area 5 (Gulgan North) investigation area.

[1] Byron Shire Council (2020), Byron Shire Business and Industrial lands Strategy – October 2020
[2] *ibid*

13. The site is approximately 52.5 hectares in area and is divided into 4 separate portions by Gulgan Road, The Saddle Road and the Pacific Motorway. Separate entrances to the site are via The Saddle Road and also Gulgan Road. Access to the small portion on the northern side of the Pacific Motorway is gained from Tweed Street.

14. As per the Byron Shire LEP 2014 The bulk of the land within the site is zoned RU2 (Rural Landscape) with small isolated areas retaining the Deferred Matters zoning. Refer to Appendix 2.

15. The current land use of the site is identified as cattle grazing on unimproved pastures. Landuses that immediately surround and that are near to the site are a therefore a combination of built up residential, general rural (grazing) and coastal scrub. Refer to Appendix 3.

4 LAND CLASSIFICATION

16. It is normal to define land use potential by using the Rural Land Evaluation Manual[3] (RLEM) to classify land forms into classes based on their potential land use. The land classes in the RLEM are as per the below.

Class 1
Arable land suitable for intensive cultivation where constraints to sustained high levels of agricultural production are minor or absent.
Class 2
Arable land suitable for regular cultivation for crops but not suited to continuous cultivation. It has a moderate to high suitability for agriculture but edaphic (soil factors) or environmental constraints reduce the overall level of production and may limit the cropping phase to a rotation with sown pastures.
Class 3
Grazing land or land well suited to pasture improvement. It may be cropped in rotation with pasture. The overall production level is moderate because of edaphic or environmental constraints. Erosion hazard and soil structural breakdown or other factors including climate may limit the capacity for cultivation and soil conservation or drainage works may be required.
Class 4
Land suitable for grazing but not for cultivation. Agriculture is based on native pastures or improved pastures established using minimum tillage techniques. Production may be seasonally high but the overall production level is low as a result of major environmental constraints.
Class 5
Land unsuitable for agriculture or at best suited only to light grazing. Agricultural production is very low or zero as a result of severe constraints, including economic factors, which preclude land improvement.
Special Class
Land which, because of a combination of climate and soil, is well suited to intensive production of a crop or a narrow range of crops whose special requirements limit their successful culture to such land. This class may include some lands formerly described as unique.

[3] RLEM. Rural Land Evaluation Manual (1988), New South Wales Department of Planning Sydney

17. Land classification studies are made based on the analysis of the lands biophysical (terrain, soil type, climate etc.), social and economic factors. In this particular situation and as per the RLEM Land Classification Classes, land within the subject site is classed as being a combination of Class 3 and Class 5 land. In this instance the principal land class determining factors are identified as being terrain (slope), soil type, rock outcrop and aspect. Further discussion around each of the principal factors studied is provided in the Sections 4.1 through to 5.1.

18. Class 3 lands occupy approximately 20.2% of the sites total area and are situated directly to the north and south of The Saddle Road. In these areas the degree of slope is more gentle, has less visual rock outcrop and is less fragmented. Class 5 lands occupy the remaining 79.8% of the total site area and is characterised by lands that have one or more elements of localised steep slopes, poorly structured surface soil, significant rock outcrop, very poorly drained soil or fragmented terrain. Refer to Appendix 5.

4.1 Topography

19. Refer to Appendix 4 that shows the terrain of the site. Landform patterns present are Low Hills and Floodplain. According to the nature of the landform present, the degree of slope within the site fluctuates between 0% on the lower floodplain and footslope areas to greater than 20% on the upper hillslopes. More gently sloping lands are situated within the site on either side of The Saddle Road which traverses a distinct ridgeline that extends into lands further to the south west of the site. There are a number of natural drainage lines that are situated particularly in the western portions of the site that serve to fragment the land and subsequently make practical land use management difficult.

20. On the basis of slope and terrain alone the best agricultural lands occupy the moderately sloping land directly to the north and south of The Saddle Road. The remainder of the upper slope areas have either excessive slope and or are fragmented by natural features. The lower lands to the south of Gulgan Road have a minimal degree of slope however this area is also floodprone.

4.2 Soil Type

21. Thirteen test holes were dug throughout the subject site so as to access soil profiles and to determine soil types. The test holes were dug using a 100 * 1500mm hand auger. Refer to Appendix 4 for locations of each test site that are delineated H1, H2, H3 etc.

22. Soils throughout the site vary according to terrain. Prairie soils occupy the lower floodplain area directly to the south of Gulgan Road and within that small area to the north of Gulgan Road as it abuts the footslopes of the hillslope areas. Krasnozem soils occupy the hillslope areas of the site and are therefore the dominant soil type that is present. The soil survey undertaken agree with that of the Soils Landscape map for the Lismore – Ballina[4] area.

[4] Morand, D.T. (1994) Soil Landscapes of the Lismore-Ballina 1:100000 Sheet. Department of Conservation and Land Management.

23. Krasnozem soils are typically strongly structured[5] deep well drained red to red-brown soils that are loam to clay loam textured at the surface and which gradually become more clayey with depth. In this instance.

24. In this instance Krasnozem soils were encountered at H3, H4, H6, H7, H8, H9, H10, H11, H12 and H13. Refer to Appendix 7 for profile photos and descriptions. Krasnozem soils within the site are considered to be of a poorer quality than those that are common to the gentle to moderately sloping lands of the Alstonville Plateau, Bangalow and Dunoon areas that are widely utilised for horticultural production; principally macadamias.

25. The Krasnozems within the site were shallow having less than 50cm of less heavily textured soil before a Medium Heavy Clay was encountered. Upon inspection the surface soils were also of a poor structure. The shallow nature of the soils and poorly structured A horizon predisposes them to a high risk of soil erosion which is exacerbated by the sloping nature of the terrain with which they are associated.

26. The Krasnozem soils of the site are or a poorer quality in comparison to those inherent to other regions that are utilised extensively for intensive horticulture.

27. Prairie soils Prairie soils typically have loam to clay-textured dark A horizons overlying B horizons that are more heavily textured (heavier clay), and lighter in colour. Prairies soils may be good quality agricultural soils; however in this instance their use for higher purposes is restricted due to a number of factors such as poor drainage and risk of flooding and distribution patterns in relation to land parcels.

28. In this instance Prairie Soils were encountered at H1, H2 and H5. Refer to Appendix 7 for profile photos and descriptions. Note the reference to mottling within the B horizons (subsoil) which is indicative of zones of alternating good and bad aeration (oxidation and reduction); that is restricted internal drainage conditions that are typically a result of a heavily textured subsoil of low permeability or a shallow water table or both. Note also the gleyed colour of the B horizon which is caused by the soil being subjected to a shallow water table for an extended period of the year.

4.3 Rock Outcrop

29. Significant areas of rock outcrop exist throughout the slope and in particular the mid-slope areas to the south and north of The Saddle Road and Gulgan Road respectively. These outcrops occupy both the steeper and moderately sloping lands and are a major constraint to cultivated agriculture. Refer to Figure 1 through to Figure 4.

[5] Charman, P.E.V., Murphy, B.W. (eds). (1991), Soils. Their Properties and Management. A Soil Conservation Handbook for New South Wales. Sydney University Press.

Figure 1: Rock shelf to north west of H4

Figure 2: Rock outcrop and shelf to north east of H8

Figure 3: Rock outcrop to north of H8

Figure 4: Rock outcrop to north west of H6

4.4 Aspect

30. Aspect for the site varies according to the terrain that is present. For the context of this report aspect has the greatest relevance to agricultural potential for the more elevated areas that are on either side of The Saddle Road. These lands have the greatest level of exposure to prevailing weather conditions particularly destructive winds that can occur from time to time from the southerly directions.

4.5 Climate

31. The property enjoys a variable but favourable annual rainfall which is ideal for the successful production of many agricultural crops.

32. Rainfall intensity in the area can be extremely high and this along with the lightly textured and poorly structured nature of the soil in the sloping areas combines to make these areas of the site vulnerable to erosion when in an unvegetated state because of high rates of surface runoff and high water flow velocities.

33. Temperatures are warm to hot in summer and this allows a long pasture and crop growing season when moisture levels permit.

5 REALISTIC LONG TERM AGRICULTURAL LAND USE

34. Land within the site is comprised of a combination of Class 3 and Class 5 land with approximately 80% of the land being Class 5.

35. Approximately 20% of the site has better quality land (Class 3) that has some potential for an associated agricultural land use such as horticultural production. Use of this land in this manner is constrained however by a number of issues:

- Identified poorer quality of the inherent soil type in comparison to the deeper and better structured soils that are widely used for horticulture in lands separate to the site – refer to Section 4.2.
- Economic viability and pressure from alternative (higher value) land uses – refer to Section 5.1.

36. Realistic agricultural land use within the site is restricted to low intensity livestock grazing as per the current situation. Higher stocking rates and or improved pastures pose a risk of soil erosion and degradation due to the poorly structured surface soils and degree of associated slope. The land is not high value or significant agricultural land.

5.1 Economic Factors – Class 3 Land

37. The Class 3 land has inherent soil, terrain and prevailing climate that would possibly result in the land being suited to a more intensive agricultural use than the current grazing enterprise. Horticultural production and in particular Macadamias that are widely grown throughout the Northern Rivers for instance is one possibility that could be investigated – although it is to be

reiterated that the land while being physically suitable is not believed to be as productive as other lands (Alstonville, Bangalow, Dunoon) that are utilised extensively for this purpose.

38. Other intensive horticultural operations such as may also be considered. However, the absence of adequate water for irrigation purposes effectively restricts this and other similar land uses that require supplementary irrigation.

5.1.1 Economics of Production - Macadamias

39. The site has an estimated 10.6 hectares that have been identified as having some suitability to horticultural production – e.g. macadamias. Assuming a required 20% of the land area for headlands, roads, infrastructure there is therefore 8.5 hectares of land that may actually be plantable.

Table 1: Economics of macadamia production

Class 3	
Total Area (Ha)	10.6
Plantable Area (Ha)	8.5
Annual Yield (Industry Average 2.58 tonnes/Ha	21.9
Income (Industry Long Term Average) $3.50/kg	$76,650
Costs of Production (Industry Average) $8,000/Ha	$68,000
NET RETURN	**$8,650**

40. Table 1 provides a broad overview of the costs and returns that could be expected to be achieved based on a potential macadamia orchard within the potentially suitable land within the site.

41. The yields achieved and prices paid to the farmer ultimately determine the economic productivity of the orchard. Yields per hectare of producing orchards vary from 0.92 for the bottom 25% to 4.06 tonnes per hectare of Nut In Shell (NIS) for the top 25% of benchmarked orchards[6]. Orchards within the Northern Rivers of NSW achieve on average 2.58 tonnes of NIS per hectare[7]. The long-term average Industry price (1996 – 2021) is approximately $3.50/Kg[8].

42. The figures within Table 1 show that assuming average Industry yields, costs and returns, the orchard will not achieve a level of income that is sufficient enough to sustain an average family without supplementary and off-site income. At the industry average yields achieved, the net income received of $8,650 is clearly insufficient to support the needs of an average family.

5.2 Land Use Pressure

43. The site does not contain high value agricultural land. Given this and the close proximity of the site to nearby tourist destinations and also its inherent elevation it is not unreasonable to

[6] Department of Agriculture and Fisheries (2016*), Macadamia industry benchmark report. 2009 to 2015 seasons.*
[7] Department of Agriculture and Fisheries, *opcit*
[8] http://australian-macadamias.org/industry/about-aussie-macadamias/stats

presume that the land would attract a higher value to a landowner if it was utilised for non-agricultural uses. The likelihood that long term agricultural use of the site (especially those uses that are more intensive in nature) would be undertaken at any time in the future is low.

6 THE APPLICATION AND RELEVANT ISSUES

6.1 North Coast Regional Plan

6.1.1 Appendix A – Urban Growth Area Variation Principles

44. Where appropriate comment is provided in relation to relevant areas (as relating to this Report) of the Urban Growth Area Variation Principles.

- **Policy**
  The proposed development is consistent with both the understood need for the provision of additional Industrial land and acknowledgement of the land within the site as suitable to such expansion.

- **Environmental and farmland protection**
  Refer to Section 6.2.

- **Land use conflict**
  Lands surrounding the site are similarly low value agricultural areas. The development to industrial purposes would be compatible therefore to these surrounding land uses.

- **Avoiding risk**
  Higher elevated lands within the area being investigated (Area 5) are not flood prone. Portions of part of the lower lands (southern side of Gulgan Road) and lower footslopes (northern side of Gulgan Road) would be effected in a 1 in 100 year flood. Appropriate levels of fill would likely be required.

  The lands that have the steepest slope and that are therefore the most erodible are excluded from the investigation area.

6.1.2 Appendix B – Important Farmland Interim Variation Criteria

45. Where appropriate comment is provided in relation to relevant areas (as relating to this Report) of the Important Farmland Interim Variation Criteria.

- **Agricultural Capability**
  The lands are low value agricultural land being predominately Class 5. The small area of better quality Class 3 land is unlikely to be utilised for an appropriate land use (according to this classification) due to the small area of land available and also the higher value that the land would naturally have for alternative non-agricultural uses.

Better quality and more contiguous farmlands are separate to and are situated generally to the south of the site.

- **Land Use Conflict**
  Refer to comments around Land Use Conflict are provided in Sections6.1.1.

- **Avoiding Risk**
  Refer to Section 6.1.1.

6.2 Northern Rivers Farmland Protection Project

46. According to Appendix 6 the bulk of the land within the site (including that land being investigated for Industrial development) is classified as Regionally Significant Non-contiguous Farmland. These are lands that have the general characteristics of state or regionally significant farmland but that do not fit within the definition of 'large contiguous areas'.[9]

This report disagrees with this classification and believes it more accurate to say that the land is Other Rural Land at best. Further discussion in relation to some central issues relating to the Farmland Protection Project are warranted.

6.2.1 Limitations to the Use of the Land for a Regionally Significant Farmland Purpose

47. Based on existing land use patterns regionally Significant farmland within the wider region is good quality land that is moderately well suited to intensive horticulture and or that is good quality grazing lands that are well suited to pasture improvement. Conversely State Significant farmland within the wider region is considered to be high quality land that is very well suited intensive horticulture – e.g. macadamias.

48. The land in this instance is not good quality land that is moderately well suited to horticulture and it is not good quality grazing lands that are well suited to pasture improvement. Soil types inherent to the site are significantly shallower and more erosive than other regionally significant farmland soils. Furthermore the area of land that is available for a regionally significant land use does not allow for a sustainable lifestyle.

49. The Northern Rivers Farmland Project Methodology Report indicates that present economics of an industry are not a sufficient justification of the inclusion or exclusion of lands from a particular land use[10]. In this instance and in relation to the identified Class 3 land it is believed that the economics of the macadamia industry; be they good or bad, is most certainly a sufficient justification for the exclusion of the land from the Significant Non-Contiguous Farmland classification.

[9] Department of Infrastructure, Planning and Natural Resources and NSW Department of Primary Industries, 2004, Northern Rivers Farmland Protection Project – Mapping Methodology.
[10] *ibid*

50. Table 1 within this report indicates that an average annual net income of $8,650 is achievable for the site under Macadamia production. In the context of average and long term trends for Macadamia production, the site therefore, irrespective of yield and price potential, simply is of not of an adequate size to be economically viable as a self-sustainable operation that is capable of supporting an average family.

6.2.2 Planning Principles – Hatched areas – significant non-contiguous farmland

51. Planning Principles as provided in Section 6 of the Final Recommendations report of the Farmland Protection Project provide comments in relation to land use change and subsequent rezoning. In particular "if there are compelling reasons to consider them for settlement as part of a council-initiated strategic planning process, then councils will be required to undertake a merit-based assessment of the agricultural value of such land."[11]

52. The lands within the site have been identified as worthy of investigation for Industrial land use as a part of the Byron Shire Business and Industrial Lands Strategy. Furthermore this report has shown that the lands are not of high value for agricultural purposes.

- **It would not significantly undermine the integrity of a regionally significant farmland area and;**

53. The site is situated separate to more contiguous significant farmlands. In this way the site's use for Industrial purposes will in no way undermine the integrity of wider farmlands.

- **It would not compromise local or regional agricultural potential by alienating agricultural infrastructure or agricultural transport routes, or decreasing 'critical mass' for any existing agricultural industry and;**

54. The establishment of an Industrial Estate onto the site would in no way negatively affect existing agricultural infrastructure or transport routes within the region.

- **It would not create impacts which would compromise the agricultural use of nearby regionally significant land; and**

55. The spatial distance of separation from nearby regionally significant lands is adequate in order to avoid compromising the agricultural use of such lands.

- **It would not be located in an area where there was an identified risk of land use conflict near an existing agricultural enterprise and;**

56. There are no areas of identified land use conflict with the proposed development. Surrounding land uses are for the most part low value agriculture, scrub and isolated lifestyle lots all of which would not be conflicting in nature with the proposed development.

[11] Department of Infrastructure, Planning and Natural Resources and NSW Department of Primary Industries, 2005, Northern Rivers Farmland Protection Project – Final Recommendations.

- **It would not involve filling part of a floodplain unless consistent with a floodplain management plan prepared in accordance with the Floodplain Management Manual and;**

57. The southern portion of the investigation area may be effected by a 1 in 100 year flood. Appropriate planning prior to the development phase would be required.

- **No viable alternative land is available which is suitable for the proposed industrial use.**

58. The need for the expansion of Industrial land for the locality has been established. The subject land has been identified as been a suitable site for such an expansion. Approval of the development will take pressure off other better quality rural lands that are separate to the site for similar developments.

6.2.3 Alienation of Agricultural Land

59. Approval of the application will remove the proposed development area of the site from future agricultural production. In terms of potential agricultural production the land has been identified as been suited to low intensity grazing operations at best. The land is not high value agricultural land due to its small land area and poor potential economic productivity. The loss of this land from future agricultural production (grazing or otherwise) will have no significant impact on the existing or future agricultural production potential of the location or wider region as a whole.

60. Irrespective, with or without approval of the application it is believed that the land has a low potential to be utilised for long term agricultural production due to its perceived higher value for alternative non-agricultural uses in comparison to an agricultural lot. As an example existing smaller scale developed macadamia properties are currently for sale at approximately $45,000 per acre of land. In contrast, similar sized lands that are suitable to horticulture but without such development are been offered for sale at approximately $70,000 per acre. To an owner the land is of more value in an undeveloped (for horticulture) state than as an existing or developed macadamia orchard.

6.3 Byron Shire LEP 2014

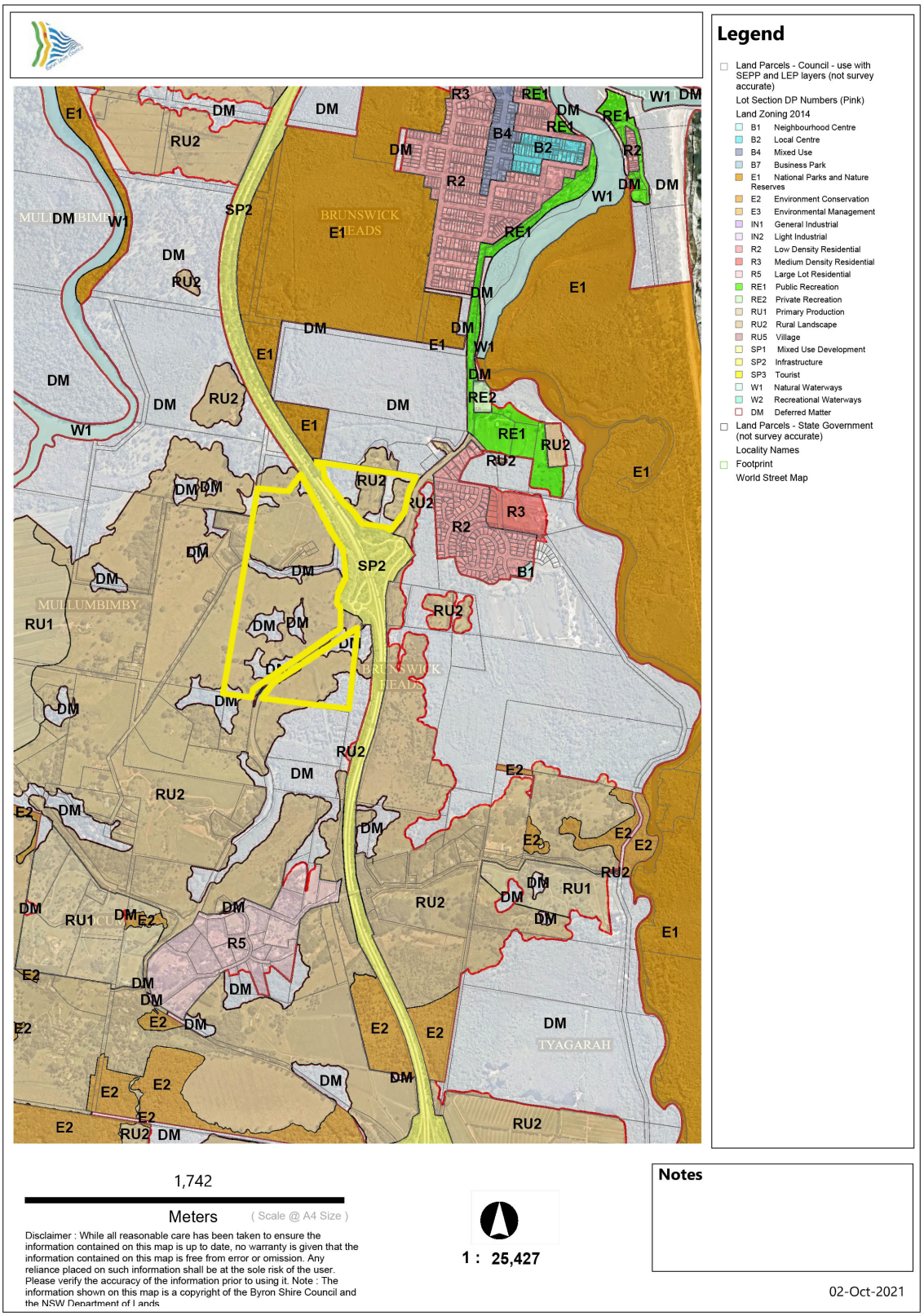
61. According to the Byron Shire LEP 2014 the site mostly has a RU2 Rural Landscape zoning. Small and separate areas within the site have a Deferred Matters zoning. Comments in relation to the Objectives of the RU2 zone are provided below.

6.3.1 Objectives of RU2 Zone

62. The objectives of the RU2 Zone have a consistent message of protecting the natural resources for agriculture and preserving the rural amenity. This report has shown that the land is poor quality agricultural land with limited potential for purposeful long term and sustainable agricultural production. By approving the land for development to an alternative non-agricultural use this will take pressure off surrounding higher value agricultural lands for such development.

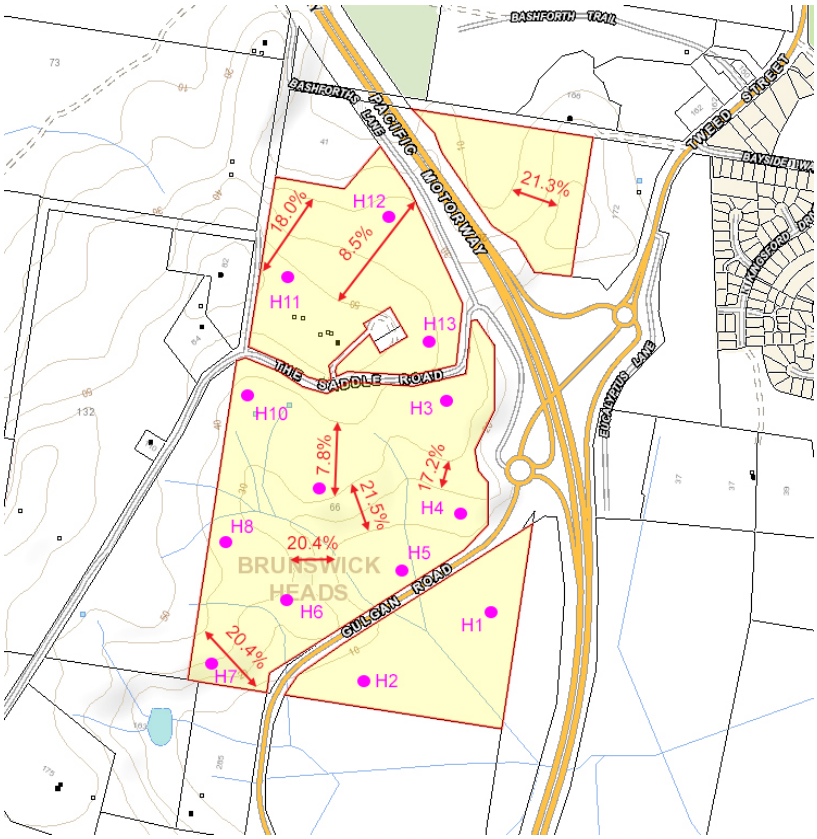
Appendix 1: Site Location

Appendix 2: Land Zoning

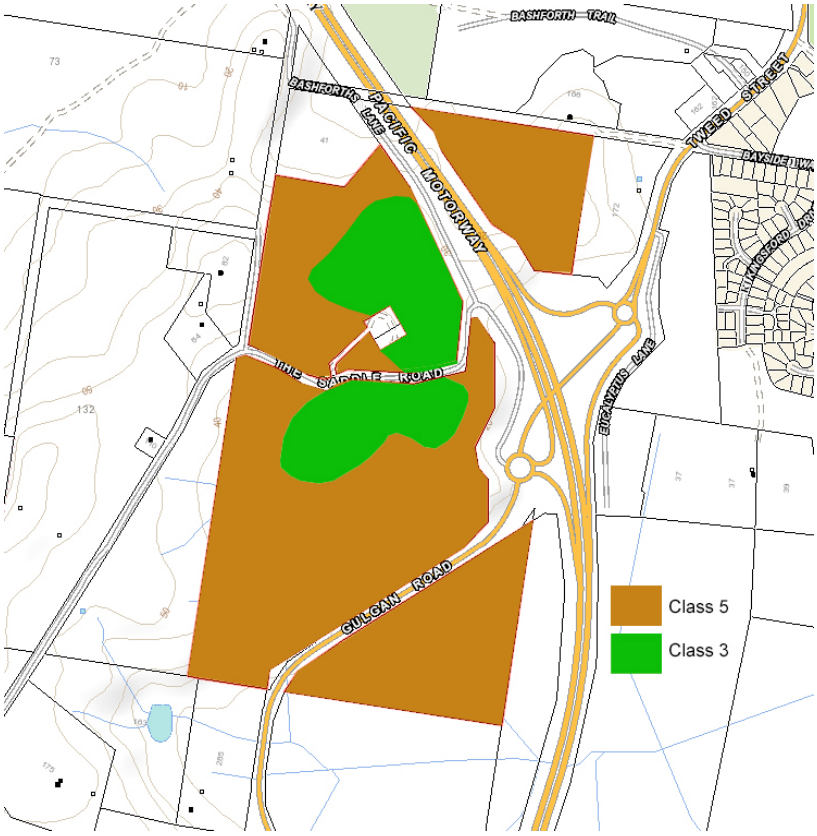


Appendix 3: Surrounding Land Uses

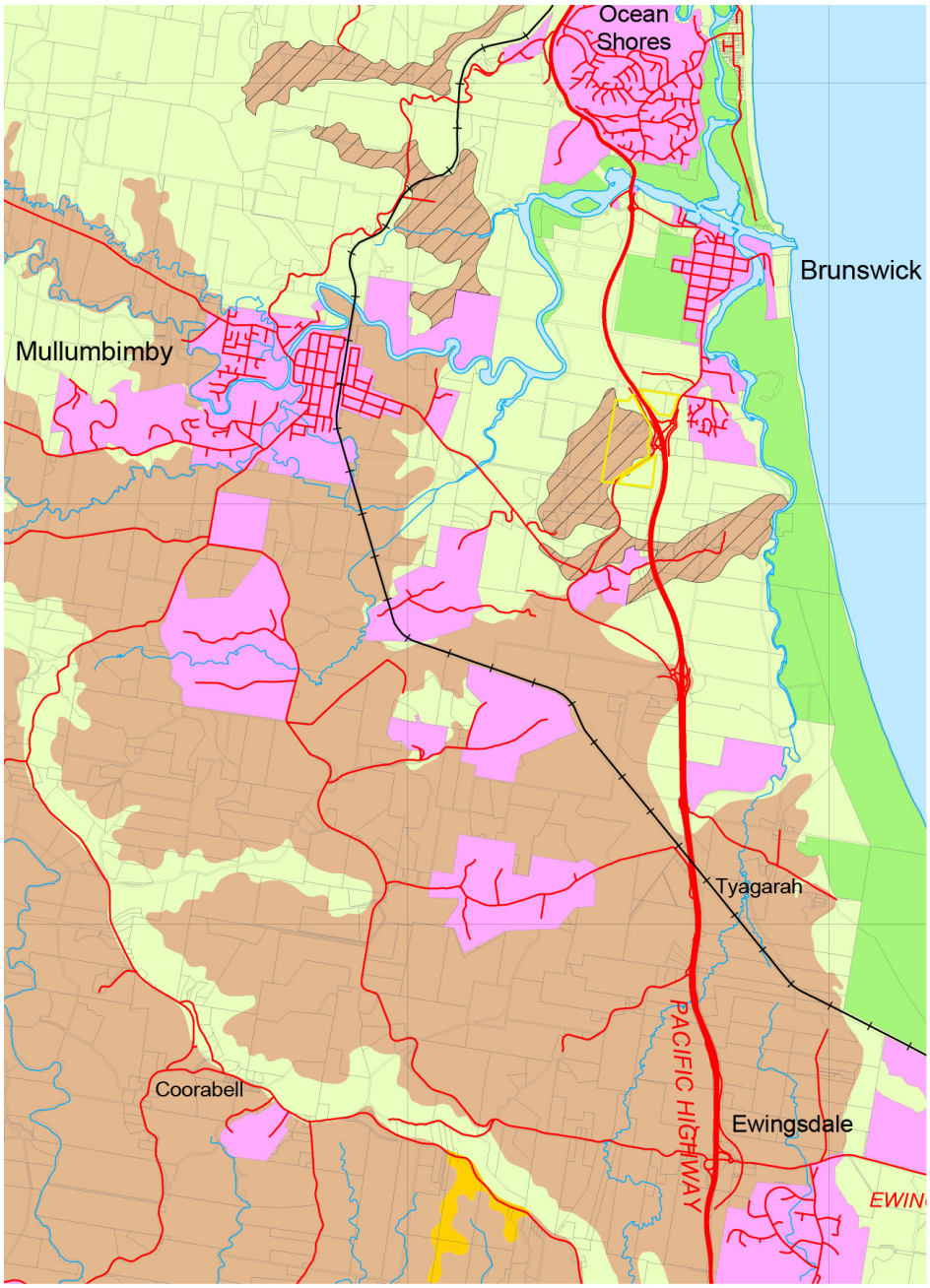
Appendix 4: Topography



Appendix 5: Land Classification



Appendix 6: Northern Rivers Farmland Protection Mapping



LEGEND

- State Significant Farmland
- Regionally Significant Farmland
- Significant Non-Contiguous Farmland
- Other Rural Land
- Committed Urban Uses and Rural-Residential Zones
- National Parks, State Forests
- Land outside Northern Rivers Catchment Management Area

Appendix 7: Soil Profiles

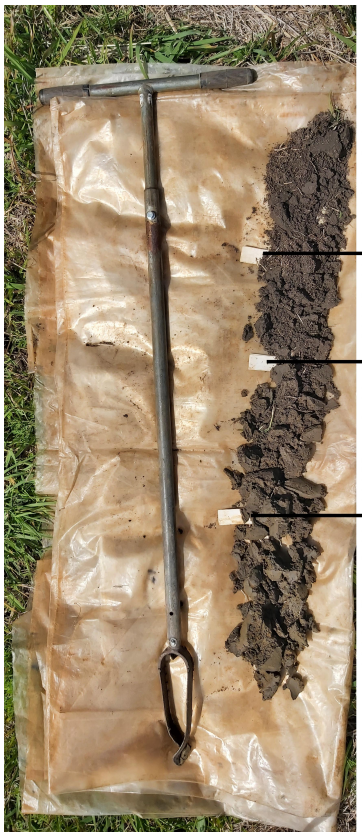
H1 Prairie Soil

A
0 - 12cm
2.5Y 2.5/1 - Black
Peaty Loam
Moderate structure
Clear change to:

B1 12 - 25cm. 2.5Y 3/1 - Very dark grey, Light Clay, Moderate Stucture, Gradual change to:

B2
25cm +
2.5Y 3/1 - Very dark grey
Medium Clay to Heavy Clay at depth
Poor structure

H2 Prairie Soil



A
2.5Y 2/1 - Black
Light Clay Loam
Moderate structure
Clear change to:

B1 0 - 12cm
2.5Y 3/1 - Very dark grey
Light Clay
Moderate structure
Clear change to:

B21
23 - 41cm
Gley 1 4/5GY - Dark greenish grey. Common orange mottles
Medium Clay
Poor structure. Clear change to:

B22
41cm +
Gley 1 4/5GY - Dark greenish grey. Common organe mottles.
Medium Heavy Clay
Poor structdure

H5 Prairie Soil

A
0 - 9cm
2.5Y 3/1 - Very dark grey
Clay Loam (sandy)
Moderate structure
Clear change to:

B1
9 - 27cm
2.5Y 4/1 - Dark grey
Light Clay
Moderate structure
Clear change to:

B21
27 - 49cm
2.5Y 4/3 - Olive brown
Medium Clay
Poor structure
Clear change to:

B22
49cm +
Gley 1 4/5GY - Dark greenish grey
Medium Heavy Clay
Poor structure

H6 Krasnozem

A
0 - 3cm
7.5YR 3/3 - Dark brown
Light Clay
Poor structure
Clear change to:

B2
3 - 41cm
7.5YR 4/4 - Brown
Medium Clay
Poor structure
Gradual change to:

B22
41cm +
7.5YR 5/6 - Strong brown
Medium Heavy Clay
Poor structure

H8 Krasnozem

A
0- 5cm
7.5YR 3/3 - Dark brown
Light Clay
Poor structure
Clear change to:

B2
5 - 48cm
7.5YR 4/4 - Brown
Medium Clay
Poor structure
Gradual change to:

B22
48cm +
7.5YR 5/6 - Strong brown
Medium Heavy Clay
Poor structure

H10 Krasnozem

A
0 - 3cm
7.5YR 3/3 - Dark brown
Clay Loam
Poor structure
Clear change to:

B1
3 - 12cm
7.5YR 4/4 - Brown
Light Clay
Poor structure
Gradual change to:

B2
12 - 40cm
7.5YR 5/6 - Strong brown
Medium Clay
Poor structure
Gradual change to:

B22
40cm +
7.5YR 5/6 - Strong brown
Medium Heavy Clay
Poor structure

H12 Krasnozem

A
0 - 6cm
7.5YR 3/3 - Dark brown
Clay Loam
Poor structure
Clear change to:

B1
6 - 18cm
7.5YR 4/4 - Brown
Light Clay
Poor structure
Gradual change to:

B2
18 - 45cm
7.5YR 5/6 - Strong brown
Medium Clay
Poor structure
Gradual change to:

B22
45cm +
7.5YR 5/6 - Strong brown
Medium Heavy Clay
Poor structure